University Calendar For 1981-82

Winter Quarter, 1981

January 5-6 (Monday-Tuesday)  
January 7 (Wednesday)  
February 10 (Tuesday)  
March 17 (Tuesday)  
March 20 (Friday)

Spring Quarter, 1981

March 25-26 (Wednesday-Thursday)  
March 27 (Friday)  
April 17-18 (Friday-Saturday)  
April 30 (Thursday)  
June 8 (Saturday)  
June 10 (Wednesday)

Summer Quarter, 1981

June 12-15 (Friday-Monday)  
June 16 (Tuesday)  
July 3 (Friday)  
July 6 (Monday)  
July 20 (Monday)  
July 21 (Tuesday)  
August 7 (Friday)  
August 21 (Friday)  
August 24 (Monday)

Fall Quarter, 1981

September 21-23 (Monday-Wednesday)  
September 24 (Thursday)  
October 28 (Wednesday)  
October 30 (Friday)  
November 7 (Saturday)  
November 26-28 (Thursday-Saturday)  
December 6 (Tuesday)  
December 11 (Friday)

Winter Quarter, 1982

January 4-5 (Monday-Tuesday)  
January 6 (Wednesday)  
February 9 (Tuesday)  
March 16 (Tuesday)  
March 19 (Friday)

NOTE: Deadlines for degree requirements described on pp. 22-24.
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34 College of Medicine-Knoxville Unit
35 College of Nursing
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37 School of Library and Information Science
38 School of Planning
39 School of Social Work
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Where To Write
The University of Tennessee, Knoxville
Knoxville, TN 37916
Office Hours: 8:00 a.m.-5:00 p.m. Monday-Friday

The Graduate School
Diana C. Lopez, Director of Graduate Admissions
Clea J. Greenawalt, Assistant Director of Graduate Admissions
218 Student Services Building

Financial Assistance
Assistantships—Head of department or program in which you plan to major Fellowships and Scholarships—Assistant Director, The Graduate School Loans, Work-Study—Director of Financial Aids, 115 Student Services Building

Housing
Married students—Office of Rental Properties, 107 S. Stadium Hall
Single students—Office of Residence Halls, 405 Student Services Building

Handicap Student Services
Counseling Services, 900 Volunteer Boulevard

International Student Affairs
Dixon Johnson, 201 Alumni Hall
Registrar
Bob L. Cochran, 215 Student Services Building

Timetable of Classes
Supervisor of Registration, Registrar’s Office
Veterans Benefits
209 Student Services Building

Regulations Subject To Change

Any and all course offerings, academic requirements and other information contained in this publication are subject to change and/or revocation without notice. Anyone interested in the precise course offering, academic requirement at a given time, or other special information should make inquiry in advance.

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.

UTK does not discriminate on the basis of sex or handicap in the education programs and activities which it operates, pursuant to the requirements of Title IX of the Education Amendments of 1972, Pub. L. 92-318, and Section 504 of the Rehabilitation Act of 1973, Pub. L. 93-112, respectively. This policy extends to both employment by and admission to the University. Inquiries concerning Title IX and Section 504 should be directed to the Office of the Vice Chancellor for Planning and Administration, 525 Andy Holt Tower, 974-4391. Charges of violation of the above policy should also be directed to the Office of the Vice Chancellor for Planning and Administration.
### Main Campus

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<td>Art Center</td>
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<td>ACH</td>
<td>Arts &amp; Crafts House (Laurel House)</td>
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<td>Holt Ave. Apartments</td>
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<td>AH</td>
<td>Alumni Hall (Alumni Placement Offices)</td>
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<td>Andy Holt Tower</td>
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<td>Administration Parking Garage</td>
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<td>AX1</td>
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<td>Estabrook Hall (Architecture)</td>
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<td>H</td>
<td>Hesler Biology Bldg.</td>
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<td>Hearing &amp; Speech Center</td>
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<td>HPR</td>
<td>Health, Physical Education &amp; Recreation Bldg.</td>
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<td>HSS</td>
<td>Humanities and Social Sciences Bldg.</td>
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### Agricultural Campus

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<th>Building</th>
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<td>AE</td>
<td>Agricultural Engineering Bldgs.</td>
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<tr>
<td>AEL</td>
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<td>CC</td>
<td>Corn-Cotton Bldg.</td>
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<tr>
<td>CVM</td>
<td>College of Veterinary Medicine</td>
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<tr>
<td>DP</td>
<td>Dairy Products Bldg.</td>
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<tr>
<td>FL</td>
<td>Fiber Research Laboratory</td>
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<td>FOR</td>
<td>Tennessee Division of Forestry</td>
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<td>FT</td>
<td>J.H. McLeod Food Technology Bldg.</td>
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<td>GH</td>
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<td>MC</td>
<td>McDord Hall</td>
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<td>MH</td>
<td>Morgan Hall</td>
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<tr>
<td>PB</td>
<td>Poultry Barn</td>
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<td>PO</td>
<td>Poultry Diagnostic Laboratory</td>
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<td>PPL</td>
<td>Ag. Campus Power Plant</td>
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<td>PS</td>
<td>Ellington Hall-Plant Sciences</td>
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<td>PSX</td>
<td>Plant Sciences Annex</td>
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<td>SL</td>
<td>Spinning Lab</td>
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*The University of Tennessee, Knoxville*

*Main Campus*

*Agricultural Campus*
## The Graduate School Administration

L. Evans Roth, A.B. M.S. Ph.D., Vice Chancellor for Graduate Studies and Research  
Clarence W. Minkel, B.A., M.A., Ph.D., Dean for Graduate Studies  
Gerald E. Hills, B.S., MBA, DBA, Assistant Dean for Graduate Studies, Director, Oak Ridge Resident Graduate Program  
Mary P. Richards, B.A., M.A., Ph.D., Assistant Dean for Graduate Studies  
Carl O. Thomas, A.B., M.A., Ph.D., Dean for Research  
L. B. Cebik, B.A., M.A., Ph.D., Assistant Dean for Research  
Diana C. Lopez, B.S., M.S., Director, Graduate Admissions  
Ben Granger, B.A., M.S.W., M.P.A., Ph.D., Dean, School of Social Work  
Charles H. Weaver, B.S., M.S., Ph.D., Dean, UT Space Institute  
A. A. Mason, B.S., Ph.D., Associate Dean, UT Space Institute  
Marvin Goodman, B.S., M.S., Director, Kingsport Graduate Program  
Alexander Hollaender, A.B., A.M., Ph.D., Director, Archival Center for Radiation Biology  
David A. Johnson, B.A., M.C.P., Ph.D., Director, Graduate School of Planning  
W. Edgar Barnett, B.S., M.S., Ph.D., Director, UT-Oak Ridge Graduate School of Biomedical Sciences  
William F. Brandes, M.S., P.E., Director, Water Resources Research Center  
Eric Schomblom, Ph.D., Director, Chattanooga Graduate Engineering Program  
Jerry D. Westbrook, B.E., M.S., Ph.D., Director, Nashville Graduate Engineering Program  
Ann E. Prentice, A.B., M.L.S., D.L.S., Director, Graduate School of Library and Information Science  
Kenneth W. Heathington, B.S., M.S., Ph.D., Director, Transportation Center  
Robert A. Bohn, A.B., A.M., Ph.D., Acting Director, Energy, Environment, and Resources Center

## The Graduate Council

### Membership January 1, 1980

#### Ex Officio Members

- L. Evans Roth, Vice Chancellor  
- Clarence W. Minkel, Dean  
- Lloyd Seatz, Chairperson for Research Council

#### Appointed Members

- Dr. Michael E. Gordon, Dec. 31, 1980  
- Dr. Kenneth E. Harwell, Dec. 31, 1980  
- Dr. Hyram Kitchen, Dec. 31, 1980  
- Dr. Ann E. Prentice, Dec. 31, 1980  
- Dr. Ivan A. Sellin, Dec. 31, 1981

#### College or Unit  
**Elected Members**  
**Date of Expiration**  
**Proxy**

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<th>College or Unit</th>
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<tr>
<td>Col. of Agriculture</td>
<td>Dr. Gary Lessman</td>
<td>Dec. 31, 1980</td>
<td>Dr. Luther Wilhelm</td>
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<tr>
<td>Col. of Bus. Admin.</td>
<td>Dr. Jan R. Williams</td>
<td>Dec. 31, 1981</td>
<td>Dr. Gary N. Dicer</td>
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<td>Col. of Communications</td>
<td>Dr. Charles B. Garrison</td>
<td>Dec. 31, 1982</td>
<td>Dr. Norman E. Dittrich</td>
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<td>Col. of Communication</td>
<td>Dr. Alan D. Fletcher</td>
<td>Dec. 31, 1982</td>
<td>Dr. Kent M. Sidel</td>
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<td>Col. of Education</td>
<td>Dr. Donald J. Dessart</td>
<td>Dec. 31, 1980</td>
<td>Dr. Paul C. Burns</td>
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<td>Dr. Madge M. Phillips</td>
<td>Dec. 31, 1980</td>
<td>Dr. Don B. Franks</td>
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<td>Dr. John Peters</td>
<td>Dec. 31, 1981</td>
<td>Dr. Charles Ball</td>
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<td>Dr. John Ray</td>
<td>Dec. 31, 1982</td>
<td>Dr. Charles Hargis</td>
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<td>Dr. Schuyler Huck</td>
<td>Dec. 31, 1980</td>
<td>Dr. Estil Alexander</td>
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<td>Dr. Pietro F. Pasqua</td>
<td>Dec. 31, 1981</td>
<td>Dr. David W. Goodpasture</td>
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<td>Col. of Engineering</td>
<td>Dr. Bruce R. Dewey</td>
<td>Dec. 31, 1980</td>
<td>Dr. Peyton Z. Peebles</td>
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<td>Col. of Home Economics</td>
<td>Dr. David B. Eastwood</td>
<td>Dec. 31, 1980</td>
<td>Dr. Betty L. Beach</td>
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<td>Col. of Liberal Arts</td>
<td>Dr. Dale Cleaver</td>
<td>Dec. 31, 1980</td>
<td>Dr. Raymond W. Beck</td>
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<td>Dr. Patricia L. Walne</td>
<td>Dec. 31, 1981</td>
<td>Dr. Carl W. Cobb</td>
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<td>Dr. John H. Fisher</td>
<td>Dec. 31, 1982</td>
<td>Dr. Anne H. Hopkins</td>
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<td>Dr. T. McN. Simpson</td>
<td>Dec. 31, 1982</td>
<td>Dr. Thomas G. Hallam</td>
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<td>Graduate Student Council</td>
<td>Mr. Michael L. Thompson</td>
<td>Apr. 30, 1980</td>
<td>Dr. Mildred Fenske</td>
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<td>Mr. Thomas L. Walden</td>
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<td>Ms. Ann Wachter</td>
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<td>Col of Nursing</td>
<td>Dr. Sylvia E. Hart</td>
<td>Dec. 31, 1980</td>
<td>Dr. Robert Bonovich</td>
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<td>School of Social Work</td>
<td>Dr. Gideon Fryer</td>
<td>Dec. 31, 1980</td>
<td>Dr. Maurice A. Wright</td>
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<td>UT Space Institute</td>
<td>Dr. Robert L. Young</td>
<td>Dec. 31, 1982</td>
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The University of Tennessee

**Board of Trustees**

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<th>Ex Officio Members</th>
<th>From Congressional Districts</th>
<th>TERM EXPIRES</th>
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<tr>
<td>Buford Goldstein, Elizabethton, First</td>
<td>District TERM EXPIRES</td>
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<tr>
<td>A. B. Long, Jr., Knoxville, Second</td>
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<tr>
<td>Scott Probasco, Jr., Lookout Mountain, Third</td>
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<td>William M. Johnson, Sparta, Fourth</td>
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<td>Marcia A. Echols, Nashville, Fifth</td>
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<td>Ben S. Kimbrough, Clarksville, Sixth</td>
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<td>R. Lee Winchester, Memphis, Ninth</td>
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<th>Warren Counties</th>
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<td>Charlotte Parish</td>
<td>Wayne Fisher, TERM EXPIRES</td>
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<tr>
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<td>James A. Haslam, III</td>
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<tr>
<td>From Shelby County</td>
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<td>Marcus J. Stewart</td>
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**University Administration**

Edward J. Boling, B.S., M.S., Ed.D., President of the University
Joseph E. Johnson, A.B., A.M., Ed.D., Executive Vice President and Vice President for Development
John W. Prados, B.S., M.S., Ph.D., Vice President for Academic Affairs
W. W. Armstead, D.V.M., M.S., Ph.D., Vice President for Agriculture
Emerson H. Fly, B.S., C.P.A., Vice President for Business and Finance
Charles H. Weaver, B.S., M.S., Ph.D., Vice President for Continuing Education
James C. Hunt, A.B., M.S., M.D., Vice President for Health Affairs
Robert S. Hutchison, B.S., M.B.A., Vice President for Public Service
Beauchamp E. Brogan, B.S., M.B.A., Assistant Secretary
Andrew J. Kozar, B.S., A.M., Ph.D., Executive Assistant to the President
Brodie Baynes, B.S., C.P.A., Treasurer

**UT, Knoxville Administration**

Jack E. Reese, A.B., A.M., Ph.D., Chancellor
Luke Ebersole, A.B., A.M., Ph.D., Vice Chancellor for Planning and Administration
Walter R. Herndon, B.S., M.S., Ph.D., Vice Chancellor for Academic Affairs
L. Evans Roth, A.B., M.S., Ph.D., Vice Chancellor for Graduate Studies and Research
Homer S. Fisher, B.S., M.B.A., Vice Chancellor for Business and Finance
Howard F. Aldmon, B.S., A.M., Ed.D., Vice Chancellor for Student Affairs
Clarence W. Minkel, B.A., M.A., Ph.D., Dean for Graduate Studies
Carl O. Thomas, A.B., M.A., Ph.D., Dean for Research
O. Glen Hall, B.S., M.S., Ph.D., Dean of the College of Agriculture
Roy F. Knight, B.A., M.Arch., Dipl. D'Etudes, Dean of the School of Architecture
C. Warren Neel, B.S., M.B.A., B.D.A., Dean of the College of Business Administration
Donald G. Hileman, B.S., M.S., Ph.D., Dean of the College of Communications
William H. Coffield, B.S., M.A., Ph.D., Dean of the College of Education
W. Ken Stair, B.S., M.S., Acting Dean of the College of Engineering
Nancy H. Belick, B.S., M.S., Ph.D., Dean of the College of Home Economics
James Kirby, B.A., LL.M., J.D., Acting Dean of the College of Law
Robert G. Landen, A.B., A.M., Ph.D., Dean of the College of Liberal Arts
Sylvia E. Hart, B.S.N., M.S.N., Ph.D., Dean of the College of Nursing
Hyram Kitchen, M.S., D.V.M., Ph.D., Dean of the College of Veterinary Medicine
Joseph P. Goddard, B.S., M.S., Ed.D., Dean of the Division of Continuing Education
John J. McDow, B.S., M.S., Ph.D., Dean of Admissions (Undergraduate) and Records
### Majors and Degrees Available

<table>
<thead>
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<th>MAJOR</th>
<th>DEGREE</th>
<th>ADMISSION TEST REQUIRED</th>
<th>ADDITIONAL REQUIREMENTS</th>
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<td><em>Food Systems Administration</em></td>
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*Note:* Some programs may require additional forms or applications beyond those listed. Always check with the respective department for specific requirements.
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*Non-degree and provisional students must obtain permission from the department/program head in order to register for courses in these fields.

*American applicants only.
*International applicants only.
*EdS applicants only.
*EdD applicants only.
*PhD applicants only.
*Departmental doctoral option offered under the major of home economics.
*Interdisciplinary option offered in each department.
*Offered at UT Space Institute.
*Forms obtained from department.
The Graduate School

The mission of The University of Tennessee, Knoxville (UTK) is to offer instruction on all levels of higher education, engage in and train for research, and provide instruction on all levels of higher education, Tennessee, Knoxville (UTK) is to offer. The Graduate School

Advanced Graduate Work and Research

The University of Tennessee has some obligations not shared in the same degree by other public colleges and universities of the state, although these specialized functions are common to most major state universities and land-grant institutions. For instance, the University must develop and maintain advanced instruction and research in the basic arts and sciences and in professional and occupational areas dependent upon the fundamental fields of learning, especially (but not exclusively) those of substantial importance to the state. It is the business of such a state university to advance the frontiers of knowledge in all areas of human concern, to discover facts previously unknown, to present new theories, and to test hypotheses and theories not previously established. The augmentation of the intellectual heritage of the human race, particularly in basic research, is a major function of this and all other universities. So far as publicly-supported higher education is concerned, UTK is the center of advanced graduate training and research in the state, although these specialized functions exist and are described within the appropriate department or college descriptions.

Energy, Environment, and Resources Center

R. A. Bohm, Acting Director, Ph.D. Washington (Missouri)

The Energy, Environment, and Resources Center was created to encourage interdisciplinary studies at UT, directed at solutions to problems related to energy and the environment. The Center provides assistance to faculty interested in developing research and public service projects, manages research and development projects that involve several disciplines, and assists Tennessee government and industry in specific problems related to energy and environment. It also participates in the Statewide Consumer Education Program, especially in developing materials for the program. Current research includes environmental and human costs of coal production, utilization of energy, solar energy, energy conservation in buildings and industry, regional solid waste management, resource recovery, and energy education and information.

Transportation Center

Director:
K. W. Heathington, Ph.D., Northwestern, P.E.

Associate Director:
M.S. Bronzini, Ph.D. Pennsylvania State.

Assistant Directors:
D. H. Jones, M.S., Tennessee;
P. R. Tutt, M.S. Texas (Austin).

The Transportation Center is a nationally recognized leader in transportation research. The Center utilizes the combined talents of University faculty and students in a research environment that emphasizes an interdisciplinary approach to problem-solving in the transportation of both goods and people. The Center involves qualified undergraduate and graduate students in a variety of research projects. This support not only provides needed financial assistance to students but also creates the environment for addressing transportation problems in a professional manner.

An important element of the Transportation Center’s success is its perspective that continuing education shares an equal partnership with research. Through workshops, seminars, and short courses the Center’s staff is involved in such diverse courses as benefit/cost analysis in state rail planning, highway rail grade crossing safety, noise assessment, remote sensing, urban public transportation management, ridesharing, transportation brokerage, urban transportation planning, child passenger safety, traffic engineering, transportation safety, urban transportation modeling, and other areas of transportation interest.

The University of Tennessee

Space Institute

C. H. Weaver, Dean, Ph.D. Wisconsin
A. A. Mason, Associate Dean, Ph.D. Tennessee

The Space Institute was originated to interface University faculty research with the Arnold Engineering Development Center of the United States Air Force. Located at Tullahoma, Tennessee, the Space Institute offers graduate degree programs with majors in Aerospace Engineering, Aviation Systems, Computer Science, Electrical Engineering, Engineering Administration, Engineering Science, Mathematics, Mechanical Engineering, Metallurgical Engineering, and Physics. In addition to the fundamental
academic work characteristic of each discipline, research opportunities and supporting interdisciplinary course work are available to permit specialization in many aspects of atmospheric and space flight such as subsonic to hypersonic aerodynamics, aerospace vehicle design, control and guidance, modern materials and structures, propulsion systems, aircraft noise and sonic boom, flight simulation, avionics, plasma dynamics, flow diagnostics including spectroscopic and electrooptic means, and systems management. Work is also in progress in remote sensing and magnetohydrodynamic power generation of coal utilization. Course and research work in related areas of environmental pollution control, earth resources, energy conversion, materials and systems and simulation are also available. The research personnel and facilities of the Institute and those available at the Arnold Center through appropriate contractual arrangements provide an outstanding opportunity for meaningful research in these and other areas. Students who enroll at UTSMI must be admitted to the Graduate School, University of Tennessee, Knoxville. Full admittance to the Institute may be obtained from the Dean, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

Water Resources Research Center

W. F. Brandes, Director, M.S. Illinois, P.E.

The Water Resources Research Center is a federally-designated institute for the conduct of 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 water research programs addressed to areas of concern to the state; (2) to provide 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 in all water-related water resources research programs addressed to areas of concern to the state; (4) to provide information concerning the Institute may be obtained from Marvin K. Goodman, Director, Kingsport University Center, The University of Tennessee, University Boulevard, Kingsport, Tennessee 37660.

Oak Ridge Resident Graduate Program: UTK offers graduate study programs at Oak Ridge, with work leading to Master's degrees in Business Administration with a concentration in management, Industrial Education, and Statistics; M.S. and doctoral degrees are available in engineering, mathematics, and physical and biological sciences. Courses are given in the late afternoons, evenings, and Saturdays, with research facilities provided by and used in cooperation with the Oak Ridge Associated Universities and the Union Carbide Corporation. Nuclear Division. This program is supported under a subcontract with Oak Ridge Associated Universities with principal support coming from Union Carbide Nuclear Division. UT is one of the forty-three colleges and universities which sponsor ORAU, a nonprofit education and research management corporation. Information and applications to the Graduate School may be obtained by writing the Director, UT-Oak Ridge Graduate School, Post Office Box 117, Oak Ridge, Tennessee 37830.

Chattanooga Graduate Engineering Program: UTK offers a program of graduate work leading to the Master's degree in the areas of engineering. Courses are given at The University of Tennessee at Chattanooga in the late afternoons and evenings. Students who enroll in this program must be admitted to The Graduate School of UTK. Information concerning this program may be obtained from the Director, Chattanooga Graduate Engineering Program, The University of Tennessee at Chattanooga, Chattanooga, Tennessee 37401.

Nashville Graduate Engineering Program: Opportunities for graduate study leading to the degree of Master of Science in Civil Engineering, Engineering Administration, and Industrial Engineering are offered by UTK.

Students who enroll in these programs must be admitted to The Graduate School of UTK. Information and appropriate forms may be obtained from the Director, Nashville Graduate Engineering Program, 3rd Floor, School of Engineering, 1000 Fifth Avenue South, Nashville, Tennessee 37203.

The University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences: The University provides programs leading to the M.S. and Ph.D. degrees in various areas of biomedical sciences. Graduate students have the opportunity to study and to do research in conjunction with the Biology Division of the Oak Ridge National Laboratory.

For complete information concerning the program see page 148.

School of Social Work: UTK offers a fully accredited two-year program leading to the degree of Master of Science in Social Work through the School of Social Work, with programs in Nashville, Knoxville, Memphis, and Chattanooga.

For complete information concerning the program see page 155.

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. (A minimum grade point average of 2.5 out of a possible 4.0, or 3.0 during the senior year, is considered a satisfactory grade point average. A minimum B average is required for international students. Meeting the minimum admission requirement does not insure acceptance into a degree program since other factors may affect admission in some areas.)

An application must be accompanied by the $10 fee (payable to The University of Tennessee).

If permission to enter UT Graduate School is given prior to graduation, this admission is automatically withdrawn if the Bachelor's degree is not awarded before the date of registration.

The file is destroyed after one year if an applicant does not enter Graduate School the quarter in which admission is requested, unless permission is requested and granted to enter in a future quarter. To respond after a file is destroyed, applicants must submit a new application and fee. Admissions to The Graduate School does not imply eligibility to candidacy for the degree desired; admission to candidacy must be obtained after entry but at least one full quarter prior to receipt of the Master's degree and three quarters prior to receipt of the doctorate.

Types of Admissions

Admission to a Graduate Degree Program: Master's degree—A candidate for a degree must fill the minimum requirements for admission to The Graduate School, applicants at the doctoral level must have demonstrated a potential for superior academic performance. To be considered are such criteria as performance in prior undergraduate and/or Master's level studies, achievement on aptitude tests for graduate studies, letters of recommendation, aptitude for and interest in the field, and the applicant's capabilities, and similar evidences of scholarly achievement. (Refer to description of doctoral programs for specific requirements for admission.)

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

1. do not desire to pursue a degree program;
2. have received an advanced degree;
3. need additional time to fulfill application requirements for a degree program.

In this status, there is no limit to the number of graduate credits which may be accumulated. However, only 18 quarter hours (including hours taken in the provisional status) may be used toward a Master's degree and only if approved by the student's committee.

The graduate application, $10 application fee, and two (2) official transcripts from each institution previously attended are required for consideration as a non-degree student. The minimum requirements are a Bachelor's degree with a 2.5 grade point average on a 4.0
The Graduate School

scale (or a 3.0 the senior year) from a college or university accredited by the appropriate regional accrediting agency.

A major area does not have to be declared, but some departments will not permit non-degree students to register for graduate courses. (See institutions on restricted programs.) Applicants should contact the Graduate Office or the department concerning registration for specific courses. Permission for registration in courses not already obtained from the department or from The Graduate School.

Admission to the non-degree status does not assure admission to a degree program.

The student who hopes to enter a degree program will be directed to the appropriate department. Students must maintain a 3.0 grade point average to continue enrollment in this status.

No international student on a non-immigrant visa may enroll in the non-degree status.

Provisional Admission: Applicants may be admitted as provisional students for one quarter (or, one course in each of two quarters) with the following:

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

The graduate application, $10 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 specific major area does not have to be declared, but some departments do not permit provisional students to register for graduate courses. (See pages 8-9 for information on restricted programs.) Applicants should contact the Graduate Office or the department concerning registration for specific courses. Permission to register in courses allowed may be obtained from the department or from The Graduate School.

Admission of Faculty Members: No faculty member of UTK or the Institute of Agriculture at the rank of Assistant Professor or above, nor an employee on the administrative staff at UTK, the UT Central Administration, or the Institute of Agriculture will normally be admitted to candidacy for a doctoral degree at UTK. Exceptions may be granted on an individual basis. Further information is provided in the guidelines published in the Faculty Handbook. Possible conflict of interest will be a major factor considered in the review of the request.

Admission Procedures

Procedures for admission are as follows: (1) complete the 'Application for Admission' form (first page of this form); (2) submit scores from the Graduate Record Examination or Management Admission Test; and (5) request that any reference or rating forms required as part of the application file be sent to the Graduate Office.

Anyone with a Bachelor's degree wishing to take courses for graduate credit, whether or not he/she desires to become a candidate for a degree, must make formal application for admission to The Graduate School or submit the Transient Form. No action is taken until a file is complete.
Examinations

Applicants for admission to many of the programs are required to submit scores from the Graduate Record Examination or the Graduate Management Admission Test. (Refer to pages 8-9 for majors requiring these examinations.) All students whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL) unless graduated from an accredited institution in the United States. Each applicant is individually responsible for arrangements for the examination and for transmission of these scores directly from Educational Testing Service to The Graduate School. Application forms may be obtained from Educational Testing Service, Princeton, New Jersey 08540, or from the UTK Graduate Office.

The completed application form and examination fee must reach the proper office at the Educational Testing Service approximately one month in advance of the test date (tests are given four to six times each year). Approximately six weeks should be allowed for the examination results to reach the University.

UTK is an approved testing center for all examinations.

Readmission

A student who has not attended The Graduate School at UTK for more than five quarters must apply for readmission. A readmission application should be submitted at least two weeks prior to desired reentry date. A student who has attended another accredited institution since enrollment at the University must submit two official transcripts showing all course work and any degrees earned at that institution. The student will be notified when the application is received and when action has been taken by the department and The Graduate School. If readmission is denied, the student may receive graduate credit for the work taken during the initial quarter; however, future registration will not be permitted until the student is fully readmitted to The Graduate School. Students are urged to reapply well in advance of planned registration.

Registration Procedures

Dates of registration are listed in the University Calendar (front of catalog). Students should report to the Graduate Office to obtain registration materials (scan form and timetable of classes giving details concerning registration procedures) and then should see a department advisor to plan a program and obtain a signature. If admitted as a non-degree or provisional student, permission for registration may be obtained from the department or from The Graduate School.

Registration requires two days. The University holds advanced registration at approximately the middle of a given quarter for the subsequent quarter. Information may be obtained from The Graduate School. If a student participates in advanced registration, the student should obtain the class schedule and pay fees on the first day of registration. All graduate students, including graduate and teaching assistants, research assistants, and scholarship or fellowship holders, who do not pay their tuition and fees before the established deadline will be charged the late registration fee. Retroactive registration is not permitted.

Fees, Residency Classification, and Financial Aid

University Fees

University fees are determined by the Board of Trustees and are subject to change without notice. The general fees in effect for graduate students are as follows:

**APPLICATION FEE: $10**
Each graduate application for admission must be accompanied by a fee of $10 before it will be processed. (Fee not required if: (1) former UTK graduate student; or (2) graduate application fee previously paid at another UT campus.)
If a student applies but does not enter graduate school within twelve months after date of requested admission it will be necessary for him or her to resubmit the $10 application fee and application. This fee is not refundable.

**MAINTENANCE FEE (all students):**

- **PER QUARTER $210**

**TUITION (additional for out-of-state students):**

- **PER QUARTER $408**

Note: In lieu of the above charge for tuition and/or maintenance fee, part-time students may elect to pay fees computed by the quarter hour credit (or audit) as follows:
- In-State $30 per quarter hour or fraction thereof; minimum charge $90.
- Out-of-State $70 per quarter hour or fraction thereof; minimum charge $210.

**UNIVERSITY PROGRAMS AND SERVICES FEE:**

- **PER QUARTER $25**

All graduate students taking more than 8 quarter hours per quarter will be assessed a University programs and services fee of $25 per quarter. Part-time students taking 8 quarter hours or fewer will be assessed at the rate of $1 per quarter hour or fraction thereof; minimum charge $3.

The fee for the summer quarter will be $18. Part-time students taking 8 quarter hours or fewer will be assessed at the rate of $1 per quarter hour or fraction thereof; minimum charge $3.

Graduate and teaching assistants, as well as fellowship students who may have waiver of fees (tuition and/or maintenance), must pay the appropriate University Programs and Services Fee.

Students enrolled exclusively in Evening School or at off-campus centers will be exempt from the programs and services fee.

Knoxville campus students taking a course load of 6-8 hours may elect to pay the full programs and services fee. This fee is not refundable.

**LATE REGISTRATION FEE:**

All students are required to have a validated fee receipt to complete the registration procedure. This includes students whose fees are billed, prepaid, or waived. Students who do not complete registration on the regular dates scheduled for this purpose will be charged a late registration fee of $2 up to $55. See the University General Catalog for application of this fee. Doctoral students who must retroactively register for dissertation credit will be charged a late fee of $33 for each quarter of retroactive registration. The payment of fees with a check which is not honored by the bank will incur a service charge of $10 to $45, depending on the date the check is redeemed.

**MUSIC FEE:**

- **One-half hour-lesson per week:**
  - $20 per quarter
- **One-hour lesson per week:**
  - $40 per quarter
- Payable at registration by students receiving individual instruction in music.

**GRADUATION FEE:**

- Master's degree candidates: $16
- Doctoral degree candidates: $46

There is no additional charge for diploma, bonding, or insignifying. The graduation fee is non-refundable and is valid for three quarters after the quarter in which it is paid.

**DEFERRED PAYMENT SERVICE FEE:**

This fee is applicable when the payment of any part of a student's account is deferred, including accounts which must be billed to outside agencies, organizations, and institutions. 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 was incurred.

It is the student's responsibility to take the initiative to pay all University obligations promptly.

**AUDITORS FEE:**

- Fees for courses being audited are the same as for courses taken for credit. For fee purposes, non-credit seminars are considered as one-hour courses.

**REFUND OF FEES FOR WITHDRAWAL:**

Withdrawal from school for the quarter after receiving a schedule must be by official notification to the Withdrawal Office, Student Counseling Services Center, 900 Volunteer Boulevard, 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 school or class.

The effective date of withdrawal is the date the Withdrawal Office is notified by completion of the official withdrawal request form. The appropriate percentage of fees will be charged unless this action is completed by the close of the last day designated for regular registration and before the first official day of classes for the quarter. 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 must not be used...
within 7 calendar days beginning with the first course(s) dropped. No refund is applicable to and dropped courses for the summer quarter are assessed at the regular quarter-hour rate. The above refund policy does not apply to the off-campus Graduate Centers. At the Centers, no refund is made after the first 14 days. Refunds, in accordance with the withdrawal policy, will be made after the drop deadline. Part-time students may pay fees computed at the appropriate quarter-hour rate as indicated above. No charge is made for courses dropped during the first 5 calendar days following regular registration. A 40 percent charge is made for courses dropped between 6 and 21 calendar days following registration, and a 100 percent charge is made for courses dropped after 21 days. Students who drop courses are eligible for a refund only if the sum of the charges computed at the quarter-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 becomes effective on the date that the drop/add slip is processed and recorded by the Admissions and Records Office. Any refund due for dropped courses will be made after the final audit at the end of the quarter. When a student withdraws, rental charges and adjustments is given in the Timetable (schedule of classes) for each quarter. The University reserves the right to withhold diplomas, grades, transcripts, and registration privileges until student debts and obligations (other than Student Loan Fund notes) owed to the University are satisfied.

Residency Classification for the Purpose of Paying University Fees

Shortly after a student applies to The Graduate School, notification of the receipt of the application, application fee, and residency classification for fee purposes is sent.

If a student has any questions concerning the residency status, he/she should contact the Residency Clerk at the Graduate School. If a student is classified as out-of-state, but resides in Tennessee, is a full-time employee in the state of Tennessee, resides in Kentucky, and elects to attend the University on a part-time basis (6 hours or less), he/she must apply for a waiver of the out-of-state portion of the fees prior to the date of registration each quarter. Forms are available from the Residency Clerk at the Graduate Office. Rules for Determination of Status.

1. Every person having his/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/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/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/her parent, having theretofore been domiciled in this state, move out of 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/her enrollment at a public higher educational institution shall be continuous.
2. An unemancipated person whose parent is not domiciled in this state but is a member of the armed forces and stationed in this state, or stationed in Tennessee, Texas, Virginia and West Virginia. The Academic Common Market is an interstate agreement among Southern states for sharing uncommon programs. Participating states are able to make arrangements for their residents who qualify for admission to enroll in specific programs at UTK on an in-state tuition basis, where these programs are not available in the state of residence. Cooperating states in the Academic Common Market are Alabama, Arkansas, Florida, Georgia, Louisiana, Maryland, Mississippi, South Carolina, Tennessee, Texas, Virginia and West Virginia. Sixteen doctoral and fifteen Master's programs at UTK are approved by the Academic Common Market for residents of these various states to enroll at in-state tuition rates. If you are a resident of one of the member states and would like further information, contact the Residency Clerk at the Graduate Office or the Southern Regional Educational Board, 130 Sixth Street, N.W., Atlanta, GA 30313.
Student Financial Aid

The University of Tennessee offers a comprehensive program of financial aid for full-time study. All applications for financial aid must be considered on the basis of ability and without regard to the for full-time studies at UTK are awarded on the use of the CSS Financial Form the College Scholarship Service (CSS). Through utilizing the need analysis system of the determining the need for financial aid, UTK Financial Aid Office determines the amount of financial aid program an eligible student may receive one or more types of assistance to help pay college expenses. For more detailed information on the determination of need, please refer to the brochure entitled, "Financial Assistance for Students." 

Fellowships and Assistantships

The Hilton A. Smith Graduate Fellowships for full-time studies at UT are awarded on the basis of ability and without regard to the file of studies of the candidate. Monthly stipends are provided, and tuition and maintenance fee are paid by the University. Successful applicants need better than an 18.0 grade point average and high from the Graduate Record Examination or the Graduate Management Admis Test. Application packets are available in the Graduate Office from November 1 through February 1. Completed applications, including all required supporting material, must be submitted to the Assistant Director of Graduate Admissions by February 15. Awards will be announced March 15. Graduate assistantships and additional fellowships are offered through many departments of the University. The stipends usually provide for payment of tuition and maintenance fee by the University. Information concerning these types of assistance may be secured by writing to the head of the department in which the student expects to study.

Student Loans

National Direct Student Loans. Longterm loans are available primarily through the National Direct Student Loan Program. Proven need for financial assistantship determines eligibility. Loan repayment and interest payments on National Direct Student Loans are deferred until after graduation or as long as the individual remains in at least half-time attendance at an accredited institution of higher education in the United States. Repayment may also be deferred for a period of 3 years while the borrower is serving in the armed forces, Peace Corps, or Vista. Interest is 3 percent per year on the unpaid balance. The maximum repayment period is 10 years with the current minimum annual repayment of $360 or 10 percent of the accumulated loan whichever is greater. If upon graduation the student becomes a full-time teacher in a public or non-profit school which is designated by the commissioner as having a high enrollment of low-income families or becomes a teacher of the handicapped, 15 percent of the total principal plus interest is cancelled for the first and second years of teaching, 20 percent for the third and fourth years, and 30 percent for the fifth year. If after graduation the student becomes a staff member in a preschool program which is operated and comparable to a full school year, 15 percent of principal plus interest will be cancelled for each year of service. Cancellation for up to 50 percent of the loan will also be given at the rate of 12.1 percent of the total principal plus interest for each year of Armed Forces service in an area of hostility. Graduate level students may be extended annual loans of $2500 to a maximum accumulated (undergraduate and graduate) loan total of $10,000. The above regulations and provisions of the National Direct Student Loan Program are subject to change by federal legislative action.

The University of Tennessee Student Loans. Student loans from University sources are available to currently enrolled students with a 2.0 or above cumulative grade point average. A loan of up to $2500 per quarter to an annual maximum of $10,000 can be extended. One surety or cosigner is required for each promissory note and a new promissory note must be completed each year. The interest is 3 percent per annum payable annually on July 1. Repayment begins on the fourth month following the last day the student ceases to be enrolled on a half-time basis. Extensions may be obtained if academic studies are continued at the graduate level. The borrower may, without penalty, pay all or part of the loan at any time before the maturity date.

Student Employment

Two employment programs are administered in the Financial Aid Office to help students find part-time employment. The College Work-Study Program is a federal work program which provides jobs for students who have financial need and who must earn a part of their educational expenses. Eligible students are placed in jobs on- or off-campus where they work approximately 15 hours in each quarter. The Student Employment Service operates as a central referral agency. It coordinates listings of part-time employment from both University and private employers with the requests of students seeking part-time employment. Referrals are made in accordance with the student's skills and qualifications. Part-time jobs average from 15 to 20 hours per week.

Other Assistance

Guaranteed Student Loans to help meet educational expenses may be available through the federal government or a state guaranteeing agency. Local banks or credit unions can determine participation in the program. To receive the loan, one must be admitted to or in regular full-time attendance in good standing at the University. Interest on such loans is paid by the federal government while the student is in school if the student is eligible for interest benefits. During the repayment period which begins no less than nine months after graduation or withdrawal from the University, the student pays up to 7 percent simple interest. Total loans outstanding may not exceed $10,000 for a graduate student.

Financial aid is available at most banks and credit unions. In the state of Tennessee, write the Tennessee Student Assistance Corporation, 707 Main Street, Nashville, Tennessee 37206.

Application Procedures

Because a student's resources can decrease or increase significantly during an academic year, the University requires each student to apply annually for renewal of financial aid:

(1) Complete and submit the Application for Student Financial Aid on or before April 1.

(2) Complete and submit a financial statement to the College Scholarship Service approximately three weeks prior to the priority deadlines.

Financial aid programs, policies, and procedures are subject to annual change. Therefore, those interested in applying for financial aid should refer to the current information brochure, "Financial Assistance for Students," distributed by the Financial Aid Office.

Applications for financial aid can be obtained by writing to The Financial Aid Office, 301 Student Services Building, The University of Tennessee, Knoxville, Tennessee 37916.

Veterans' Benefits

Students applying for veterans' benefits to assist veterans and widows or children of certain deceased or disabled veterans should contact the Veterans Affairs Office, Room 209, Student Services Building, 974-2103. Full-time benefits are paid by the Veterans Administration on registrations of 9 or more hours in each quarter.

General Information

Housing

Single Men and Women: Single graduate students are provided accommodations in both traditional and modern facilities conducive to academic achievement and personal development. Single graduate students have the same priority as other single students and may be assigned to any residence hall. Some units of the residence halls and of the student apartment building have been designed specifically for single graduate students. In Melrose Hall the graduate section offers community living units for groups of six to ten students with personal responsibility emphasized. The Holt Avenue Apartment Residence Hall accommodates, on a graduate floor, students in groups of four. It is the responsibility of each resident to maintain the apartment to University standards. Further information can be obtained from the Office of Residence Halls, 405 Student Services Building.

A limited number of assistant head resident positions are available for single graduate students. The assistant head resident assists the head resident in coordinating and
supervising operation of the hall. This is a live-in position with part-time responsibilities on a nine-and-a-half month appointment. Further information can be obtained from the Office of Student Life, Halls, 405 Student Services Building.

Married Students: The University has provided excellent apartment facilities in several locations for married students. Information and application for these facilities may be secured from the Office of Rental Properties, Stadium Hall.

Vehicle Operation And Parking

The University of Tennessee endeavors to provide adequate facilities for vehicles being operated by students and staff. However, areas available for parking are necessarily limited. To reduce the traffic congestion within the campus area, large student parking areas are located on the perimeter of the campus. Presently, FREE bus service is provided from the Main Campus to the Agricultural Campus. 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 traffic section of the Security Department. A University Traffic and Parking Authority determines the parking policy, traffic regulations, and fees. This information is published each year in the "University Traffic and Parking Regulations" and is available at registration or at the Security Building, 1115 UT Drive.

Services to the Physically Disabled

Services for students with physical disabilities, whether permanent or temporary, are coordinated by the Office of the Dean of Admissions and Records, 305 Student Services Building. In conjunction with the Physical Plant Office, the UT Bookstore, the Student Activities Office, and academic departments, the office seeks to ensure that attendance at UT is as convenient as possible for students with physical disabilities.

These services include assistance during registration (pre-registration, collection of class schedules, payment of fees, drop and add); the securing of special parking permits, elevator keys, tickets for special events; and similar efforts to relieve the special mobility problems of the students. The Physical Plant Office coordinates efforts to eliminate physical barriers to the degree possible, with priority being given to access and facilities for academic buildings.

The Office of the Dean of Admissions and Records assists students in the scheduling of special class sections in order to respond to the particular needs of the physically handicapped.

The Office of Handicapped Student Services, 900 Volunteer Boulevard (Ground Floor—Student Counseling Center Building) offers academic support services and functions in an advocacy capacity for disabled students. The services include interpreters for hearing impaired students and readers for sight and other print impaired persons. Also, the office assists with ordering recorded or Braille textbooks. As the needs of disabled students vary, the office seeks to individualize assistance to accommodate them. Further information is available in the Handicapped Student Services brochure and directory.

The University Library

The University of Tennessee, Knoxville Library owns approximately 1,360,000 volumes, more than 7,000,000 manuscripts, 56,000 microfilm reels and 1,100,000 items of other microtext, plus recordings, tapes, United States and United Nations documents, and more than 17,500 periodicals and other serial titles, which are received annually. The library's membership in the Association of Research Libraries reflects the University's emphasis on research and graduate instruction at the doctoral level and the support of its 1,000,000+ collections of library materials on a permanent basis.

Library holdings in Knoxville are housed in the James D. Hoskins (Main) Library and its four branches: Agriculture-Veterinary Medicine, Science-Engineering, and the John C. Hodges Undergraduate Library.

The Special Collections section in the Main Library is a repository of regional and local materials, Tennesseana, and other specialties, including legislative papers and mementoes of many Tennessee political figures. The Radiation Biology Archives comprises the files of a group of internationally known scientists. Special Collections materials are of particular interest to scholars in the fields of history, political science, social sciences, biological sciences, and the arts.

Interlibrary Services augments the UTK Library research holdings for faculty and graduate students and includes borrowing monographs, obtaining copies of other materials, and providing access to bibliographic services of other institutions, such as computer-based data searches and information retrieval.

The Law Library on the Knoxville campus and the libraries located on the campuses in Chattanooga, Martin, Memphis, and Tullahoma are individually administered; all libraries of The University of Tennessee are accessible to all students and faculty in the system.

Computing Center

The University of Tennessee Computing Center (UTCC) provides computing facilities and services for the University's teaching, research, public service, and administrative activities. UTCC maintains close contact with the UTK academic community by supporting research and instructional activities and students with professional computer staff.

UTCC is principally located in the Stokely Management Center and in Andy Holt Tower. From the Stokely location, UTCC supplies computing services to all campuses in the UT System through jobentry facilities located on each campus. At UTK, UTCC maintains seven job entry stations for batch work and eight sites for interactive computer work. UTCC maintains a graphics center with four digitizing tablets, a graphics hardcopy unit, and nine terminals, four storage and four refresh. Another digitizing tablet, plotter, and storage terminal are available at SMC M-4.

UTCC's computers at Stokely Management Center are two IBM 370/303s and a DECsystem-10, which are used in research, instruction and administrative work. UTCC also has an IBM 360/40 used exclusively for administrative work. Each IBM 370/3031 has four million bytes of memory. The DECsystem-10 is a 1090 configuration with 512k words of memory. UTCC supports remote job entry stations (card reader/line printer) with the IBM 370/3031-DECsystem-10 combination and CalComp plotter. The IBM 370/3031s run under SVS with HASP II. The DECsystem-10 runs under TOPS-10. Time sharing features include ATS/360 and Coursewriter Ill on the 370/3031s, and, APL, FORTRAN, BASIC, COBOL, MACRO, and other special purpose application programs on the DECsystem-10.

UTCC publishes a User's Guide which describes the use of the IBM 370/3031 computer and the DECsystem-10 User's Guide which describes the use of the DECsystem-10. The guides are available at the UT Book and Supply Store. UTCC also publishes a monthly Newsletter which includes announcements of equipment and procedural changes and contains other items of interest to users. Program writeups and special user's guides are also available.

UTCC periodically offers intensive training seminars of several days duration in computer utilization on the IBM 370/3031s and the DECsystem-10. These seminars are primarily for faculty, staff and graduate students who use or plan to use UTCC facilities. UTCC offers non-credit short courses each quarter in topics such as programming languages and special purpose programs. These courses are announced in the Newsletter and in the UT Notes section of the UT Daily Beacon.

Computing services can be requested via the request for services form available from the receptionist, the Information Services Center. All users of UTCC facilities are assigned a consultant to provide user assistance.

Office of International Student Affairs

This office, located at 201 Alumni Hall, assists students from other countries with the many matters that are of particular concern during their stay at UT. International Student Affairs serves as the official University representative in all matters involving immigration authorities, international educational organizations, and foreign governments.

The office maintains the student's official immigration records and handles questions regarding immigration regulations. It coordinates such projects as a community volunteer program for international students and activities for the use of the IBM 370/3031. The international student's understanding of American life, the office staff serves as advisors on personal and related problems. Orientation programs are held at the beginning of each term, and international students are urged to attend them.
The International House is located near the campus, at 1601 West Clinch Avenue. Provided by UT and operated by the staff of the Office of International Student Affairs, the House is a social and recreational center where domestic and international students meet to relax and discuss matters of mutual interest. The small library at "I" House contains books and periodicals from all over the world. The University facility is open during vacation periods.

International students applying for admission should write to The Graduate School.

General Regulations of The Graduate School

Responsibilities and Requirements

A graduate student must assume full responsibility for knowledge of rules and regulations of The Graduate School and departmental requirements concerning the individual degree program. A statement on Graduate Students’ Rights and Responsibilities is printed on the back of the student’s Admission Status Form. Additional copies are available at the Graduate Office. The Graduate School has basic requirements outlined below. Individual colleges and departments may have additional requirements beyond the minimum established by The Graduate School.

Graduate School News

The Graduate School News is published quarterly and is available to all graduate students. Copies may be obtained at any time from the Graduate Office. The News includes calendars, schedules, and new requirements for degrees so that students have access to the latest information, some of which may supersede this catalog.

Advisor/Major Professor

Every graduate student must have an advisor from the major department to approve the student’s program before each registration. Many departments assign a temporary advisor to direct the entering student’s work during the period in which the student is becoming acquainted with the institution and determining the focus of research interests, and in which the department is forming a judgment concerning the candidate’s promise as a scholar. As early as appropriate the student follows departmental procedures to obtain a major professor. This professor advises the student about courses, supervises the student’s research, and acts as a channel of temporary advisor to direct the entering student’s research, and acts as a channel of communication within the major department, to other departments and The Graduate School.

Prerequisites

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

Graduate Credit

No student may receive graduate credit for a course unless properly admitted to The Graduate School. It is expected that students will be so admitted prior to registration for courses carrying graduate credit. In some instances, however, students who appear to meet the criteria for admission are allowed conditional registration for graduate credit after filing an application for admission to The Graduate School and paying the application fee. Transcripts (two official copies) and additional materials required must then be filed with the Graduate Office at once if seeking admission to a degree program or as non-degree. If applying for admission in the provisional status, proof of the Bachelor’s degree is the only requirement. The student must be admitted to The Graduate School within seven weeks after the last official day of registration. No future registration will be permitted nor a copy of the transcript obtained until the student is properly admitted.

Explanation of Course Listings

Each course listing in the Graduate Catalog contains information in an abbreviated form. The course number indicates the level at which the course is taught. All 5000-6000 level courses are graduate courses. The 3000-4000 level courses are upper division courses normally available for graduate credit. To receive graduate credit, a student must so indicate on the registration material.

The official course title appears in bold-faced type following the course number. Numbers in parentheses following the course title indicate the quarter hours credit. If the credit is variable, to be determined in consultation with the instructor, the minimum and maximum are shown (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 5000 and Dissertation 6000. Courses may be cross-listed with two or more departments, an arrangement that is indicated by a parenthetical statement. (Same as Psychology 5432). 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. At the end of most course descriptions is a symbol indicating the quarter or frequency that this course normally is offered: F-Fall, W-Winter, S-Spring, E-Every quarter, Su-Summer.

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

Recommended Course Loads

Nine to 12 hours is considered to be a full load. Students receiving financial assistance should consult with the department/program head concerning appropriate course loads. The maximum load is 15 hours unless the student has prior approval of The Graduate School, which may allow registration of up to 18 hours if the student has achieved an average of 3.6 or better in at least 9 hours of graduate work. Students may enroll in only one course in a September or December mini-term.

Change of Registration

A student’s permanent record card will show all courses for which registration has been completed except those from which the student withdraws during the first 5 consecutive instructional days after the beginning of classes.

Students who fail to attend the first class meeting without prior arrangement with the department may be dropped from the course to make their spaces available to other students. Students have the responsibility to assure that they have been dropped; otherwise, they are liable for a grade of F in the course.

The deadline for change of registration (from credit to audit, audit to credit, graduate to undergraduate, undergraduate to graduate, withdrawal, etc.) is set at midquarter, approximately 35 calendar days after the first day of classes each quarter. A student may change registration from a course at any time up to and including this date by executing a change of registration slip and submitting this to the Graduate Office.

The advisor’s signature is not required. The instructor is required to add a course two weeks after classes begin and/or to add a course that is closed. If withdrawal from a course or from the University occurs after the first 5 days of classes and before the withdrawal deadline, the grade of W will automatically be entered on the student’s record and on the final class roll sent to the instructor in the course.

After the change of registration deadline, a student withdrawing from a course or from the University will receive the grade F, unless the student can demonstrate that the request for withdrawal is based on circumstances beyond the student’s control.
To change registration in any way after the deadline, a student must present the request, together with documentary evidence of extenuating circumstances, to The Graduate School. In addition, he/she must complete a change of registration slip and, if appropriate, a Late Withdrawal Questionnaire signed by the instructor(s) and advisor as evidence of their notification of the request. If the request is approved, the Graduate Office will notify the Office of Admissions and Records, which will enter the change on the student's permanent record.

Grades
Grades in The Graduate School have the following meanings:

A—(4 quality points per quarter hour); indicates above satisfactory work.
B—(3 quality points per quarter hour); indicates satisfactory work.
B—(2 quality points per quarter hour); indicates performance less than expected. This grade represents work below the standard expected of graduate students and cannot be used in a graduate program.
C—(1 quality point per quarter hour); indicates unsatisfactory work and cannot be used in a graduate program.
I—(no quality point value); indicates that the student has done satisfactory work in the course, but because of circumstances beyond control—has been unable to finish all requirements. It is not given to enable a student to do additional work to bring up a deficient grade. All incompletes must be removed within two quarters excluding the summer quarter. If a supplementary grade is given, the I grade must be changed to a grade that indicates the student's performance in the course. A grade of F may be given in a supplementary grade.
F—(no quality point value); indicates extremely unsatisfactory work and cannot be used in a graduate program.

Proficiency Examination
A proficiency examination may be given in any academic course offered for graduate credit. To be eligible, a student must be regularly admitted to the Graduate School, and the examination must be recommended by the head of the department offering the course. Students applying for this privilege must present evidence that they have developed the knowledge and abilities expected of graduate students who have taken the same courses. Upon passing such an examination with a minimum grade of B, the student will receive regular graduate credit. A maximum of three graduate courses may be completed by this method. A fee must be paid before administration of 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.

English Proficiency
Any student whose native language is not English must present a TOEFL score of at least 525 unless he/she has received a Bachelor's or Master's degree from an accredited institution in the United States. The student must also pass an English proficiency examination prior to initial registration. The regulations concerning this examination are described under Admission of International Students.

Law Courses
Law courses are not available for graduate credit; however, a graduate student may be allowed to take up to 6 semester hours of law courses and apply them toward a graduate degree in accordance with the approval of the College of Law and the student's major professor. A student enrolled in the DBA program may use 8 semester hours or more of law courses for the supporting area under the arrangement described above. 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 obtained in a law course, an S will be recorded on the transcript. If a student earns a grade 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.

Different rules apply to the student enrolled in the Dual J.D.-MBA Program. Grades must be earned according to the grading system of the respective college. The graduate student must pass the course and receive a grade of A or better, be part of an otherwise satisfactory graduate program, and must present evidence that they have developed the knowledge and abilities expected of graduate students who have taken the same courses. Upon passing such an examination with a minimum grade of B, the student will receive regular graduate credit. A maximum of three graduate courses may be completed by this method. A fee must be paid before administration of 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.

Auditors
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 auditors, and paying regular fees. Auditors are not permitted to participate in class discussions and recitations, or use laboratory equipment and materials.

Correspondence Study
No graduate credit is accepted at UTK for work done by correspondence study at any university.

Transfer Credits
A maximum of 9 quarter hours (6 semester hours) may be transferred into a student's Master's program from work taken at accredited institutions. (Extension courses at foreign institutions are not applicable.) One-half of a student's program may be transferred from within The University of Tennessee System.

Such work must have been taken for graduate credit and passed with a grade of B or better, be part of an otherwise satisfactory graduate program (B average) but not used toward another degree, and be listed on the Admission to Candidacy Form approved by the committee members and the Vice Chancellor for Graduate Studies and Research. Ordinarily, course work from foreign institutions is not transferred since these institutions have not been accredited. This course work must be completed within the six-year period prior to the receipt of the degree. The same rule applies also to the Specialist in Education degree. Courses transferred into a student's Master's program may consist of a combination of University of Tennessee System courses and courses from other institutions so long as the total accepted does not exceed one-half the total program requirements and courses accepted from outside the University of Tennessee System do not exceed 9 quarter hours. Transfer credits will be placed on The University of Tennessee transcript record only after the student has been admitted to candidacy.

Courses taken for graduate credit at another institution and passed with a grade of B or better from a satisfactory graduate program (B average) may be accepted in a student's doctoral program. The number of hours a student may include will be determined by the doctoral committee. They must be listed on the Admission to Candidacy form and approved by the committee members. Although the hours may be used as part of the requirements for the degree, the courses will not appear on The University of Tennessee transcript record.

Official transcripts must be received by The Graduate School directly from appropriate institutions before any transfer of credit will be approved.

Credits accepted in either the Master's or doctoral program will not affect the minimum residence requirements, nor will they be counted in determining the student's grade average. Neither will they count toward meeting 5000- or 6300-level requirements for an advanced degree.
Revision of Program

A student who wishes to revise a major program of study must complete a "Request for Revision of Graduate Program" form which can be obtained from the Graduate Office. It is necessary to obtain the signature of the head of the department in which admission was previously granted. No signature is needed if a student is requesting a change from non-degree or provisional to a degree program or from one degree to another in the same department.

Time Limit

The time limit for the use of graduate credit toward a Master's degree is six years from the beginning date of the earliest course applied toward the degree. The last 45 hours of credit for the Specialist in Education degree must also be earned within a period of six years prior to the award.

Normally, these time limits may not be extended. However, in exceptional cases, courses taken beyond these periods may be recognized after special examination or other means recommended by the department and given prior approval of the Vice Chancellor for Graduate Studies and Research.

The doctoral program must be completed within a period of five years after passage of the comprehensive examination.

Residence Requirements

There is no residence requirement for any Master's program.

The Specialist in Education Degree requires one quarter of full-time study if the student has a Master's degree. A student without a Master's degree is required to have two consecutive quarters of full-time residence.

The minimum residence for any doctoral degree is one academic year of three consecutive quarters of full-time study (minimum of 9 hours) in the resident graduate program. Without a Master's degree, a student must complete at least one-half of all credits in residence.

Residence for the Specialist in Education degree must be earned within a period of six years prior to the award.

Theses and Dissertations

All theses and dissertations are submitted to The Graduate School for acceptance. It is the responsibility of the Thesis Consultant to examine the materials and to make sure that they are mechanically accurate and attractively presented, free of technical errors in format, suitable for binding, and that they reflect credit upon the University and its Graduate School. If the thesis or dissertation is not accepted, the student must make corrections and submit the materials again.

The student and major professor together should compose a plan of studies devoting essentially all energies to graduate study on campus. Partial-time enrollment does not count toward this requirement.

Consecutive quarters include the summer quarter.

Academic Termination

Graduate education requires continuous evaluation of the student. This evaluation includes not only periodic objective evaluations such as the cumulative grade point average, performance on comprehensive examinations, and acceptance of the thesis or dissertation, but also the subjective appraisal by the faculty of the student's progress and potential. Continuation in a program is determined by the faculty and the department head.

Departments and programs may have requirements for continuation or graduation in addition to the minimum requirements set forth in this Catalog. Such additional requirements must be written and on file in the Graduate Office. It is the student's responsibility to become familiar with the special requirements of his/her department or program.

Appeals Procedure

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 Vice Chancellor for Graduate Studies and Research, then to the Graduate Council and then to the Chancellor. The By-Laws of the University (Article V, Section 7) provide that any individual may ultimately appeal to the Board of Trustees, through the President. A copy of the detailed procedure is available in the Graduate Office and in each department.

Requirements for Advanced Degrees

Master's Degrees

Master's degree programs offered in the Graduate School are listed under "Majors and Degrees Available" on pages 8-9. See also chart, page 22, for a summary of procedures for these degrees.

Non-Thesis Programs: Some departments offer optional non-thesis programs for the Master's degree. Departmental announcements indicate whether the option is available.

Course Requirements: A candidate for a Master's degree must present a total minimum credit of 45 quarter hours of approved graduate courses. These courses may be entirely in one major subject or may include one or two minors. If approved by the student's faculty advisory committee and the Vice Chancellor for Graduate Studies and Research, the major subject may include at least 18 quarter hours credit of course work in an MBA degree program. A minor shall consist of not less than 9 or more than 18 quarter hours of course work.

All courses for which a student registers must be completed before graduation. At least one-half of these total hours in the graduate program must be at or above the 5000-level, of which no more than 9 may be thesis hours. These courses must be completed at The University of Tennessee. (5000- and 6000-numbered courses are open to graduate students only; 3000- and 4000-numbered courses may be taken for graduate credit if listed in the Graduate School Catalog.)

The Master of Arts in College Teaching requires 60 quarter hours, 9 hours of which must be devoted to the preparation of a thesis (some departments permit the student to take additional courses in lieu of a thesis—see departmental requirements). In the two-year program, the candidate also spends six quarters as a part-time teaching intern. The emphasis in the program will be on training prospective teachers of undergraduate courses. Participating departments are indicated in the list of "Majors and Degrees Available" on pages 8-9.

Master's Committee: A committee for the Master's degree is formed at or before the time the student applies for admission to candidacy. The responsibility of this committee is to assist the student in planning a course of study and carrying out research, and to test for the fulfillment of degree requirements. The student should consult with the major professor concerning the composition of a committee. This committee consists of a minimum of three members, with the rank of assistant professor or above. If a student does not have a minor, all members may be from the major department. If a student does have a minor, one member of the committee must be from the minor department. A student should consult with the advisor or department head concerning the Master's committee after one quarter of graduate-level work.

Admission to Candidacy: Application for admission to candidacy for the Master's degree is made as soon as possible after the student completes any required prerequisite courses and 15 hours of graduate course work with a B average in all courses taken for graduate credit. Approval of the Vice Chancellor for Graduate Studies and Research is required. The student must submit the Admission to Candidacy form, with appropriate signatures, to the Graduate Office no later than commencement day of the quarter preceding the quarter in which he/she plans to graduate. The deadline for submission of this form is given each quarter in the Graduate School News.

Thesis Registration: A minimum of 9 quarter hours and, in some approved programs, a maximum of 18 quarter hours of credit (course number 5000 which is variable credit) in the major may be earned in the preparation of an acceptable thesis, representing original, independent work. A student must be registered for a thesis course each quarter work is being pursued on the thesis. If the thesis is not completed during the quarter in which the student registers for the last 3 hours of 5000, 3 semester hours must be used to register for a minimum of 3 hours of 5000 each quarter while actually working on the
research and thesis through the quarter in which the thesis is accepted by the Graduate School. Similar rules apply when problems are used in lieu of the thesis.

Non-Thesis Registration: All non-thesis students using University facilities or faculty time must be registered for course 5002 if not registered for thesis. This is also applicable to graduating students who must remove incompletes. Students taking the final examination but not otherwise using University facilities must pay a fee of $50. Final exams will not be scheduled until one of the above is met.

Final Examination for Thesis Students: A candidate presenting a thesis must pass a final oral (or oral and written) examination on all work offered for the degree. The examination is not merely a re-examination over course work, but it is a test of the candidate's ability to integrate material in the major and related fields, including the work presented in the thesis. This examination, which must be scheduled through the Graduate Office, shall be held at least two weeks before the final date for submission of theses to the Graduate School. The complete thesis, in a form approved by the candidate's major professor, shall be distributed to all committee members at least two weeks before the date of the final oral examination. This examination will be conducted by a committee of not fewer than three faculty members, with the student's major professor as chairperson. (Members of the University faculty may attend the examination.) In case of failure of the final examination, the candidate may not appear for re-examination until the following quarter. The result of the second examination is final.

Final Examination for Non-Thesis Students: A non-thesis student must pass a final written examination on all work offered for the degree. The department may or may not follow this examination with an oral examination. The examination is not merely a reexamination of course work but is a test of the candidate's ability to integrate material in the major and related fields. It must be scheduled through the Graduate Office in accordance with the Graduate School News deadlines and will be conducted by a committee of not fewer than three faculty members, with the student's major professor as the chairperson. In case of failure of the final examination, the candidate may not appear for reexamination until the following quarter. The result of the second examination is final.

Thesis: The thesis represents a culmination of an original research project completed by the student. The organization, method of presentation, and subject matter of the thesis are important in conveying to others the results of such research. Two copies of the thesis must be submitted to and approved by The Graduate School on or before the dates specified by The Graduate School. Each copy of the thesis must include an approval sheet, signed by the members of the committee, which certifies to the Vice Chancellor for Graduate Studies and Research that the committee has examined the final copy of the thesis and found its contents to be satisfactory. The student should check with the department head concerning additional required copies of the thesis. The thesis must be prepared according to the Graduate School Thesis and Dissertation Manual.

Specialist in Education Degree

The Specialist in Education (Ed.S.) degree is offered in Curriculum and Instruction, Educational Administration and Supervision, Educational Psychology and Guidance, Safety Education and Service, and Vocational-Technical Education. Admission to the Specialist in Education program requires formal application for admission to Graduate School, processing and recommendation by the department or area in which the student is majoring, and approval by the Vice Chancellor for Graduate Studies and Research. Students who become candidates for the Ed.S. degree should preferably have a minimum of one year of appropriate work experience. Each department should be contacted to determine its particular admission requirements.

- The formulation of the student's program, supervision of program development, recommendation for admission to degree candidacy, direction of research, and qualifying and terminal examinations are executed by a committee of not fewer than three faculty members following guidelines developed by the major department.
- The committee is appointed by the Vice Chancellor for Graduate Studies and Research upon request from the department head and includes a minimum of two members from the department or area of specialization. See chart, page 23 for summary of procedures.

Course Requirements: Each student's program involves a minimum of six quarters of study totaling not less than 90 quarter hours. The last 45 hours of credit must be earned within six years prior to the award. A student admitted to the program with a Master's degree or appropriate work beyond the Master's degree may have program requirements modified upon recommendation of the student's committee using departmental guidelines and approval of the Vice Chancellor for Graduate Studies and Research. No modifications shall be permitted, however, with respect to examination requirements, research requirements, and a minimum of 9 quarter hours of course credit outside the department or area in which the student is majoring. All graduate course work completed prior to admission and accepted as part of the student's program must be appropriately related to the student's objectives. Credits earned in a Master's degree may meet course requirements in the student's Specialist in Education Program to which they are specifically comparable. Nine hours of work beyond the Master's degree must be transferred from approved institutions and may be used to meet the student's course requirements. (See Transfer Credits, page 18.)

A minimum of 9 quarter hours from fields supporting the student's specialization but outside the department or area is required for each individual program.

Undergraduate courses required for certification at UTK in the student's field of specialization may not be taken for graduate credit as part of the program.

At least one-half of the last 45 quarter hours of work, exclusive of the thesis or problems, must be in 5000- or 6000-level courses.

Admission to Candidacy: The Admission to Candidacy form, with appropriate committee members' signatures, is submitted to the Graduate Office for approval by the Vice Chancellor for Graduate Studies and Research. This application is to be submitted within 18 quarter hours after admission to the Ed.S. program. A qualifying examination may be required if the student's Master's degree was earned six or more years prior to admission to the program period. The qualifying examination may be written and/or oral.

Research Requirements: Some departments offer a thesis program while other departments offer a choice between a thesis or non-thesis program. Departmental announcements indicate which option is available.

A. In the non-thesis program, each candidate will study research methods and findings and will demonstrate skill in adapting them to professional needs following guidelines developed by the major department.

B. In the thesis option, a minimum of 9 hours of research credit (5180-5190, and 5200) may be earned in the preparation of an acceptable thesis. If the research is not completed during the first quarter for which the student is registered for 5200, the student must continue to register for this course (minimum of 9 quarter hours) each quarter as long as active work on the thesis continues or until the thesis is accepted by The Graduate School. The thesis is prepared according to the instructions in The Graduate School Thesis and Dissertation Manual. It must be approved by the committee prior to submission and must be accepted by the appropriate date in the quarter the student wishes to graduate.

Final Examination: A non-thesis student must pass a final written or oral examination on all work offered for the degree. The examination is not merely a reexamination of course work, but is a test of the candidate's ability to integrate material in the major and related fields. It must be scheduled through The Graduate School in accordance with the Graduate School News deadlines and will be conducted by a committee of not fewer than three faculty members, with the student's major professor as the chairperson. In case of failure of the final examination, the candidate may not appear for reexamination until the following quarter. The result of the second examination is final.

Doctoral Degrees

Three doctoral degree programs are available: Doctor of Philosophy, Doctor of
Education, and Doctor of Business Administration. Doctoral programs are listed under "Majors and Degrees Available" (see pages 5-9). The doctoral degree, the highest in-course degree, is awarded in recognition of distinct scholarship and the completion of a dissertation which is a significant contribution to knowledge.

Doctoral programs include a field of specialization and often study in one or more collateral fields. Collateral study is defined as a minimum of 9 quarter hours of graduate courses in a given area outside of the department of the student's major field. The selection of specific courses will be determined by each student's faculty committee, subject to regulations of The Graduate School and approval by the Vice Chancellor for Graduate Studies and Research. See chart, page 24, for summary of procedures for this degree.

Doctoral Committee: The student's committee is nominated by the student's major professor who serves as the chairperson of the committee, and department head and approved by the Vice Chancellor for Graduate Studies and Research, preferably during the first year of graduate study. This committee shall consist of at least one member from outside the major department. Three of the four members, including the chairperson, must be approved by the Graduate Council to direct doctoral research.

This committee has the primary responsibility, subject to Graduate Council policies and special requirements adopted by the faculties of individual areas of study, for the degree work of the student. The committee should plan and must approve all course work, certify the student's mastery of the subject matter of the field of study, direct the research, and recommend the dissertation for approval.

Continuous Registration: Registration for course 6000 is necessary whenever a student is working on the dissertation. A minimum registration of course 6000 is required of all doctoral candidates before the dissertation will be accepted. The student will continuously register for course 6000 (minimum of 3 hours) from the time that the doctoral research is approved, admission to candidacy is accepted, or registration for course 6000 is begun, whichever comes first, including the quarter in which the dissertation is accepted by the Graduate School. (NOTE: Continuous registration is interpreted to include the summer quarter.) If a student must be away from the University during the doctoral study the student may, upon recommendation of the department head and approval of the Vice Chancellor for Graduate Studies and Research, be granted a leave of absence from the requirement for periods not exceeding eight quarters.

Doctoral Examinations: Departments may, at their option, administer diagnostic and/or qualifying examinations in the early stages of the student's doctoral program.

(1) Diagnostic or placement examinations, which may be written and/or oral, may be given to students on admission to the doctoral program to help in the determination of the student's level of preparation, areas of strengths and weaknesses, and general background. Since courses bearing the same title may vary in content, when a student to institution, the diagnostic or placement examinations are designed to aid in the selection of courses that the student should take and to determine that the student is adequately prepared to undertake doctoral studies at this University.

(2) Qualifying examinations, which may be written and/or oral, may be given to students about the end of their first year in the doctoral program. Qualifying examinations are designed to test the student's progress, general knowledge of fundamentals of the field, and fitness to continue with the more specialized aspects of the doctoral program. Successful completion of a written comprehensive examination is required for the doctoral degree. The faculty of the graduate program and/or the student's permanent guidance committee will determine the content, nature and provisions for repeating a failed examination.

The comprehensive examination (or the final part of the examination, when parts of the examination are given at different times) is normally taken when the student has completed or nearly completed all required and prescribed course work. Successful completion indicates that, in the judgment 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 and at least three quarters prior to the date of the degree. The doctoral program must be completed within a period of five years after passage of the comprehensive examination.

A final examination (oral, or oral and written on dissertation, special field, and such other fields as the student's faculty committee may specify, will be administered by the full, approved committee after completion of the dissertation and all course requirements. This examination must be passed at least two weeks before the date for submission of the dissertation to the Graduate Office. The examination must be scheduled through The Graduate Office and oral examinations not properly scheduled must be repeated. The dissertation, in the form approved by the major professor, must be distributed to the committee at least two weeks before the date of the examination is announced publicly and the examination is open to all faculty members.

Language Requirements: Usually candidates for the Ph.D. degree must possess a reading knowledge of at least one foreign language in which there exists a significant body of literature relevant to their major field of study. Some programs require two languages and some none. Language requirements may be met by The University of Tennessee and cannot be transferred from another institution. Refer to the departmental descriptions of each Ph.D. program. The student's faculty committee will determine, with the approval of the Vice Chancellor for Graduate Studies and Research, the specific language (or languages) required. When the student feels adequately prepared to take a language examination, they should inform the department and notify the language representative in the department. The appropriate forms to schedule the examination may be obtained from the Graduate Office. The dates and times of the examinations are printed in the Graduate School News.

Satisfactory completion (B grade or better) of an appropriate 3030 course in a language department may be substituted for the actual language examinations. (The student cannot repeat this course if a grade of C or below is received when used in lieu of language examination.)

Admission to Candidacy: A student may be admitted to candidacy after passage of the comprehensive examinations, the successful completion of the language requirements (for Ph.D.), and maintenance of at least a B average in the courses. (Each doctoral student must plan to take an appropriate number of 6000-level courses, usually a minimum of 9 quarter hours, which are designed expressly for doctoral students at The University of Tennessee, during the program of study. These courses cannot be transferred from another institution.) Admission to candidacy must be secured at least three quarters prior to the date the degree is to be conferred. Each student is responsible for filing the application for admission to candidacy, which must be signed by the committee members and approved by the Vice Chancellor for Graduate Studies and Research. The student will be notified when admission to candidacy has been approved.

Research Requirements: Research is an essential part of the program of every candidate for the doctoral degree. For the Doctor of Philosophy and Doctor of Business Administration degrees, original research forms the basis of the dissertation.

The program for the Doctor of Education degree requires demonstration of proficiency in at least two types of research techniques. These techniques may include foreign languages, historical research methods, statistics, experimental design, sociological research methods, survey design and analysis, philosophical research methods, or machine data processing. The candidate's faculty committee must determine, with the approval of the Vice Chancellor for Graduate Studies and Research, which research techniques to be included in the candidate's program.

Dissertation: The dissertation represents a culmination of an original major research project completed by the student. The original research, methodology, findings, and subject matter of the dissertation are important in conveying to others the results of such major research.

A student should be registered for the number of dissertation hours representing the appropriate fraction of effort devoted to this phase of the candidate's program. A minimum registration of 36 quarter hours of
course 6000 is required of all doctoral candidates before the dissertation will be accepted. The student shall continue to register for course 6000 (minimum of 3 hours) for the entire period during which the person is actually working on research and dissertation, including the quarter in which the dissertation is accepted by The Graduate School. The number of hours registered each quarter should be at full-time levels (12 hours) if the facilities and faculty are being utilized at full-time levels.

Two copies of the dissertation (prepared according to the regulations given in the Graduate School Thesis and Dissertation Manual) must be submitted to and approved by The Graduate School. These copies must include an approval sheet, signed by all members of the faculty committee, which certifies to the Vice Chancellor for Graduate Studies and Research that they have examined the final copy and found that its contents demonstrate scholarly achievement. Doctoral forms and a thesis card are also submitted at this time. The student should check with the department head concerning additional required copies of the dissertation.

### Summary of Procedures for Master's Degrees

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<tr>
<th>PROCEDURE</th>
<th>UNDER DIRECTION OF</th>
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<tbody>
<tr>
<td>Admission as a potential candidate (if previously admitted non-degree)</td>
<td>Major departmental advisor and Vice Chancellor for Graduate Studies and Research</td>
<td>Prior to completing 18 hours of course work</td>
</tr>
<tr>
<td>Formation of faculty committee</td>
<td>Major departmental advisor</td>
<td>Prior to application for admission to candidacy</td>
</tr>
<tr>
<td>Submission of application for admission to candidacy (Forms at Graduate Office)</td>
<td>Faculty committee</td>
<td>At least one quarter prior to Graduation*</td>
</tr>
<tr>
<td>Approval of admission to candidacy</td>
<td>Faculty committee and Vice Chancellor for Graduate Studies and Research</td>
<td>Prior to Graduation</td>
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**GRADUATION REQUIREMENTS**

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<tr>
<td>Placement of name on graduation list</td>
<td>Student</td>
<td>Indicate on registration material</td>
</tr>
<tr>
<td>Application for diploma</td>
<td>Graduate Office</td>
<td>Deadline notice available at registration*</td>
</tr>
<tr>
<td>Scheduling of oral or written examination</td>
<td>Major professor, student, and Vice Chancellor for Graduate Studies and Research</td>
<td>Not later than one week prior to oral or written examination*</td>
</tr>
<tr>
<td>Submission of thesis to faculty committee</td>
<td>Faculty committee</td>
<td>At least two weeks prior to oral examination</td>
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<tr>
<td>Oral examination</td>
<td>Major professor and committee</td>
<td>Not later than two weeks before thesis deadline*</td>
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<tr>
<td>Removal of incompetes</td>
<td>Instructor of course</td>
<td>Not later than one week before Commencement*</td>
</tr>
<tr>
<td>Submission of final copy of thesis and thesis card</td>
<td>Major professor, candidate's committee, and Vice Chancellor for Graduate Studies and Research</td>
<td>After oral examination and no later than two weeks before Commencement*</td>
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*Dates are printed in Graduate School News quarterly.
### Summary of Procedures for Specialist in Education Degrees

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<td>Major departmental advisor</td>
<td>Prior to application for admission to candidacy</td>
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<tr>
<td>Submission of application for admission to candidacy (Forms at Graduate Office)</td>
<td>Faculty committee</td>
<td>At least one quarter prior to graduation*</td>
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<td>Major professor, Vice Chancellor for Graduate Studies and Research, student</td>
<td>Not later than one week prior to oral or written examination*</td>
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<tr>
<td>Submission of thesis or problems to faculty committee</td>
<td>Faculty committee</td>
<td>At least two weeks prior to oral examination</td>
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<tr>
<td>Oral examination</td>
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<tr>
<td><em>Appointment of faculty committee</em></td>
<td>Assistant Dean for Graduate Studies on recommendation</td>
<td>Preferably during the first year of graduate study, but at the latest, prior to admission to candidacy</td>
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<td>of department head</td>
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<tr>
<td><em>Comprehensive examination</em></td>
<td>Major department</td>
<td>Prior to admission to candidacy</td>
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<tr>
<td><em>Foreign Language examination(s)</em>**</td>
<td>Major department and language department jointly</td>
<td>Prior to admission to candidacy</td>
</tr>
<tr>
<td>Submission and approval of application for admission to candidacy</td>
<td>Faculty committee and Vice Chancellor for Graduate</td>
<td>At least three quarters prior to graduation**</td>
</tr>
<tr>
<td>(Forms at Graduate Office)</td>
<td>Studies and Research</td>
<td></td>
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</table>

### GRADUATION REQUIREMENTS

| Placement of name on graduation list                                     | Student                                                | Indicate on registration material                                  |
| Application for diploma                                                  | Graduate Office                                        | Deadline notice available at registration**                         |
| Scheduling of oral examination                                           | Faculty committee, student, and Vice Chancellor for    | When approved by faculty committee and at least one week prior to oral examination** |
|                                                                           | Graduate Studies and Research                           |                                                                      |
| Submission of dissertation to faculty committee                          | Faculty committee                                      | At least two weeks prior to oral examination                        |
| Final examination                                                         | Faculty committee                                      | Not later than two weeks before dissertation deadline**             |
| Removal of incompletes                                                    | Instructor of course                                   | Not later than one week before Commencement**                        |
| Submission of final copy of dissertation, doctoral forms, and thesis card| Faculty committee and Vice Chancellor for Graduate     | After final examination and no later than two weeks before Commencement** |
|                                                                           | Studies and Research                                    |                                                                      |

*The order of these items varies with individual programs.

**Dates are printed in Graduate School News quarterly.

***Not required in some programs.
The Institute of Agriculture traces its history to 1869 when the University was designated as Tennessee’s Federal Land-Grant Institution. Under the terms of the Federal Land-Grant Act, the University was able 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 three main divisions: Agricultural Experiment Station, Agricultural Extension Service, and College of Agriculture.

In 1974 the College of Veterinary Medicine was established within the Institute. The college is developing research and graduate programs in veterinary medical sciences in addition to the professional curriculum leading to the degree, Doctor of Veterinary Medicine.

**Agricultural Experiment Station**

D. M. Gossett, Dean  
T. J. Whitley, Associate Dean  
J. I. Sewell, Assistant Dean

The Agricultural Experiment Station was established by the University's Board of Trustees on June 8, 1862, 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 investigations of the Station follow a systematic method of gaining and applying knowledge efficiently to the biological, physical, and economic phases of producing, processing, and distributing farm and forest products; to the social and economic aspects of rural living; and to consumer health and nutrition. Both farm and urban populations gain from the accomplishments of the Agricultural Experiment Station. Examples of some of these accomplishments are new and improved varieties of crops, new and better methods of controlling crop and livestock pests, more efficient production of crops and pasture through improved farm management and mechanization, and more efficient feeding and management of livestock.

The program is designed and administered through sixteen subject matter departments located at Knoxville. A number of the staff have teaching responsibilities in addition to their research. To assist in the research program the Station supports a large number of graduate students. To serve Tennessee’s diverse agriculture, branch stations are operated at Jackson, Spring Hill, Springfield, Lewisburg, Crossville, Greeneville, and Martin. In addition, field stations are operated at Grand Junction, Milan, Wartburg, Tullahoma, and near Chattanooga. Professional and technical staff are in residence at these locations.

The UT-DOE Comparative Animal Research Laboratory is located about twenty miles west of Knoxville near Oak Ridge, where a program of radiobiological research in the field of agriculture is carried out by the Agricultural Experiment Station under contract to the Department of Energy. The program includes research with farm and laboratory animals, with soils, and in applied radiobotany and plant breeding.

**Agricultural Extension Service**

M. L. Downen, Dean  
T. W. Hinton, Associate Dean  
M. F. Clarke, Assistant Dean  
B. G. Hicks, Assistant Dean

The Agricultural Extension Service was established in 1914. Its purpose is to extend through various educational programs 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 ninety-five counties of the state. Education 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.

**College of Agriculture**

O. Glen Hall, Dean

Graduate programs of the College of Agriculture are designed to prepare men and women for positions of leadership in industry, state and federal government, teaching, research, and extension. The graduate student is expected to demonstrate a thorough knowledge of the subject matter in his/her specialized field of study and its relationship to the sociological, economic, and environmental impact on society. The student must demonstrate the ability to plan, conduct, analyze, and report original research. More importantly, emphasis is given to intellectual growth and to the development of scholarly habits of study, reasoning and analysis to the end that the graduate will continue to grow and develop professionally throughout his/her career.
MASTERS OF SCIENCE PROGRAMS

Programs of graduate study leading to the Master of Science degree are offered through all departments in the College of Agriculture. The general rules of the Graduate School apply to all graduate work in the college. 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 Extension, Agricultural Mechanization, 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 Plant Pathology. The minor is available in General Agriculture and Rural Sociology.

In general, each graduate program is guided by a major professor and a faculty advisory committee to meet the student's preparation and area of interest. Each program of study approved by the Graduate School requires the student to have a satisfactory academic average and at one grade level or above, exclusive of Forestry 5011.

For admission to a graduate degree program, the student must have a satisfactory academic average and have completed the minimum requirements for an undergraduate major in his/her field of study or have completed sufficient undergraduate work in related areas to satisfy the department that he/she can successfully pursue graduate study in the chosen field. Prerequisite courses may be required when the student's preparation is deemed to be inadequate.

The program of each candidate for the degree of Master of Science in Agricultural Extension may be planned by the major professor and a faculty committee to meet the student's preparation and area of interest. Each program of course work is planned by the major professor in consultation with the faculty advisory committee. The strength, breadth, and direction of the program is planned in consultation with the faculty advisory committee and the student's faculty committee in consultation with the major professor in the Department of Agriculture.

The specific program of a candidate for the degree of Doctor of Philosophy in Agricultural Engineering will depend upon the interest and previous training of the candidate. Each candidate will be under the immediate supervision of a faculty advisory committee in planning his/her program. The major professor will serve as chairperson of the faculty advisory committee and will direct the research and preparation of the dissertation.

Animal Science

The Department of Animal Science offers programs leading to the Doctor of Philosophy degree in the following areas of specialization:

1. Animal nutrition
2. Animal breeding
3. Animal production
4. Animal products

Supporting studies are required in related biological and physical sciences fundamental to the training of the candidate.

The specific program for a candidate for the degree of Doctor of Philosophy in Animal Science includes:

1. Minimum of 108 quarter hours credit in courses beyond the Bachelor's degree, exclusive of credit for the Master's thesis. Of this number, students are required to complete a minimum of 36 quarter hours in 6000 Doctoral Research and Dissertation.
2. At least 36 quarter hours credit in courses numbered 5000 and 6000, exclusive of Doctoral Research and Dissertation.
3. A minimum of 24 quarter hours must be completed in related fields outside of animal science.

Doctoral Programs

Graduate study programs leading to the Doctor of Philosophy degree in Master of Science, Agricultural Economics, Agricultural Engineering, and Plant and Soil Science are offered in the college.

General Graduate School requirements relative to admission, faculty advisory committees, residence, grades, research, and admission to candidacy for degree apply to all doctoral programs. Special departmental requirements are listed in the following paragraphs.

Agricultural Economics and Rural Sociology

Subject Area Requirements: All candidates pursuing the Doctor of Philosophy degree will be required to demonstrate competence in examinations in the following areas:

A. A major area of concentration to be selected from the following:
   1. Agricultural policy
   2. Agricultural marketing and price analysis
   3. Farm management and production economics
   4. Natural resource economics
   5. Rural development

B. The core areas:
   1. Agricultural economics
   2. Economic theory
   3. Mathematical and quantitative methods in agricultural economics

Course Requirements: A minimum of 108 quarter hours credit beyond the Bachelor's degree, exclusive of credit for the Master's thesis, is required in the doctoral program. Of this total, 36 hours in doctoral research and dissertation are required. At least 30 hours of course work shall be in agricultural economics and 15 hours in economics. Excluding the dissertation, a minimum of 21 hours in agricultural economics and 36 hours in agricultural economics and economics combined must be in courses numbered 5000 and above.

Agricultural Engineering

Candidates pursuing the Doctor of Philosophy degree in Agricultural Engineering may specialize in one of the following areas:

1. Agricultural economics
2. Agricultural engineering
3. Electric power and processing
4. Soil and water conservation engineering
5. Agricultural structures
6. Plant breeding and genetics

Supporting studies are required in related biological, physical, and engineering sciences and mathematics fundamental to the training of the candidate.

Additional course requirements for the degree are:

1. Minimum of 108 quarter hours credit beyond the Bachelor's degree, exclusive of credit for the Master's thesis. Of this number, students are required to complete a minimum of 36 quarter hours in 6000 Doctoral Research and Dissertation.
2. A minimum of 30 quarter hours credit will be in courses numbered 5000 and 6000, exclusive of Doctoral Research and Dissertation.
3. The program of each candidate shall consist of a major and supporting studies in one or more additional areas. The major shall consist of a minimum of 24 quarter hours exclusive of research and dissertation. A minimum of 24 quarter hours shall be taken in departments outside of the Department of Agricultural Engineering.

The specific program for a candidate for the degree of Doctor of Philosophy in Agricultural Engineering will depend upon the interest and previous training of the candidate. Each candidate will be under the immediate supervision of a faculty advisory committee in planning his/her program. The major professor will serve as chairperson of the faculty advisory committee and will direct the research and preparation of the dissertation.

Plant and Soil Science

The Department of Plant and Soil Science offers programs leading to the Doctor of Philosophy degree in the following areas of specialization:

1. Soils
2. Plant breeding and genetics
3. Crop physiology and ecology

Supporting studies are required in related sciences fundamental to the training of the candidate.

Some of the specific requirements for the degree are:

1. Minimum of 108 quarter hours credit beyond the Bachelor's degree exclusive of Master's thesis. Of this number, students are required to complete a minimum of 36 quarter hours in 6000 Doctoral Research and Dissertation.
2. Minimum of 30 quarter hours credit in courses numbered 5000 and 6000 exclusive of Doctoral Research and Dissertation.
The specific program of a candidate for the degree of Doctor of Philosophy in Plant and Soil Science will depend upon the interest and previous training of the candidate. The program of courses and research will be planned with the student in consultation with a faculty advisory committee. The major professor will serve as chairperson of the faculty advisory committee and will direct the research and the preparation of the dissertation.

Departments of Instruction

Agricultural Economics and Rural Sociology

MAJORS

DEGREES

M.S., Ph.D.

Professors: J. A. Martin (Head), Ph.D., Minnesota; M. A. Busscher, J. R. Brooker, Ph.D., Florida; D. W. Brown, Ph.D., Iowa State; G. L. Cleland, Ph.D., Wisconsin; J. W. Causby, Ph.D., Oklahoma; L. H. Keller, Ph.D., Kentucky; F. O. Leuthold, Ph.D., Wisconsin; B. R. McManus, Ph.D., Purdue; C. D. Sugden, Ph.D., Illinois.

Associate Professors: C. M. Cuskaden, Ph.D., Michigan State; T. H. Klimt, Ph.D., Kentucky; L. L. McMellen, Ph.D., Clemson; S. D. Mundy, Ph.D., Tennessee; R. H. Orr, Ph.D., Illinois; R. W. Todd, J.D., Tennessee; B. J. Trenery, Ph.D., Tennessee; O. N. Walker, Ph.D., Oklahoma State.

Assistant Professors: W. M. Park, Ph.D., Virginia Polytechnic Institute; G. D. Whipple, Ph.D., Washington State.

The department has programs for the Doctor of Philosophy degree and the Master of Science degree with a thesis or non-thesis option.

Agricultural Economics

4120 Farm Management (3) Principles of farm organization and operation; allocating land, labor, and capital; changing technology; tenure arrangements and use of credit; risks; measures of success. Use and analysis of records; exercises in implements. Emphasis on accounting data and economic theories for decision-making. Prereq: Agriculture 1110 and Economics 2120. F

4330 Land Economics (3) Principles of land use, tenure, development, taxation, and tenure; population growth and demand for land; principles and theories of rent, property, value, and income. Prereq: Agriculture 1110 and Economics 2120. F

4610 Management of Farm Supply and Marketing Firms (3) Operation of firms selling farm supplies and marketing of farm products. Emphasis on understanding marketing and problems in marketing. Prereq: Economics 4180 or consent of instructor. Sp

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) E

5120 Agricultural Price Analysis (3) Analysis and interpretation of factors affecting agricultural prices; price trends and cycles; application of economic theory and empirical concepts to agricultural price research. Prereq: 3120 and Statistics 4310 or equivalent. W

5130 Advanced Agricultural Production Economics (3) Theory and empirical concepts of agricultural resource allocation problems under conditions of uncertainty. Prereq: 4140 or equivalent. Sp

5210 Seminar: Agricultural Policies (3) Sp

5220 Seminar: Methodology of Research (3) W

5230 Seminar: Adjustments to Industrialization (3) F

5310 Research (3) Special research projects in agricultural economics and rural sociology. Gathering, tabulating and interpreting data and report writing. May be repeated. Maximum 9 hrs. S/NC only. E

5410 Agricultural Marketing Analysis (3) Application of tools of economic analysis and measurement to problems at all levels of marketing system for agricultural commodities. Prereq: 4630 or equivalent. Sp

5420 Advanced Land Economics (3) Problems in land tenure, land use, and conservation in United States and selected foreign countries. Prereq: 4330 or equivalent. F

5440 The Economics of Agricultural Development (3) Role of agriculture in overall economic development; economic nature of traditional agriculture, and analysis of causal force and structural independence of agricultural development under conditions of economic change. Prereq: 4240 or consent of instructor. W

5510 Quantitative Methods in Agricultural Economics (3) Analytical techniques useful in estimation of functions—supply, demand and production—prediction of economic variables. Emphasis on application of multiple regression: model specification, estimation technique using computer and interpretation of results. Prereq: Statistics 4310 or Economics 5510 or consent of instructor. W

5710 Quantitative Methods in Agricultural Economics (3) Linear and nonlinear programming techniques with empirical applications, made to problems of maximizing, profit, minimizing cost, profit, transportation, and location analysis, regression, curve, and game theory, and nonlinear programming. Prereq: Economics 4180 or consent of instructor. W

6000 Doctoral Research and Dissertation (3-15) E

6120-30 Seminars in Agricultural Economics (3, 3) Topics selected from the areas of economic of production, consumption or distribution in agriculture and related industries and public policies concerned with agricultural and related industries. F, Sp

6210 Agricultural and Rural Transformation Problems (3) Systematic evaluation of policy and development proposals related to agricultural modernization, foreign supply, and rural living. Decision-making process and useful roles of social scientists. Analysis of current issues in U.S. and developing nations. Prereq: Consent of instructor. W

6410 Agricultural Supply Analysis (3) Estimating agricultural supply relationships using aggregate time series regression, production functions, linear programming, simulation and firm growth models with emphasis on correspondence between theoretical concepts and model attributes. Prereq: 5130 or consent of instructor. F

6420 Marketing and Resource Use (3) Institutional settings for research and policy formulation. Analytical tools to measure efficiencies of marketing and resource use. Wastes management in marketing systems to conserve resources and environment. Prereq: 5410 or consent of instructor. W

Rural Sociology

4320 Rural Sociology (3) Nature of rural society; social systems concept; rural-urban differences; nature of social relations and social movements; problems of rural people; tenancy, farm labor, health, services, educational facilities, churches, local government; impact of industrialization. F, W, Sp

4450 Diffusion of Agricultural Technology (3) Analysis of diffusion process whereby new technology spreads from scientists to final adopters. Adoption process, communication behavior, mass media, role of professional change agents, opinion leadership, and two-step flow hypothesis. Prereq: 3420 or consent of instructor. Sp

5340 Special Problems (3) Special topics in rural sociology. Prereq: 4320 or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

5430 Seminar in Rural Sociology (3) Current rural sociological literature and research; relevance of general sociological theory and methodological techniques. May be repeated. F

5450 Advanced Rural Sociology (3) Application of sociological concepts to analyze changing structure and function of rural life; rural social values, attitudes, and norms as they influence the family, formal and informal groups, population shifts and changing farm technology. Prereq: 4320 or equivalent. F

5470 Research Problems in Rural Communities (3) Emphasis on problems that arise in survey research in rural areas. Sampling procedures, questionnaire construction, interviewer selection, training, control, and legitimization needs. Prereq: Undergraduate course in statistics. Sp

5480 Rural Population Analysis (3) Analysis of U.S. and world population changes and determinants of fertility, mortality, migration and integration with emphasis upon changes in rural sector. Prereq: Sociology 4110 or equivalent. W

Agricultural Engineering

MAJORS

DEGREES

M.S., Ph.D.

Professors: D. H. Luttrell (Head), Ph.D., Iowa State; B. L. Bledsoe, Ph.D., Oklahoma State, P.E.; J. W. Causby, Ph.D., Michigan State, P.E.; J. L. Sewell, Ph.D., North Carolina State, P.E.

Associate Professors: Z. A. Henry, Ph.D., North Carolina State, P.E.; C. H. Shelton, M.S., Virginia Polytechnic Institute; F. D. Tompkins, Ph.D., Tennessee; L. R. Wilhelm, Ph.D., Tennessee, P.E.

4210 Agricultural Engineering (3) Nature and source of capital; credit problems of farmers; kinds and sources of farm credit. Agricultural insurance and taxation. Prereq: Agriculture 1110 and Economics 2120. Sp

4360 Agricultural Policies (3) Meaning of agricultural policy in democratic society; relationship of farm groups to public policy; problems arising as a result of agricultural and rural development. Prereq: Agriculture 1110 and Economics 2120. Sp

4390 Land Economics (3) Problems and policies of land use, tenure, development, taxation, and tenure; population growth and demand for land; principles and theories of rent, property, value, and income. Prereq: Agriculture 1110 and Economics 2120. F

4610 Management of Farm Supply and Marketing Firms (3) Operation of firms selling farm supplies and marketing of farm products. Emphasis on understanding marketing and problems in marketing. Prereq: Economics 4180 or consent of instructor. Sp

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5130 Advanced Agricultural Production Economics (3) Theory and empirical concepts of agricultural resource allocation problems under conditions of uncertainty. Prereq: 4140 or equivalent. Sp

5210 Seminar: Agricultural Policies (3) Sp

5220 Seminar: Methodology of Research (3) W

5230 Seminar: Adjustments to Industrialization (3) F

5310 Research (3) Special research projects in agricultural economics and rural sociology. Gathering, tabulating and interpreting data and report writing. May be repeated. Maximum 9 hrs. S/NC only. E

5410 Agricultural Marketing Analysis (3) Application of tools of economic analysis and measurement to problems at all levels of marketing system for agricultural commodities. Prereq: 4630 or equivalent. Sp

5420 Advanced Land Economics (3) Problems in land tenure, land use, and conservation in United States and selected foreign countries. Prereq: 4330 or equivalent. F

5440 The Economics of Agricultural Development (3) Role of agriculture in overall economic development; economic nature of traditional agriculture, and analysis of causal force and structural independence of agricultural development under conditions of economic change. Prereq: 4240 or consent of instructor. W

5510 Quantitative Methods in Agricultural Economics (3) Analytical techniques useful in estimation of functions—supply, demand and production—prediction of economic variables. Emphasis on application of multiple regression: model specification, estimation technique using computer and interpretation of results. Prereq: Statistics 4310 or Economics 5510 or consent of instructor. W

5710 Quantitative Methods in Agricultural Economics (3) Linear and nonlinear programming techniques with empirical applications, made to problems of maximizing, profit, minimizing cost, profit, transportation, and location analysis, regression, curve, and game theory, and nonlinear programming. Prereq: Economics 4180 or consent of instructor. W

6000 Doctoral Research and Dissertation (3-15) E
Assistant Professors:
D. O. Baxter, M.S. Missouri; L. M. Safely, Jr., Ph.D. Cornell.

Agricultural Engineering
4230 Selected Topics in Agricultural Engineering (3) Develop new topics as required by current trends and problems in agricultural engineering.

4610 Design of Water Control and Waste Utilization Systems (3) Earth dams, irrigation, drainage, land grading, hydraulic transport of wastes, and application of wastes on agricultural land. Prereq: 3610 or consent of instructor. 2 hrs and 1 lab. F

4620 Design of Structures for Production, Processing and Environmental Control (3) Functional planning and structural design of agricultural buildings; emphasis on complete design of structure and system, functional, structural and environmental aspects. Prereq: 3620. 1 hr and 2 labs. W

4630 Design of Processing and Materials Handling Systems (3) Development of systems and components for integrated agricultural processing considering mass and energy balances, product characteristics, equipment specifications, storage, handling and economic merit. Prereq: 3630. 1 hr and 2 labs.

4640 Design of Agricultural Machinery (3) Functional requirements of agricultural machinery. Elements of machine design; synthesis of mechanisms, mechanical and hydraulic drives. Team effort in completing machine design project. Prereq: 4620 or consent of instructor. 1 hr and 2 labs. Sp

5000 Thesis (1-15) E

5240 Environmental Control in Agricultural Structures (3) Engineering analysis of factors related to processes of animal and plant life; basis for development and design of facilities and structures for confined housing of animals, controlled environment for plant growth, and storage facilities for plant and animal products. Prereq: Agricultural Mechanization 3220, Mechanical Engineering 3110 or consent of instructor. 1 hr and 2 labs. Sp

5340 Hydrology of Agricultural and Forest Lands (3) Analytical approach to problems involving water surplus, deficiency and time distribution as related to agricultural and forest purposes. Prereq: 3619, introductory hydrology; Forestry 4020, or consent of instructor. 2 hrs and 1 lab. F

5440 Instrumentation in Agricultural Systems (3) Analysis of specific instrumentation needs in agriculture; industry and research problems; principles and design in utilization of specialized instrumentation. Prereq: Agricultural Mechanization 3220. 2 hrs and 1 lab. Sp

5540 Engineering Properties of Agricultural Materials and Products (3) Fundamental engineering properties of agricultural products and materials related to handling, processing, and utilization. Prereq: Processing and materials handling systems and Engineering Science and Mechanics 3311. 2 hrs and 1 lab. Sp, A

5640 Research Problems in Agricultural Engineering (3) Theoretical and experimental studies relating to current problems in agricultural engineering. May be repeated. Maximum 9 hrs.

5710-20 Similitude in Design and Research (3, 3) Dimensional analysis in development of models; theoretical development of models; prediction equations; interpretation of data; applications to machinery, soil and water structures, agricultural buildings, and other agricultural engineering-related problems. Prereq: Agricultural Engineering and Mechanics 3130 and 3311. 2 hrs and 1 lab. F, W

6000 Doctoral Research and Dissertation (3-15) E

6110 Seminar (1) Current research and literature related to extension and education in agriculture. May be repeated. Maximum 3 hrs.

6310 Engineering Systems Analysis in Agriculture (3) Systems approach to design of engineering equipment and applications to include linear programming, computer applications, statistical evaluations, and feedback control in agricultural problems. Prereq: Mathematics 4550 or 4710. Coreq: 5710 or 5720. 2 hrs and 1 lab. F

6610 Selected Topics in Agricultural Engineering (Lecture, group discussion, and individual study on specialized developments in power and machinery, soil and animal production, structure and processing. May be repeated. Maximum 9 hrs. F

Agricultural Mechanization
4160 Agricultural Waste Utilization and Disposal (3) Techniques, equipment, and structures for utilizing, treating, and disposing of agricultural wastes by land spreading, lagooning, and processing. 2 hrs and 1 lab. F

4170 Small Engine (3) Concepts and mechanics of small gasoline engines; selection, operation, adjustment, and repair of single cylinder engines. 2 hrs and 1 lab. F

4180 Equipment and Techniques for Application of Agricultural Chemicals (3) Equipment for application of liquid, solid, and gaseous chemicals; system components; operational characteristics; safety considerations; calibration; selection and management; materials handling and disposal methods. 2 hrs and 1 lab. F

4210 Agricultural Machinery and Tractors (4) Agricultural machinery and power units; adaptation to agricultural practices; field efficiencies, capacities, adjustment and servicing. Prereq: Mathematics 1550, 3 hrs and 1 lab. W

5000 Thesis (1-15) E

5110 Research Problems in Agricultural Mechanization (3) Research problems related to recent developments and current practices in agricultural mechanization. May be repeated. Maximum 9 hrs.

5210 Electromechanical Systems in Agriculture (3) Integration of electric power, mechanical equipment, structures, and environmental systems for plant and animal production, crop processing, and materials handling. Prereq: 3220 and 3510. 2 hrs and 1 lab. Sp, A

5410 Agricultural Machinery Systems Analysis (3) Analysis of field machinery; adaptation planning for sequential operations; machinery for unique and alternate production and harvesting systems; operational management. Prereq: 4510. 2 hrs and 1 lab. Sp, A

5610 Selected Topics in Agricultural Mechanization (3) Lecture, group discussion, and individual study on specialized agricultural mechanization developments. May be repeated. Maximum 9 hrs. F

Agricultural Extension Education
MAJOR
Agricultural Extension DEGREE

MAJOR

Professor: R. S. Dottin (Head), Ph.D. Pennsylvania State; L. H. Dickson, Ed. D. Cornell.

Associate Professor: C. E. Carter, Jr., Ph.D. Ohio State.

3110 Introduction to Agricultural Extension (3) History; philosophy; organization; teaching methods; relationships with other educational agencies. Graduate credit for non-majors only.

4110-20 Field Studies (3, 3) Supervised work experience with county extension agents in a designated county. Prereq: 3110 and consent of instructor. Requires living on campus for a specified time.

5000 Thesis (1-15) E

5100 Special Problems in Agricultural Extension (1-5) May be repeated. Maximum 9 hrs.

5210 Long-range Extension Program Planning (3) Development of county extension program based on effective interpretation of physical, social, economic characteristics of areas. Prereq: 3110 or consent of instructor.

5220 Seminar (3) Review of literature and developments in agricultural extension methods. Prereq: 3110 or consent of instructor.

5230 Evaluation in Programs of Agricultural Extension (3) Principles, instruments, and techniques of identifying goals, gathering and analyzing data, planning and carrying out experimental and educational programs to determine progress of clientele. Prereq: 5210 or consent of instructor.

5310 History, Philosophy and Objectives (3) Historical and philosophical foundation of informal adult education in American agriculture from the agricultural societies (1785 to present). Key figures, issues, legislative movements, farmer organizations and programs. Emphasis on agricultural extension service, its origin, legislation and growth and nature of present day objectives and programs. Prereq: 3110 or consent of instructor.

5320 Volunteer Leadership in Agricultural Extension (3) Development and implementation of training programs for volunteers in agricultural extension. Prereq: 5310 or consent of instructor.

5330 Supervision of Agricultural Extension Programs (3) Principles and procedures for supervision of effective extension programs. Emphasis on analysis of place and importance of training and leadership functions. Techniques of effective leadership in small groups and methods of developing volunteer leadership in agricultural extension work. Prereq: 5310 or consent of instructor.

Animal Science
MAJOR
Animal Science DEGREE

MAJOR

Animal Science
M.S., Ph.D.

Professors:
R. R. Johnson (Head), Ph.D. Ohio State; K. M. Barth, Ph.D. Rutgers; M. C. Bell, Ph.D. Oklahoma State; J. K. Kletner (Emeritus), P.H. Ohio State; C. G. Chamberlain, Ph.D. Iowa State; C. F. Fall (Emeritus), Ph.D. Iowa State; S. L. Hensard (Emeritus), Ph.D. Florida; H. M. Jamison, Ph.D. Tennessee; E. R. Lidwell M. S. Tennessee; J. B. McLaren, Ph.D. Auburn; G. M. Merrin, D.V.M., Michigan State; M. J. Montgomery, Ph.D. Wisconsin; R. L. Murphy, Ph.D. Wisconsin; D. S. Padfield, D.V.M., Ph.D. South Carolina; H. V. Shirley, Ph.D. Illinois; R. R. Shrode, Ph.D. Iowa State; E. W. Swanson, Ph.D. Missouri; R. T. Tugwell, Ph.D. Kansas State; C. E. Wylie (Emeritus), A.M. Missouri.

Associate Professors:

Assistant Professors:

3210 Anatomy and Physiology of Farm Animals (3) Skeleton and joints, skeletal muscles, blood and microcirculation, and respiratory, digestive, renal and endocrine systems; demonstrations of physiochemical phenomena. Prereq: Biology 1210 or Agriculture 1130. 3 hrs and 1 lab. F, W

3220 Physiology of Reproduction (3) Comparative anatomy and physiology of reproductive systems of higher vertebrates, including domestication development, implantation, prenatal growth, parturition and initiation of lactation; endocrine regulation of reproduc-
4820 Dairy Cattle Production and Management (4)
Principles of nutrition, physiology and breeding in a complete dairy cattle management program. Structure of industry, enterprise establishment, systems of production, production practices and herd improvement programs. Alternatives in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab. W, A

4830 Pork Production and Management (4)
Integration of principles of selection, nutrition, breeding, physiology and marketing in a complete pork production program. Structure of industry, enterprise establishment, systems of production, production practices and herd improvement programs. Alternatives in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab. W

4840 Poultry Production and Management (4)
Structure of poultry industry, organization and management of poultry enterprises including rearing, housing, feeding, processing and marketing. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab. W

4850 Light Horse Production and Management (4)
Integration of principles of nutrition, physiology and breeding in a complete light horse management program. Structure of industry, systems and practices of production, individual animal and herd improvement programs. Alternatives in terms of production responses and economic returns. Prereq: Completion of animal science sophomore and junior core courses or consent of instructor. 3 hrs and 1 lab. W

5100 Thesis (1-15 E)
5000 Thesis (1-5 E)

5110 Special Problems in Animal Science (1-6)
E

5200 Environmental Physiology of Farm Animals (3)
Environmental factors and measurement; physiological mechanisms of response to environmental factors and measurement; interactions of animals and environment in terms of productivity and health. Prereq: Consent of instructor. 2 hrs and 1 lab. W, A

5201 Endocrine Relations in Animal Production (4)
Endocrine glands related to growth and reproduction; hormone preparation for altering growth and reproductive processes. Prereq: 3210 or consent of instructor. 2 hrs and 1 lab. W, A

5230 Advanced in Mammalian Reproduction (3)
Germ cell development, maturation, transport, metabolism, and preservation; fertilization and embryonic mortality. Prereq: 3220 or 4230. 2 hrs and 1 lab. W, A

5240 Advanced Studies of the Secretion of Milk (3)
Effect of endocrine and nutritional factors on mammary gland development; initiation and maintenance of lactation. Prereq: 4210. 2 hrs and 1 lab. Sp, A

5311 Analytical Techniques in Animal Nutrition (3)
Physical and chemical analyses of feeds, ingredients, and biological fluids associated with nutrition research. 1 hr and 2 labs. F, Su

5322 Advanced Experimental Animal Nutrition (3)
Animal experimental techniques for digestion, absorption, nutrient balances and radioisotope tracer techniques. Prereq: 5311. 1 hr and 2 labs. Sp

5333 Nonruminant Animal Nutrition (4)
Physiological development of the digestive system of nonruminant animal during the life cycle. Concepts and methodology concerning nutrient requirements, interactions, availability and deficiencies of nutrients. Nonnutritive additives, toxins, poisons, and disease effects; nutritional effects on products. Prereq: 3330 or consent of instructor. 3 hrs and 1 lab. W

5344 Ruminant Animal Nutrition (3)
Digestive physiology of the ruminant stomach, rumen fermentation, determination of nutrient requirement and feed intake regulation of ruminant animals. Prereq: 3330. F

5410 Genetics of Animal Populations (3) Population and individual, gene and zygotic frequencies; statistical description of gene frequencies; genetic mutations; application to animal breeding. Prereq: 3420 or consent of instructor. 2 hrs and 1 lab. F

5510-20 Advanced Animal Physiology (5, 5)
Advanced animal physiology (primarily mammalian physiology). 5510—Membrane potential, central nervous system, muscular system, cardiovascular system, and control mechanisms. 5520—Respiratory, renal, gastrointestinal, and reproductive physiology, acid base mechanisms, and metabolism. Should be taken in sequence if both courses are taken. Prereq: General undergraduate anatomy and physiology and Biochemistry 4110 or equivalent or consent of instructor. Biochemistry 4120 also recommended. (Same as Zoology 5510-20.) 4 hrs and 1 lab. W, Sp
Entomology and Plant Pathology

MAJOR
Entomology and Plant Pathology

DEGREE
M.S.

Professors:
C. J. Southards (Head), Ph.D. North Carolina State; J. W. Hilfy, Ph.D. Ohio State; L. F. Johnson, Ph.D. Louisiana State; C. D. Flessa, Ph.D. Clemson.

Associate Professors:

Assistant Professors:
E. C. Bernard, Ph.D. Georgia; M. R. McLaughlin, Ph.D. Illinois.

4010 Biology of Soil Microorganisms (4) Morphology, physiology, and ecology of soil organisms, decomposition of organic matter, chemical transformations, and interactions between soil organisms and higher plants. Prereq: 3130. 3 hrs and 1 lab.

4030 Forest and Shade Tree Entomology (3) Identification, biology, ecology, and control of forest and shade tree pests. Prereq: 3210 or equivalent. 2 hrs and 1 lab.

5000 Thesis (1-15) E

5010 Research Methods and Instrumentation in Plant Pathology and Entomology (3) Techniques for laboratory, field, and greenhouse research in plant pathology and entomology. 1 hr and 2 labs.

5110 Plant Disease Diagnosis (3) Diagnosis of plant diseases, disease symptoms, causal agents and control measures. Prereq: 3130.

5120 Insect Diagnostic Clinic (3) Identification of insects and insect damage to crops, livestock and residences. Obtaining of insects and damaged specimens, diagnostic characteristics and control measures. Prereq: 3210 or Zoology 3110.

5210 Plant Parasitic Nematodes (4) Morphology, physiology, taxonomy, and ecology of plant parasitic nematodes with emphasis on host-parasite relationships. Prereq: 3 hrs biological science or consent of instructor. (Same as Zoology 5210). 2 hrs and 2 labs.

5220 Plant Disease Control (3) Basic problems and principles involved in controlling plant diseases. Prereq: 3130.

5230 Field Crop and Vegetable Insects (3) Taxonomy, biology, and control of insects affecting field and vegetable crops. Prereq: 3210 or equivalent course in applied entomology. 2 hrs and 1 lab.

5240 Plant Virology (4) Symptoms, taxonomy, cytology and epidemiology of virus infection; structure, morphology, replication, transmission, purification, characterization, and classification of plant viruses; serology, plant pathogenic viroids, mycoplasmas and viroids. Prereq: 3130 or consent of instructor. 2 hrs and 2 labs.

5250 Medical and Veterinary Entomology (4) Morphology, taxonomy, biology and control of arthropod parasites and vectors of pathogens in humans and animals. Ecology and behavior of vectors in relation to pathogen transmission and control. Prereq: 3210, general entomology, or consent of instructor. 3 hrs and 1 lab.

5260 Insect Pest Management (4) Principles and applications of biological, cultural, genetic, behavioral, and chemical methods of control to maintain pest populations below economic threshold levels.

5310 Special Problems in Plant Pathology or Econo- my. May be repeated. Maximum 3 hrs.

5410 Seminar (1) Review of literature and current research in plant pathology and economic entomology. May be repeated. Maximum 3 hrs.

Food Technology and Science

MAJOR
Food Technology and Science

DEGREE
M.S.

Professors:
J. T. Miles (Head), Ph.D. Wisconsin; J. L. Collins, Ph.D. Maryland; H. O. Jaynes, Ph.D. Illinois; C. C. Meltan, Ph.D. Kansas State; W. W. Overcast, Ph.D. Iowa State.

Associate Professors:
B. J. DeMott, Ph.D. Michigan State; S. L. Kitzmann, Ph.D. Tennessee.

Assistant Professors:

3020 Dairy Products I (4) Procurement, processing and distribution of fluid milk. Manufacture of frozen and dry fluid milk products. 3 hrs and 1 lab.

3840 Meat Science (3) Processing methods, carcass characteristics of meat animals; slaughter, cutting, selection, curing, freezing and cookery. 2 hrs and 1 lab. W, Sp.


4130 Food Chemistry I (3) Minerals, fats, oils and vitamins in food as affected by processing and storage. Prereq: Nutrition 3320 or equivalent. 2 hrs and 1 lab. Sp.

4140 Food Chemistry II (3) Reactions of proteins, carbohydrates and natural food colorants in food materials. Protein structure, food enzymology and browning reactions. Effects of storage and processing on proteins and carbohydrates with emphasis on nutritional value and functionality. Prereq: Nutrition 3320 or equivalent. 2 hrs and 1 lab. W.

4200 Food Processing II (4) Prevention of deterioration and spoilage of foods. Methods of preservation and packaging. Prereq: 2200 and Agricultural Mechanization 3510. 3 hrs and 1 lab. F.

4210 Food Additives (3) Substances used in food manufacturing with emphasis on properties and functions. Prereq: Nutrition 3320 or equivalent. 2 hrs and 1 lab.

4300 Food Processing III (3) Water, sanitation and waste control in food industry. Prereq: Agriculture 1150 and Microbiology 2910-19 or equivalent. W.

4410 Food Crop Products (3) Foods products from crops with emphasis on types, manufacturing systems, quality attributes, and utility. F.

4420 Bakery Products (3) Baking ingredients and their interactions during production and storage of bakery products. Prereq: 4130 and Chemistry 2230 or equivalents. 2 hrs and 1 lab. Sp.

4510 Microbiology in Food Manufacturing (3) Relationship of growth of common food microorganisms in fermentative and enzymatic changes occurring during production and processing of foods. Prereq: Microbiology 2910-19 or equivalent. 1 hr and 2 labs. F.

4820 Fermented Foods (3) Role of microorganisms in preparing foods with emphasis on development of certain desirable characteristics, flavor, aroma, texture, and keeping quality. Prereq: Microbiology 3810. 2 hrs and 1 lab. Sp.

4840 Meat Products Manufacturing (3) Prepared meat products. Effects of ingredients and processing on product characteristics. Prereq: 4130 or consent of instructor. 3 hrs and 1 lab. W.

4920 Analysis of Physical Properties of Foods (4) Physical states of food materials, water, viscosity, color, texture, flavor, and other sensory characteristics. Prereq: 4030 and Agricultural Mechanization 3510 or consent of instructor. 3 hrs and 1 lab. W.

4940 Advanced Meat Science (3) Qualitative and quantitative characteristics of meat and poultry related to palatability, cooking, preservation, packaging and merchandising. Prereq: 3840. F.

5000 Thesis (1-15) E

5100 Seminar (1) Reports and discussions of selected topics from research literature. May be repeated. Maximum 3 hrs. F, W, Sp.

5120 Food Color (3) Chemistry of natural food pigments and measurement, notation, and preservation in food. Prereq: Nutrition 3320. 2 hrs and 1 lab. W.


5140 Food Flavors (3) Food flavor maintenance and improvement. Natural and synthetic compounds in manufacture of foods with predictable consumer acceptance. Technology of flavor manufacture and formulation. Techniques for determining flavor profiles. Prereq: 4130. 2 hrs and 1 lab. W, A.

5150 Fats and Oils (3) Application of scientific principles to commercial technology of fats and oils. Prereq: 4130. 2 hrs and 1 lab. W, A.

5200 Research (1-5) Research in selected areas. Consent of department head. Credits and hours to be arranged. May be repeated. Maximum 10 hrs. E.

5310 Food Products Development (3) Fundamentals of art, science, and technology applied to research, development, and marketing of new food processes and products. Prereq: 4210. 2 hrs and 1 lab. W.

5320 Food Thermobiology (3) Fundamentals of heat transfer as related to rate of destruction of microorganisms and to rate of loss of food quality through calculation of minimum safe thermal processes for hermetically-sealed packages of foods. Prereq: 4200. 2 hrs and 1 lab. W, A.

5420 Advanced Food Quality Assurance (3) Applications of current instrumental methods used to control food manufacturing processes. Prereq: 4140. 2 hrs and 1 lab. F.

5510 Meat Technology (3) Physical and chemical changes that occur during conversion of muscle to meat; the influence these changes have on quality and composition; meat packaging, preservation, and quality control. Prereq: 3840. 2 hrs and 1 lab. Sp.

5530 Microorganisms Common In Food Products (3) Identification of desirable and undesirable microorganisms in food products and relationship to manufacturing operations; isolation and characterization of microorganisms from food products and plant equipment. Prereq: 4810 or Microbiology 3810. 3 labs. W.

5540 Microbial Cultures In Foods (3) Physical and chemical environment and metabolism of microorganisms as related to cultured foods. Prereq: 4810 and Microbiology 3810. 2 hrs. and 1 lab. Sp.

Forestry, Wildlife and Fisheries

MAJORS
DEGREES

Forestry
M.S.

Wildlife and Fisheries Science
M.S.
purposes; tree and stand growth; site evaluation; field problems; Prereq: 3110 and Agricultural Mechanization 3140.

4004 Forest Entecology (3) Management of forest lands by public and private organizations; "multiple-use" concept as it influences management decisions; impact of public pressure for outdoor recreation development; management prescriptions. Prereq: 4006. S/N/C only. Sp

4006 Silvicultural Methods (4) Methods and application of intermediate and regeneration cuttings; site preparation, forest nutrition, and modifications of cutting methods to obtain desired goals and benefits. Prereq: 3320, 4002, 4003. Sp

4020 Forest Watershed Management (3) Water as a forest resource; role of forests in the hydrologic cycle; control of water quantity, quality, and regimen; watershed planning. Prereq: 3320 or consent of instructor. Two overnight field trips. W

4210 Forestry Organization and Administration (3) Planning, organizing, and leadership concepts and cases; problem analysis and decision making in forest resources management. Prereq: Consent of instructor. 2 hrs and 1 lab. F

4220 Forest-Resource Management (4) The forest as an integration of resource uses; review of traditional and multiple-use concepts; valuation of forest resources for decision making and planning; taxation of forest firm. Prereq: 4210. W

4230 Forest-Resource Management Plans (4) Field problems and case studies in forest-resource management; the forest as a system; management of forest resources; site preparation, watershed services, and wildlife; producing multiple services; preparation of a complete plan based on optimizing forest uses. Prereq: 4210. Sp

4240 Interpreting Forest Resources (3) Principles and techniques of interpreting forest resources; importance of environments; future management of forest resources; development and administration of interpretive services. Possible overnight trips required. 2 hrs and 1 lab. Sp

4330 Forest Policy (3) History of forestry in United States with emphasis on development of forest resources; current policies influencing forest resources; brief survey of policy implications of forest resource organizations in public and private sectors. Prereq: 4004. W

4340 Aerial Photography in Forest-Resource Management (3) Use of conventional aerial photographs in forest resources management; interpretation of detail; applications of remote-sensed images. Prereq: Forest Resources 4210 and 4230. 3 hrs and 1 lab. Sp

4420 Forest Tree Improvement (3) Forest tree improvement relative to silviculture; nature and purpose of tree improvement and forest genetics; principles and techniques of tree improvement; importance of seed source; variability and taxonomy of forest trees; forest reproduction, and physiology of forest trees. Prereq: 4210, Biology 3110, and consent of instructor. 2 hrs and 1 lab. F

4510 Fish Populations (4) Principles and methods of fish population estimation; sampling techniques and applications. Prereq: 4510. F

5011 Problem Analysis in Forest Resources (3) Problem identification, analysis and solution in forest resources management. Identity, analyze, and prepare written report on a problem. Topic and report must have approval of all committee members. Formal presentation to faculty and students. Available only to students in the non-thesis option for the M.S. in Forestry.

5110 Special Problems in Forestry (1-5) May be repeated. Maximum 2 hrs. E

5220 Seminar in Forest Tree Biology (3) Growth, reproduction, and physiology of forest trees; forest ecology; variability and taxonomy of forest trees. Prereq: 4006 or consent of instructor. W

5230 Seminar in Forest Management (3) Newly developed systems in forest organization and regulation; financial and operational planning in forest management. Prereq: 4210 or equivalent. W

5240 Seminar In Forest Genetics (3) Population genetics and speciation, variation patterns and heritability in forest trees; gains with different breeding methods; planning and conducting forest genetics research. Prereq: 4420, Biology 3110, and consent of instructor. W

5250 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forests and associated lands; analysis and critique of specific operational plans; overnight field trips may be required. 2 hrs and 1 lab. F

5260 Industrial Forestry (3) Structure and analysis of wood-using firms and industries. Forest taxation, land tenure and wood procurement alternatives. Development and application of forestry planning models. Prereq: 4230 or consent of instructor. W

5270 Topics in Forest Industries Management (3) Current problems in industrial forestry. Executives from public and private business sector (concerned with forest industry) conduct classes in selected topics. Prereq: 4230 or consent of instructor. F

5280 Seminar in Forest Biometry (3) Theory and application of forest biometric procedures for area, volume growth increment, future yield, and forest growth modeling. Prereq: 4230 or equivalent. 3 hrs. W

5310 Seminar (1) Current developments in forestry. Required of each graduate student in residence Winter Quarter. May be repeated. Maximum 2 hrs. S/N/C only. W

Wildlife and Fisheries Science

3320 Wildlife Management (3) Lives and ecological relationships of wild animals; biological, social, and economic aspects of their management. 2 hrs and 1 lab. F

4450 Game Mammals (4) Classification, identification, distribution, natural history, and management principles of game mammals in North America. Prereq: 3320 or 1 yr of zoology. 2 hrs and 2 labs. F

4460 Game Birds (4) Biology, classification, identification, distribution, and management of game birds in North America. Prereq: 3320 or 1 yr of zoology, 3 hrs and 1 lab plus one weekend field trip. W

4510 Fish Populations (4) Principles and methods of fish population estimation; sampling techniques and equipment; population dynamics; age and
growth; Prereq: Biology 3130, 8 hrs mathematics, or consent of instructor. 3 hrs and 1 lab or field period. W

4520 Fisheries Management (4) Methods of warm and cold water fisheries management including techniques of biological assessment, public relations, habitat manipulation, and stocking. Prereq: Biology 3130 or consent of instructor. 3 hrs and 1 lab or field period. S

5000 Thesis (1-15) E

5110 Special Problems in Wildlife and Fisheries Science (1-6) May be repeated. Maximum 9 hrs. E

5210 Seminar in Wildlife Conservation (3) Current studies, problems and issues in wildlife agencies and organizations and their programs. Prereq: 3230 or consent of instructor. W, A

5310 Seminar (1) Current developments in wildlife and fisheries science. Required of each graduate student in residence Winter Quarter. May be repeated. Maximum 6 hrs. S, W

5400 Advanced Topics in Wildlife Science (3) Recent advances and concepts, research techniques, and analysis of current problems. Prereqs: 4450 and 4460 or consent of instructor. May be repeated. Maximum 6 hrs. Sp

5450 Wildlife Diseases (3) Necropsy of birds and mammals. Recognition of various diseases and methods of diagnosis in field and lab. Investigative procedures concerning wildlife diseases. Prereq: 1 yr zoology, or a course in parasitology. 4450 or 4460, or consent of instructor. 2 hrs and 1 lab. Sp

5460 Predator Ecology (3) Dynamics of terrestrial vertebrate predator populations in human-altered and relatively unaltered environments. Principles of predator biology and management. Prereqs: 4450 and 4460 or consent of instructor. 2 hrs and 1 lab. Sp

5500 Advanced Topics in Fish Science (3) Recent advances and concepts, research techniques, and analysis of current problems. Prereq: 4520 or consent of instructor. May be repeated. Maximum 6 hrs. Sp

5550 Fish Physiology (3) Mechanisms of circulation, excretion, osmoregulation, and thermal control of these systems in fishes. Practical applications of fish physiology in water pollution assessment, fish culture, and fish management. Prereq: Consent of instructor. 2 hrs and 1 lab.

Ornamental Horticulture and Landscape Design

MAJOR

Ornamental Horticulture and Landscape Design M.S.

Professors:
D. B. Williams (Head), Ph.D. Pennsylvania State; L. M. Callahan, Ph.D. Rutgers.

Associate Professors:

Assistant Professor:
D. T. Kendall, MLA Louisiana State.

3030 Plant Propagation (3) Physiology, methodology, and environmental requirements for propagation. Prereq: 8 hrs of biological science. 2 hrs and 1 lab. Sp

3110 Greenhouse Management (3) Factors involved in management of greenhouses for production and research. Structures, soils, pest control measures, heating, ventilating, lighting, water supply, crop success. Prereq: Consent of instructor. 2 hrs and 1 lab. F, Sp

3620 Intermediate Landscape Design (4) Application of skills acquired in 3610 to variety of landscape problems. Factors affecting landscape design relates to contemporary applications. Technical aspects of planning design and implementation of plant materials in the design of small and moderate scale landscape situations. Prereq: 3610 or equivalent. 1 hr and 2-3 hr-labs. F, W

3630 Landscape Construction and Contracting (4) Construction methods, materials and practices of landscape and nursery contracting. Site layout, procedures, earthwork and drainage, landscape construction materials; application through detail design and preparation of specifications. Landscape contracts, specifications and bidding procedures. Prereq: 3310, 3810; Agricultural Mechanization 2130 or equivalent. 2 hrs and 3-2 hr-labs. Sp

4150 Nursery Production (4) Modern methods of producing liners, field and container grown woody ornamental plants. History and evolution of nursery industry and modern production recommendations for woody ornamental plants. Prereq: 3300, 3810 and Plant and Soil Science 2130. 2 hrs and 2 labs. F, Sp

4160 Nursery Management (3) Modern management methods for wholesale and retail nurseries, garden centers, and landscape contractors. Prereq: 3310. 2 hrs and 1 lab.

4180 Park Design (4) Design criteria for parks and outdoors recreation systems. Park site selection, analysis, planning and management as related to needs and design criteria affecting resources. Evaluation of aesthetic and functional quality of parks and their impact on environmental quality of rural and suburban environments. Prereq: 3320. Recommended: 4140. 2 hrs and 2 labs. Sp

4190 Advanced Landscape Design (4) Comprehensive application of landscape design skills and knowledge in design of major projects. Analysis, programming, planting design, construction detailing, estimating, specifications, contracts, and bidding. Prereqs: 3310, 3820, 3830. 1 hr and 2-3 hr-labs. W

4220 Advanced Turfgrass Management (4) Principles and scientific basis of turfgrass culture: adaptation, ecology, physiology, soil fertility and grass nutrition; climatic influences on grass culture; physiology of clipping and water management; traffic effects and compaction; and the physiological influences of pest infestations and control measures. Prereqs: 3210. 3 hrs and 1 lab. W

4320 Speciality Floriculture (3) Specific practices in production of minor cut flower and potted plant crops. Production methods for scheduling flowering or vegetative growth of speciality florist crops in controlled environments. Prereqs: 3410. 2 hrs and 1 lab. Sp

4400 Individual Problem Study (1-5) May be repeated. Maximum 10 hrs. E

5000 Thesis (1-5) E

5100 Special Problems in Ornamental Horticulture and Landscape Design (3) May be repeated. Maximum 9 hrs. W

5210 Golf Course Design, Development, and Management (4) Principles and applications in design, development, and management of golf courses. Selection and utilization of grass varieties and other plant materials and development of specifications for nutritional, chemical, and mechanical maintenance. Financing, equipment, labor management, and public relations. Prereq: 4220 and consent of instructor. 2 hrs and 2 labs. Sp

5310 Park and Public Grounds Management System (4) Legal considerations and economic factors affecting maintenance systems requirements. Protection and cultural care of trees, shrubs, and turf in parks and public grounds; pressure of vandalism and maintenance of park and recreation facilities. Resource management and performance analysis. Development and analysis of maintenance systems and specifications. Maintenance programming. Prereq: 4190 or consent of instructor. 2 hrs and 2 labs. F

5410 Histological Microtechnique (4) Preparation of plant tissue for microscopic examination, paraffin and plastic embedding, microtomy and mounting of sections, and preparation for histological, cyto-photography. Prereq: General biology or botany; general and organic chemistry; and consent of instructor. 2 hrs and 2 labs. W

5500 Seminar (1) Current literature and developments in ornamental horticulture and landscape design. May be repeated. Maximum 3 hrs. F, W, Sp

5610 Advanced Nursery Production (4) Preparation and use of growth media for woody ornamental plants; nutrition of ornamental plants including diagnosis, prevention and correction of mineral deficiencies. Prerequisites: 3300, 3810, 4460 or equivalent, and Plant and Soil Science 3040. 3 hrs and 1 lab. W

Graduate credit for non-majors only.

Plant and Soil Science

MAJOR

Plant and Soil Science M.S., Ph.D.

Professors:
L. F. Swatzy (Head) Ph.D. North Carolina State; F. F. Bell, Ph.D. Iowa State; B. V. Conger, Ph.D. Washington State; H. A. Fridburg, Ph.D. Iowa State; L. M. Josipsson (Emeritus), Ph.D. Wisconsin; W. L. Parks, Ph.D. Purdue; W. E. Reeds, Ph.D. Wisconsin; N. E. Springer (Emeritus), Ph.D. California (Berkeley); H. D. Swingler (Emeritus), Ph.D. Louisiana State.

Associate Professors:

Assistant Professors:
D. E. Dayton, Ph.D. North Carolina State; W. J. McLain, Ph.D. Louisiana State; D. R. West, Ph.D. Nebraska; J. D. Wolf, Ph.D. Auburn.

3230 Crop Ecology (3) Crops and environment, geographic location, site, heat, light, water and interplant relationships as a basis for judgment of cultural practices used to modify environmental factors. Prereq: 8 hrs biological science. 2 hrs and 1 lab. W

3240 Crop Physiology (3) Physiology of crop plants; growth phenomena related to crop production; use of general theories of physiology; effects of season, growth; regulating substances, functions of light, heat, air, minerals, and water. Prereq: 8 hrs biological science. 3 hrs and 1 lab. W

3210 Soil Fertility and Fertilizers (3) Properties of soils in relation to plant nutrient availability and uptake. Methods of soil fertility evaluation and principles of fertilizer use, manufacture and properties of fertilizers. Prereq: 2130. 3 hrs and 1 lab. W

3210 Grain and Oil Crops (3) Distribution, improvement, morphology, culture, harvesting, and utilization of corn, small grains, grain sorghum, soybeans and related crops. Prereq: 2130. 8 hrs biological science. 2 hrs and 1 lab. W

3340 Forage Crops (4) Characteristics, adaptation, improvement, management, and utilization of grasses and legumes for pastures, hay, and silage. Prereq: 2130. 8 hrs biological science. 3 hrs and 1 lab. F, S

3360 Cotton and Tobacco (4) Characteristics, adaptation, improvement, culture, harvesting, and marketing of cotton and tobacco. Prereq: 2130. 8 hrs biological science. 3 hrs and 1 lab. F

3310 Fruit Crops Management (4) Soils, planting, cultivation, development, and growing media for fruit and vegetable plants; pest control, harvesting, packing, storage, and processing. Prereq: Entomology and Plant Pathology 3130 and 3210. 3 hrs and 1 lab. F

3220 Soil Management (4) Soil management for crop production including cropping systems, fertilizer use, and tillage operations for specified soil

Animal Science/Veterinary Medicine

Professor:
R. R. Johnson (Head), Ph.D. Ohio.

Associate Professors:

Assistant Professors:

Microbiology

Professors:
A. Brown (Head), Ph.D. Chicago; R. W. Beck, Ph.D. Wisconsin; B. T. Rouse, Ph.D. Guelph; J. M. Woodward, Ph.D. Kansas.

Associate Professor:

Courses

5010 Comparative Pathology (5) Lectures and lab. Emphasis on pathogenic mechanisms. Comparative aspects considered. Lectures reinforced by lab study of gross, microscopic and ultrastructural lesions. Prereq: Zoology 3060, 3320.

For specific course listings please see College of Agriculture, Department of Animal Science, and College of Liberal Arts, Department of Microbiology.
School of Architecture

Roy F. Knight, Dean
William J. Lauer, Associate Dean

Professors:

Associate Professors:
J. Burell, M.Arch.; Academy of Fine Arts (Prague); A. Derman, Ph.D. Pennsylvania State; R. M. Kelso, M.S. Tennessee; A. J. Lester, B. Arch. North Carolina State; W. E. Martella, B. Arch. California (Berkeley); M. S. Moffatt, Ph.D. Massachusetts Institute of Technology; R. T. Quinn, Ph.D. Lehigh.

Assistant Professors:

Lecturers:
A. G. Anderson, M.A. Missouri; M. C. Martin.

4031 Accelerated Historical Studies I (4) Introduction to evolution of architectural periods with selected illustrations from local examples. Advanced examination of relationship of historical and cultural developments to the built environment from antiquity through Byzantine period with applications to present-day design issues. Independent student projects on topics related to course material. Prereq: 4031 and 4032. Sp

4170 Introduction to Preservation and Restoration (4) History and theory of restoration and preservation. Sp

4175 Technology of Preservation (4) History of technology and materials, methods analysis and dating, techniques of preservation. W

4311 Historic Preservation Laboratory (0) Directed study: buildings of historical significance. Techniques of preservation; research of historic methods of construction; and studies of viable uses. Rehabilitation, restoration, preservation, and adaptive uses. F, W, Sp


4373 Structural Design for Protection Against Extreme Hazards (4) Probability, risk, human values, insurance. Survey of possible hazards; floods, fire, hurricanes, and tornadoes, earthquakes, nuclear effects, internal and external explosions. Building code and engineered design of steel, masonry, concrete, and wood structures to resist extreme effects. Protective construction for human and system needs. Fire protection engineering, fire phenomena, life safety and analysis. High-rise building fires.

4736-37 Planning and Design of Tall Buildings (4) Introduction to generalized matrix methods of analysis of structures. Review of matrix algebra and vectors; development of member stiffness and flexibility matrices; assembly of structure stiffness and flexibility matrices. Prereq: Consent of instructor. (Same as Civil Engineering 4850 and Engineering Science and Mechanics 4850.) Su

4910 Architectural Photography (4) Photography as a design, research and presentation medium. Emphasis on architectural photography using black and white media. E

4920 Advanced Architectural Photography (4) Application of special photographic techniques with emphasis on color printing and processing. Prereq: Consent of instructor. F, W, Sp

4940 Proxemics (4) Seminar for graduate students and upper division students. Introduction to proxemic research. Definition of proxemic variables. Proxemic notation exercises. Analysis of etic data and the identification of emic categories. Observer bias and methods of bias reduction. Members of seminar required to design, conduct, and present original proxemic research. Prereq: 2000 or consent of instructor.

4950 Environment as Code (4) Advanced lecture of graduate students and upper division students. Advanced lecture course of theoretical issues involved in considering environment as a medium of human communication. Codes and nature of coding behavior in animals and humans. Relationship between coding behavior and the organization of the central nervous system. Coding and social behavior. Communication process as a generic model of human environment relations. Hierarchical aspects of environmental communications. Prereq: 2000 or consent of instructor.
College of Business Administration

C. Warren Neel, Dean
John R. Moore, Associate Dean
Francis A. Chamblin, Assistant Dean for Graduate Programs
Liston M. Fox, Assistant Dean for Undergraduate Programs
John A. Bachmann, Assistant Dean for External Affairs, Director, Management Development Programs
David A. Hake, Director, Center for Business and Economic Research

Graduate programs of the College of Business Administration are designed to prepare men and women to assume executive, managerial and professional positions in the increasingly complex world of domestic and international business and industry, teaching and research, government and institutional management.

Viewing the business firm as operating in a dynamic social, political and economic environment which demands leaders capable of dealing with innovation and rapid change, the College places central importance on development of students' thought processes rather than on specialized subject matter and courses descriptive of past practices. Emphasis is focused on flexibility of mind, receptivity to new ideas, capacity to adapt one's reasoning powers and judgment to rapid changes, vigor and imagination in using the mind, ability to reason analytically and logically and, above all else, inculcation of an irrepressible desire to continue to learn and grow in knowledge throughout the student's life.

Graduate Programs

The College of Business Administration offers programs leading to seven advanced degrees: the Doctor of Business Administration, the Doctor of Philosophy with majors in Economics and in Management Science, the Master of Arts and the Master of Arts in College Teaching with a major in Economics, the Master of Science with majors in Economics and Statistics, the Master of Accountancy in Accounting, and the Master of Business Administration. The Department of Management and the Department of Psychology in the College of Liberal Arts jointly offer an intercollegiate program in Industrial and Organizational Psychology leading to the Master of Science and Doctor of Philosophy degrees. (See page 97). Also, the Department of Management Science offers an intercollegiate program leading to the Master of Science degree. (See page 98).

The two College-wide programs, the MBA and the DBA, are described below. Descriptions of other degree programs will be found under the appropriate departmental or program headings.

Academic Common Market. An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UTK on an in-state tuition basis. Programs in the College of Business Administration available to residents of the states indicated include: MBA (all concentration areas) - West Virginia; MBA (Transportation and Logistics) - Virginia and West Virginia; Industrial and Organizational Psychology (M.S. and Ph.D.) - Alabama, South Carolina, and Virginia. Additional information may be obtained from the Graduate Programs office of this college.

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. A full-time student can complete the program in six academic quarters. Those with degrees in business earned at an institution accredited by the American Assembly of Collegiate Schools of Business (AACSB) should be able to complete the program in five quarters.

The complete MBA program with a concentration in management is offered by the regular graduate faculty of the College for part-time students on the Knoxville campus, at Oak Ridge and at the Kingsport University Center. The part-time student carries two courses per term in classes scheduled in the evening hours and, like the full-time student, typically is enrolled in each of the four quarters of the year.

The program consists of the MBA core (twelve to nineteen courses depending upon exemptions based on prior studies and/or proficiency examinations) and a concentration/electives block of eight courses. Each course is 3 quarter hours of graduate credit. Thus, the total program may consist of from 60 to 81 quarter hours.

Prerequisites. Upon matriculation, the student must have received a bachelor's degree from a regionally accredited institution, but there are no specific course prerequisites required to begin the program except college level mathematics through at least one course in calculus. Those electing the management science or statistics concentration must have completed two years of college level calculus. Those admitted to the accounting concentration should plan on up to two additional quarters for undergraduate prerequisite courses that are taken during the first year of the program. Although not required, completion of undergraduate courses in certain areas may qualify the student for exemption from some core courses. (See information under "Exemption from Core Courses" on page 37). MBA Core. The following courses are required in each student's program unless an exemption from one or more courses is granted as provided below under the heading "Exemption from Core Courses." All courses are 3 credit hours. The core courses are:

Accounting 5010, 5020, 5030; Business Administration 5310; Business Law 5010; Economics 5010, 5020, 5030; Finance 5010, 5020; Management 5010, 5020; Management Science 5010, 5020; Mathematics 5052; Office Administration 5050; Statistics 5010, 5020.

*Accounting 5020 and 5030 are waived for students who complete the concentration in accounting.

*See notation under the heading "MBA Concentration" in the Management Science Program section (page 44).

*See notation under the heading "MBA Concentration" in the Statistics Department section (page 46).
### Prerequisite Relationships of MBA Core Courses

Read across table to identify prerequisites/corequisites for courses listed in left column

- **Prerequisite** = Prerequisite or corequisite
- • Prerequisite to a prerequisite or corequisite

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<th>Prerequisite</th>
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*UTK Math 1550, 5051 or equivalent.

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### Concentration and Electives

An applicant for admission must select a concentration area. However, a change to another area may be requested at any time after entering the program. Among the 8 courses in the concentration/electives block, at least 4 but not more than 6 must be in one of the following concentration areas (for specific courses required in some concentration areas, see departmental sections on following pages):

- **Accounting**
- **Economics**
- **Finance**
- **Forest Industries Management**
- **Governmental Financial Administration Management**
- **Management Science**
- **Marketing**
- **Real Estate and Urban Development**
- **Statistics**
- **Transportation and Logistics**

The remaining elective courses (2 to 4) must be in fields outside the concentration area, normally selected from MBA courses offered in other departments of the College, and may comprise a second concentration area of 4 courses. Up to 2 courses (6 hours) in this block may be taken outside the College of Business Administration. No more than 3 courses numbered below 5000 may be included in this 8-course block. Courses numbered below 4000 normally are not approved for the MBA program. Before beginning the concentration/electives part of the curriculum the student must have his/her program approved by the appropriate faculty advisor.

### Exemption from Core Courses

A student may be exempted from certain core courses on the basis of having recently completed equivalent undergraduate courses in these subjects with grades of C or higher at a regionally accredited institution. Recently completed means, for mathematics, completion of the last course or regular use of math tools within three to four years of matriculation, and for other areas within five to six years of matriculation. Courses in this category (and the approximate undergraduate equivalent work) are:

- **Accounting 5010** (6 quarter hours, fundamentals of financial accounting)
- **Business Law 5010** (6 quarter hours, the legal and social environment of business)
- **Economics 5010** (9 quarter hours, principles of economics—macro and micro)
- **Mathematics 5052** (12 quarter hours, including college algebra and calculus. See topics included in Mathematics 5051 and 5052)
- **Office Administration 5050** (3 quarter hours, introductory course in computer science with programming).

In addition to the above, a graduate of an AACSB accredited undergraduate business program may request exemption from one or both of the core courses in the area of his/her undergraduate major field, provided at least 30 quarter hours (20 semester hours) of course work were completed in the major area no more than five years prior to matriculation, and a grade average of 3.0 or higher (on a 4.0 scale) was earned for all courses in the major. Students requesting such an exemption must petition the appropriate department head. The department may require the student to pass a proficiency examination over any course for which exemption is requested. (See page 37.)
A minimum of 60 quarter hours of graduate credit is required to earn the degree. If a student qualifies for exemption from a course in addition to those provided for in the two categories described above, whether by proficiency examination or otherwise, an additional elective course approved by the student's advisor will be included in the student's curriculum for each such exempted course so as to meet the 60-hour minimum requirement.

Law students holding degrees from foreign institutions normally may not be exempted from taking core courses.

**Transfer Credits.** Graduate level courses taken at other AACSB accredited institutions that otherwise conform to University policy (page 18) may be credited toward MBA degree requirements within the following limits:
- Maximum: 6 hours
- Concentration Area: 3 hours (provided at least 12 hours of course work at this institution are included in each concentration area)
- Elective Area: 3 hours

The maximum number of hours that may be transferred is 9 quarter hours.

**Other Requirements.** The Application for Admission to Candidacy (see page 19) must be completed and signed by the student or his/her sponsor, and submitted to the Director of Graduate Programs in Business Administration, signed by the department head, and submitted to the Vice Chancellor for Graduate Studies and Research. To qualify for the degree, the student must achieve a B average (3.00) or above in MBA core courses required in his/her program, a B average in his/her concentration area(s) and a B average or higher in the overall program. In lieu of passing a written comprehensive examination the student must satisfactorily demonstrate his/her ability to analyze and solve multi-functional problems of the administrative processes and policy determination and to integrate the concepts of the various areas embodied in the curriculum of the program. The student is tested in these areas in the courses of the MBA core, particularly in the capstone course, Business Administration 5310—Business Policy, as well as in work required in the concentration areas.

**Application and Admission.** Application materials may be requested from the Graduate Programs Office, College of Business Administration, The University of Tennessee, Knoxville, Tennessee 37916. Applicants whose programs will include Accounting 5010, Economics 5010 and Office Administration 5050 must begin either in the summer or fall term. Those who are exempted from these courses and who are prepared to take Mathematics 5052 may begin either in the fall or winter quarter. There are three rounds of admittance to which students are admitted. The application deadlines shown below are the dates when the GMAT must have been taken and all other required documentation must be in the Graduate Business Programs Office. Application materials should be requested well in advance of these dates.

<table>
<thead>
<tr>
<th>Application Deadlines</th>
<th>Autumn Quarter</th>
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<td>Winter</td>
<td>Apr. 1, Aug. 1</td>
<td>Nov. 1</td>
<td>Apr. 1</td>
<td>Aug. 1</td>
</tr>
</tbody>
</table>

For admission to the MBA program, consideration is given to the applicant's academic record and work experience. In addition to the last two years of undergraduate work and previous graduate studies, to scores on the Graduate Management Admission Test (GMAT) and the Test of English as a Foreign Language (TOEFL) for those whose native language is not English, to work experience and other activities which demonstrate potential for leadership, and recommendations from professors or 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.

**Dual J.D.-MBA Program**

The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration. Each college will award a degree for acceptable performance in a maximum of 12 quarter hours of approved graduate level courses offered by the College of Business Administration. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a Law School 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 basis for any appropriate purpose in the college offering the course.

**The DBA Program**

The basic objective of the Doctor of Business Administration program is to provide the student with an opportunity to attain the intellectual competence necessary to meet the highest standards for advancement to a professional position in an academic institution, business, or the government. The student will develop a sound foundation for expanding knowledge in the student's chosen area of concentration and will contribute through research to advancement of the state of knowledge in this area. Moreover, the student's educational experience should develop perspective toward education for business in a manner that will enable the student to spearhead innovation and change in response to needs. The DBA program is structured around four major features. First, it recognizes the interdisciplinary thrust of graduate education and provides the student with a sound foundation for expanding the body of knowledge related to business systems and their interactions with other socioeconomic systems and environmental forces. Second, the student's program is flexible enough to respond to individual interests and yet is formulated within a sound framework to achieve overall objectives. Third, emphasis is placed upon conceptual foundations and analysis of decision-making processes rather than the descriptive aspects of business administration. Fourth, the student does advanced work in the basic disciplines of economic theory, behavioral science and quantitative science to provide the necessary foundation for research.

**Foundation Requirements.** The program is designed for students who have completed a bachelor's degree in business administration or equivalent. Exceptions are made in cases where undergraduate records in any area may be admitted directly to the DBA program and may, if they desire, earn the MBA degree in a coordinated program of study. Program prerequisites include the following college mathematics to include a course in calculus, a course in statistics, knowledge of computer programming, and intermediate economic theory (micro and macro). See page 37 for MBA degree requirements. Entering students deficient in any of these facets of the dual program by taking courses in both colleges as required.

**Awarding of Grades.** For grade recording purposes in the College of Law for graduate business courses and in the College of Business Administration for law school courses, grades are awarded comparable to either Satisfactory or No Credit and will not be included in the computation of the student's grade average or class standing in the college where such grades are so converted. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a Law School 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 basis for any appropriate purpose in the college offering the course.
areas may enroll in courses designed to meet these requirements.

**Course Requirements for the DBA Program**

Each student must demonstrate, by passing appropriate graduate level courses and/or by examination, an understanding of the business functional areas, the basic disciplines underlying the study of business administration, the student’s concentration area and a supporting area. Following are the requirements for each area:

### A. Business Functional Areas

One graduate level course in each of the following areas must be completed: managerial accounting, financial management, marketing management, organization theory and behavior, and business policy. Students who have earned an MBA degree at an accredited institution may enroll in courses designed to meet these requirements. Others may include appropriate courses in their programs as approved by their academic committees.

### B. Basic Disciplines

Each student must demonstrate proficiency in the following areas by completing course work indicated or by passing appropriate examinations: Economics1, Management, Behavioral Science2, Quantitative Science3, and Management. Graduate work in the above areas will not be accepted as meeting the requirements. Others may include additional work in one of the basic disciplines or a related area in another school or college of the University. The program of study should be arranged with an advisor in the College of Business Administration.

### C. Concentration Area

This is the focal point of the program and the area in which the student expects to do his/her research and dissertation. A minimum of 24 quarter hours of course work is required, including 9 hours of doctoral seminars taken at this University. A study of research methodology of the discipline is included. Graduate work in the field taken at other institutions is considered by the student’s committee in determining additional course work required. Available concentration areas are:

- Accounting
- Finance
- Management
- Marketing
- Transportation and Logistics

### D. Supporting Area

A minimum of 12 quarter hours of additional work in one of the basic disciplines or a related area in another school or college of the University is required. The student may choose the supporting area from one of the following:

- one of the business functional areas,
- additional work in one of the basic disciplines or a related area in another school or college of the University.

The program of study should be arranged with an advisor in the discipline chosen and must be approved by the student’s committee.

### Comprehensive Examinations

Comprehensive written examinations over the concentration and supporting areas are required of each student seeking candidacy for the DBA degree. The concentration area examination is administered in two sessions of approximately four hours each and the supporting area examination in one session of approximately four hours. The examining committee may, if it deems advisable, supplement the written examinations with oral examinations and may accept the results of an oral examination for a supporting area in the College of Law. Scheduling of comprehensive examinations will be determined by the examining committee in each of the five concentration areas in coordination with the Assistant Dean for Graduate Programs. The committee must designate two periods during the calendar year and announce the dates at least 90 days in advance. A student may sit for examinations in both areas at one examination period or take them in two consecutive periods. A student who fails an examination on the first attempt must repeat the examination over that area at the next examination period, the results of which shall be final.

### Admission to Candidacy

A student may apply for admission to candidacy for the DBA degree after maintenance of at least a B average in course work, successful completion of comprehensive examinations and acceptance of a research proposal for the dissertation by his/her faculty committee. Admission to candidacy must be approved at least three quarters prior to the date the student degree is conferred. (Admission in the fall quarter permits graduation in the following spring quarter.) See sections headed “Doctoral Committee” and “Admission to Candidacy,” page 21.

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 area and supporting area). Graduate courses accepted from other institutions must be included. Under “Other Requirements” indicate date of acceptance of the research proposal by the Faculty committee. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration. The application must be approved by the student’s faculty committee and the Assistant Dean for Graduate Programs in the College of Business Administration.

### Minimum Academic Performance Standards

A graduate student in the College of Business Administration whose grade point average at any point after 12 hours is below 3.0 shall be placed on probation. A student on probation shall be dropped from the program unless his/her cumulative graduate grade point average is 3.0 or higher at the end of the probation period. The probation period is defined as the next 12 quarter hours of course work attempted which is specified in the student’s degree program. Exceptions to this policy may be made only with the approval of the Assistant Dean for Graduate Programs of The College of Business Administration upon recommendation of the student’s faculty committee.

### Admission Requirements

General admission requirements for the Graduate School are stated on pages 12-13. MBA and DBA applicants are required to take the Graduate Management Admission Test (GMAT). Applicants for programs in economics, management science, and statistics may submit results of either the GMAT or the Graduate Record Examination (GRE) aptitude portion. Applicants for management science and statistics programs must have completed at least two years of college level calculus and be proficient in a computer language.

Applications whose native language is other than English must demonstrate English proficiency through the Test of English as a Foreign Language (TOEFL). Scheduled dates and locations for taking these examinations may be obtained from Educational Testing Service, P. O. Box 606, Princeton, New Jersey 08540, and from most colleges and universities.

In addition to procedures required for admission to the Graduate School (pages 12-13), MBA and DBA applicants must submit additional information on forms provided by the College of Business Administration. The application for all programs and supporting materials should be submitted at least three months prior to desired entry date.

The College of Business Administration is associated with other leading graduate schools of business as a member of the Graduate Management Admission Council.

### Fellowships and Assistantships

**Fellowships.** Information concerning non-service fellowships administered by the Graduate School as well as application blanks may be obtained from the office of the Graduate Assistant Dean for the College of Business Administration.

**Assistantships.** A limited number of assistantships are available from the Graduate Programs Office of the College of Business Administration. Assistantships. A limited number of teaching assistantships and assistantships that require from 10 to 20 hours of service per week are available through the departments of the College. Remuneration includes payment of fees and out-of-state tuition as well as a monthly stipend. Awards are generally made on the basis of scholarship and performance on the admission test. Application forms may be obtained in any of the departments or from the office of the Assistant Dean for Graduate Programs. Applications must be received by March 1 for consideration of assistantships to be awarded for the following fall term.

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1. Substitute Economics 5111 and 5121 followed by completion of 5112 and 5122 for certain supporting areas in Economics.
2. Students who choose this field as a supporting area take Management 5170 and 5180.
3. MBA core courses in this area may not be included.
Center for Business and Economic Research
The staff of the Center for Business and Economic Research engages in studies of the business and economic environment in Tennessee, the Southeast, and the nation. The Center promotes the development of business community, state government, individuals, and the University through dissemination of various kinds of economic and socioeconomic information and supports the faculty of the College in seeking funding for research projects. Staff members conduct research in regional economics, public finance, and areas related to socioeconomic problems in the region. The Center publishes the results of its own research and that of others in monograph form so that significant developments in the various business disciplines and economics can achieve widespread exposure. In addition, the Center staff does contract research on business and economic problems for governmental organizations and private industry. The Center publishes periodically the Tennessee Statistical Abstract and quarterly the Survey of Business Conditions. The Center is a member of the Association for University Business and Economic Research.

Management Development Programs
The Management Development Programs Department offers a wide variety of programs ranging from two- to three-day public seminars and customized "in-plant" programs to the four-week Tennessee Executive Development Program.

The Tennessee Executive Development Program (TEDP) is designed to provide extensive continuing educational opportunities for executives from firms and organizations in Tennessee, the South, and the nation. The major objective of the program is to prepare and develop executives for increasingly higher levels of management responsibility and to sharpen existing executive skills to prepare for comprehensive decision making and leadership. Other major aims of the TEDP are to teach the fundamentals of analytical thinking and the use of the decision tools, and to examine the economic, political, technological and other environmental factors affecting the firm's operations.

The TEDP limits enrollment to thirty-six outstanding practitioners in their fields of business and industry.

Departments of Instruction

Accounting and Business Law

J. E. Kiger (Head), Ph.D. Missouri, C.P.A.

Accounting MAJOR DEGREE

Professors:
N. E. Dittrich, Ph.D. Ohio State, C.P.A.;
J. R. Williams, Ph.D. Arkansas, C.P.A.

Associate Professors:
H. C. Herring, III, Ph.D. Alabama, C.P.A.;
G. E. Nichols, Ph.D. Louisiana State, C.P.A.;
J. A. Purkey, M.S. Tennessee, C.P.A., C.M.A.;
J. H. Schellen, Ph.D. Ohio State, C.P.A.;
W. S. Siegel, Jr., Ph.D., Texas;
K. G. Stanga, Ph.D. Louisiana State, C.P.A.;
R. L. Townsend, Ph.D. Texas, C.P.A.

Assistant Professors:
U. D. Gelinas, Jr., Ph.D. Massachusetts;
M. C. Letsinger, M.S. Tennessee, C.P.A.

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 background should develop perspective 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 or government.

Foundation Requirements. 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.

Course Requirements for the M.Acc. Program. A student's program encompasses 51 quarter hours of graduate course work. Specifically, the student must complete courses in selected business disciplines and in the areas of accounting as indicated below. Each course is 3 quarter hours of graduate credit.

Business Core (21 quarter hours):
- Economics 5030; Finance 5010; Management 5100; Management Science 5010; Marketing 5010; Statistics 5010, 5020.
- Accounting Core (15 quarter hours):
  - Accounting 5110, 5120, 5210, 5420, 5950.
  - Accounting Electives (Select five) (15 quarter hours)

Where prior course work and/or experience justifies, substitutions may be made in the business core courses upon approval of the M.Acc. program advisor.

MBA Concentration: Accounting. DBA Concentration: Accounting.

Minimum Course Requirements for MBA Concentration:
5110, 5120, 5210, 5420.

5002 Non-Thesis Graduation Completion (3-15)
Required for the non-thesis student not otherwise registered during any such student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. INC only. E

5010 Financial Accounting (3) Introduction to accounting concepts and model of financial reporting system. Not available to students with credit for 2110-20 or equivalent. F, Su

5020 Corporate Reporting Problems (3) Analysis of usage of accounting concepts in professional firm. Emphasis on internal and external uses of general purpose financial reports. Prereq: 5010 or equivalent. F


5110 Seminar in Accounting Theory (3) Evolution of accounting theory, concepts underlying modern accounting, financial reporting models, and authoritative accounting literature as each relates to measurement of financial performance and financial position. Prereq: Consent of department head. May not be taken by students with credit for 4990.

5120 Seminar in Advanced Auditing (3) Theory and concepts underlying the philosophy of auditing as related to current auditing issues. Prereq: 4120 or equivalent.

5130-40 Seminar in Current Accounting Topics (1, 3) Critical professional issues and information in professional financial accounting literature. Prereq: 4990 or 5110. Must be taken in sequence.

5150 Graduate Internship in Accounting (3) Full-time resident professional employment for one academic quarter involving qualified job experience, written report of responsibilities, and evaluation of student performance. Prereq: Consent of instructor.

5210-20 Seminar in Advanced Managerial Cost Accounting (3, 3) Critical analysis of current issues and formulation of budgeting and cost behavior models for cost analysis and control. Topics include cost allocation problems, budgeting, human resource measurement, social cost effects, performance evaluation, responsibility accounting concepts, service industry, costing and analysis of not-for-profit ventures and programs. Prereq: 3230 or equivalent. Must be taken in sequence.

5310 Auditing Concepts (3) Concepts and theory of auditing, environmental of internal and external audit, theory, and professional auditing. Emphasis on auditing, internal control evaluation, and reporting. Not intended for persons who have credit for auditing course. Prereq: 3130. Prereq or coreq: Statistics 4415, 5630, or equivalent. (May be taken concurrently.)

5320 Advanced Auditing (3) Case-oriented, including audit of specific asset, liability, revenue and expense accounts. Emphasis on reporting, data processing, statistical sampling, and internal auditing. Prereq: 4110 with C or better. (Available only to MBA students who do not have credit for 4120.)

5330 Advanced Income Tax (3) Federal income tax law with emphasis on tax planning and research. Prereq: 3210 with C or higher; 3430 with C or higher. (Available only to MBA students who do not have credit for 4430.)

Selected courses from other disciplines may be substituted for accounting electives upon approval of the M.Acc. program advisor.
5340 Consolidations and Business Combinations (3) Theory and practice of accounting for interrelated business entities—domestic and foreign. Not intended for persons who have credit for a course with a similar content. Prereq: 3130.

5420 Tax Research (3) Development of expertise in tax research utilizing tax service, tax periodicals, legal cases and other available sources. Includes individual research projects. Prereq: 4430 or equivalent.

5430 Tax Planning (3) Advanced study of income tax problems emphasizing alternatives available to minimize tax liability compatible with achieving taxpayer objectives. Prereq: 5420.

5440 Taxation of Estates and Gifts (3) Transfers at death, inter vivos transfers, life insurance, annuities and employee death benefits, marital and other deductions and exemptions, and estate and gift tax returns. Prereq: 4430 or 5330 and 5420. (Not available to students with credit for 4440.)

5510 Not-for-Profit Accounting (3) Theory and practice of budgetary and fund accounting, financial reporting, measures of output and accomplishment, and financial and performance auditing for non-profit entities. Prereq: 9 hrs of accounting and consent of instructor.

5630 Accounting Systems and EDP Concepts and Controls (3) Survey of automated information system and the organization of computer-based business environment. Analysis, design, implementation, documentation, and control of accounting systems. Hardware and software and knowledge of a computer programming language.

5640 Seminar in Accounting Information Systems (3) Literature on accounting information systems and computer-based systems analysis and design concepts. Informational needs of other functional areas of business and interfacing of these areas. Prereq: 4630 or equivalent.

5910-20-30 Accounting Seminar (1, 1, 1) Research in accounting. Prereq. 9 hrs of accounting and consent of instructor.

5960 Seminar in Accounting Research (3) Integration of areas of financial, managerial, tax, and auditing, including directed problem-oriented research in selected topics. Prereq. 5110, 5120, 5210, 5420. (Not available to MBA students.)

5990 Individual Research in Accounting (3) Directed research in a topic of mutual interest to student and faculty member. Prereq: Consent of department head. S/NC only.

6000 Doctoral Research and Dissertation (3-15) Registration and use of university facilities and/or faculty time before registration during any quarter when such a student uses university facilities and/or faculty time before department head of department. Not available for credit in any College of Business Administration degree program. Prereq: consent of instructor. May be repeated. Maximum 6 hrs.

5410 Business and Its Societal Environment (3) Analysis of current forces and changes in society and the interrelation of plans and actions in business firms with environmental factors. Prereq: Consent of instructor.

5610 Seminar in Applied Business Analysis (3) Application of business concepts and analytical skills to problems of business organizations. Students work in teams under supervision of participating professor. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

Business Education

See College of Education

Economics

MAJOR

DEGREES

Economics

M.A., M.A.T., M.S., Ph.D.

Professors:


Associate Professors:

H. S. Chang, Ph.D. Vanderbilt; E. Glustoff, Ph.D. Stanford; H. W. Hexmoor, Ph.D. Community College of the Air Force; M. A. Schott, Ph.D. (Washington State); W. C. Neal, Ph.D. (Texas); K. E. Phillips, Ph.D. Washington (Seattle); E. G. Sager, Ph.D. Washington (St. Louis).

Assistant Professors:

D. P. Clark, Ph.D. Michigan State; S. P. Coelen, Ph.D. Syracuse; C. B. Denn, Ph.D. Massachusetts Institute of Technology; D. L. Kaserman, Ph.D. Florida; N. C. Modeste, Ph.D. Florida; G. E. Schuler, Ph.D. Rochester; E. D. Wickham (part-time), Ph.D. Rochester.

The MASTER'S PROGRAM

The minimum requirements for a graduate major in Economics for the Master of Arts and the Master of Science degrees consist of the following:

1. Economics 5111-12 and 5121-22. (2) 9 additional hours in economics at the 4000 level or above, (3) a thesis, or an additional 9 hours in economics at the 5000 level above to be concentrated in one field.

Students electing the non-thesis option will be required to pass a final written comprehensive examination.

The requirements for a graduate minor in Economics are as follows. Either (1) 5111 and 5121, or (2) 5111 and 5121-22, or (3) with the consent of the head of the economics department, an alternative sequence of 9 hours to meet unusual conditions.

MASTER OF ARTS IN

COLLEGE TEACHING DEGREE

The requirements for the MACT degree are listed on page 19. A thesis is required.

THE DOCTORAL PROGRAM

Subject Area Requirements

1. Students will be required to demonstrate their competence in the core subject fields as indicated:

a. Economics: the preliminary examination or by completion of Economics 5111-12 and 5121-22 with a B average or higher and successful completion of Economics 6111 and 6121.

*Alumni Distinguished Service Professor

b. Economic history, by completing 6 hours of historical history at the graduate level or above with an average grade of B or better or by satisfying an examining committee.

c. History of economic thought, by completing Economics 5150 and 3 additional hours in this area at the 5000 level with an average grade of B or better or by satisfying an examining committee.

d. Mathematical and quantitative methods in economics by completing Economics 5170, 5171, and 3 additional hours at the 5000 level with an average grade of B or better or by satisfying an examining committee. (Note: The Economics 5510 requirement may be waived for those students completing Economics 6170, 6180, and 6190.)

2. Students will be required to demonstrate their competence by comprehensive examination in three fields with the approval of the department, at least two of which must be selected from the following: economic development; economics of centrally planned economies; economics of labor and human resources; industrial organization; international economics; regional and urban economics; a field, as agreed to by the department, combining two or three of the above.

Exceptions to the foregoing are discouraged but may be petitioned by writing directly to the department head who will decide with the advice of an ad hoc committee of three tenured members of the faculty. This petition is to be submitted at least nine months before the student takes the comprehensive exam in question.

Course Requirements. Candidates for the Ph.D. degree in Economics will be required to complete a minimum of 72 quarter hours of course work beyond the Bachelor's degree, plus the dissertation which carries 36 quarter hours of credit. At least 54 hours shall be in economics.

MBA Concentration: Economics.

2. Course Requirements for MBA Concentration: As approved by the area MBA faculty advisor.

4000 Special Topics (3) Subject generated course offered at convenience of department upon student and instructor approval. Subject must be selected from the list of courses approved by students and instructor with approval of the department.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) E

5004 Thesis Graduation Completion (3-15) E

5090 Workshop in Economics (3-9) Special topics in economic education. Not available for credit in any College of Business Administration degree program. Prereq: consent of instructor. May be repeated. Maximum 9 hrs.

6000 Doctoral Research and Dissertation (3-15) E

ECONOMIC THEORY

4110 Managerial Economics (3) Application of economic theory to business decision making; emphasis on profit objectives, measurement and forecasting demand and revenue, cost, and capital budgeting. Prereq: 2110-20-30.

4130 Business Cycles (3) Fluctuations in income, employment, prices, and output in the economics
system; subjects discussed are the historical facts concerning booms and depressions, statistical methods for analyzing business fluctuations, their causes, fluctuations of cycles, and policies that have been proposed to combat them. Prereq: 3120 or consent of instructor. Sp

4170-40 Introduction to Mathematical Economics (3, 3) Application of mathematical methods in theoretical study of micro- and macroeconomic phenomena. Designed for beginning graduate students who have limited training in analytic geometry and calculus. Must be taken in sequence. Prereq: 3110 and college algebra, calculus, and analytic geometry or their equivalent. F, W

5010 Introduction to Economic Analysis (3) Analytical tools of macro- and microeconomics for students without prior training in economics. Price determination, national income measurement and determination, and banking system. Not available to students with credit for 2110-20-30 or equivalent. F, Sp

5020 Managerial Economics (3) Application of economic concepts to business decision making. Analysis and forecasting of demand, cost analysis, pricing behavior, and optimization techniques. Prereq: 5010 or equivalent. Prereq or coreq: Statistics 5010 or equivalent. F, W


5110 Fundamentals of Microeconomics (3) Verbal arguments and geometric and algebraic techniques. Theory of aggregate behavior and demand theory of production and cost; long and short run theories of profit maximizing firm in both perfectly competitive and imperfect environments; theory of derived demand. For students whose major is other than economics. Not available for students with credit for 5111. Prereq: 3120 or equivalent. F

5111-12 Microeconomic Theory I, II (3, 3) Theory of consumer choice and demand; the firm; production and costs; market structure; derived demand and factor pricing; introduction to welfare economics. Should be taken in consecutive quarters. Prereq: 3110 or equivalent. W, Sp

5120 Fundamentals of Macroeconomics (3) Determination of levels and rates of economic activity for economy as a whole; relationships between interest rates, price expectations, productivity, and quantity of money; measurement of inflation, savings, investment, and liquidity preference. For students whose major is other than economics. Not available for students with credit for 5121. Prereq: 3120 or equivalent. W

5121-22 Macroeconomic Theory I, II (3, 3) Mone tary and income-expenditure approaches to income and price level determination; applications to contemporary macroeconomic problems. Should be taken in consecutive quarters. Prereq: 3120 or equivalent. W, Sp

5150 History of Economic Thought (3) Development of economic ideas from mercantilists through Alfred Marshall; emphasis given to classical and neoclassical tradition.

5160-90 Mathematical Methods in Economics (3, 3) Application of basic tools of economic analysis to economic relationships with use of time series and cross section data, with applications to current economic problems. Prereq: Introductory statistics or Statistics 5211 or equivalent. W

5200 Introduction to Econometrics (3) Statistical demand analysis, production and cost analysis, distribution of income and wealth, models of growth and cycles, macroeconomic applications. Should not be taken by students who contemplate taking Econometrics 5700-90. Sp

5710 Public Finance: Revenues (3) Same as Finance 5710. F

5720 Public Finance: Expenditures (3) Same as Finance 5720. W

5740 Seminar in Public Finance (3) Same as Finance 5740. Sp

5810 Financial Markets and Intermediaries (3) Same as Finance 5610. W

5820 Monetary Theory and Policy (3) Same as Finance 5820. F

5830 Commercial Bank Management (3) Same as Finance 5830. F, Sp

5811 Advanced Microeconomic Theory (3) Consumer behavior, production, and exchange in partial equilibrium settings. Prereq: 5170, 5110, or equivalent. F

5121 Advanced Macroeconomic Theory (3) Topics in macroeconomic theory and policy. Prereq: 5122 or equivalent. W

5190-91 History of Economic Doctrines (3, 3) Important ideas of economic thinkers from Middle Ages to present. W, Sp

5170-80-90 Econometric Methods (3, 3, 3) Theory and techniques of statistical testing of economic hypotheses and construction and estimation of econometric models. Review of classical least squares regression models, extensions of least squares regression model, and approaches to simultaneous equation models with application to current econometric research. Prereq: 5180-90 and 5510 or equivalent. F, W, Sp

6710-20 Seminar: Fiscal Theory and Public Finance (3, 3) Same as Finance 6710-20. INTERNATIONAL TRADE AND ECONOMIC DEVELOPMENT

4230 Problems in International Trade and Economic Development (3) Problems or problem areas of current importance in fields both of international economics and economic development. Prereq: 5210 or 2220. W

4231 The Political Economy of Latin America (3) Description, analysis, and comparison of major economics problems and policies of various Latin American countries. W

4232 The Political Economy of Asian Development (3) Description, analysis, and comparison of major economics problems and policies of India, China, and South East Asian countries. W

4260 Economics of Resources and Environmental Policy (3) Economic analysis of environmental policy and allocation of resources. Benefits and costs of development of natural resources and impacts of growth on environment. Prereq: 2130. W

5210 Seminar in International Trade Theory (3) Pure theory of international trade. F

5220 Seminar in Economic Development (3) Economic problems of developing countries. F

5250 Economic History of Europe (3) Nature and functioning of economic systems and policies in history of Western civilization; examination of some major issues of methods and interpretation. F

5260 Economic History of the U.S. (3) Interpretation of American economic structure and policies from colonial times. W

5610 Location and Regional Development Theory (3) Theory of industrial, agricultural, and residential location; economic basis for land use patterns and central places; examination of regional inequalities and national assistance for regional economic development. F

5620 Methods of Regional Analysis (3) Theory of regional structure and growth. Examination of regional models for impact analysis and economic forecasting. Methods of analysis include regional descriptive statistics, regression analysis, and statistical tools of economic concepts, regional income and product accounts, shift and share analysis, economic base studies, and regional input-output and linear programming, and econometric models. W


6231-32, 6241-42 Seminar in Economic Development (3, 3, 3) Development and application of analytical tools to problems of economic policy faced by developing regions and countries. W, A; A

6250 Seminar in European Economic History (3) Selected topics in European economic history. Prereq: Consent of instructor. May be repeated with consent of department. W

6260 Seminar in American Economic History (3) Selected topics in American economic history. Prereq: Consent of instructor. May be repeated with consent of department. Sp

6270 Seminar in Economic History of the Third World (3) Selected topics in economic history of societies other than those of Western Europe and English-speaking North America. Prereq: Consent of instructor. May be repeated with consent of department. F, A

6610 Seminar in Regional Analysis (3) Selected topics in regional economic theory and analysis. May be repeated. Maximum 6 hrs. Sp, A

6620 Regional Economics Workshop (3) Selected topics in applied regional research. Emphasis on student participation in model design and estimation, forecasting, simulation, and computer programming. May be repeated. Maximum 6 hrs. Sp, A

6650 Seminar in Environment and Resource Economics (3) Topics in environmental quality, natural resource allocation by private markets, and issues in formulating public policy towards environmental problems. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. Sp, A

INDUSTRIAL ORGANIZATION

4350 Industrial Organization Analysis (3) Monopoly and competition in the United States economy; market structure, business behavior, and economic performance and interrelationships. Prereq: 9 hrs of introductory economics. W

5340 Seminar in Private Enterprise and Public Policy (3) Structure of contemporary industry, factors in development, and consequences for business conduct and performance; social control of business through antitrust and other government regulation. F

6351-52, 6361-62 Seminar in Industrial Organiza tion (3, 3, 3) Organization of industry in America. Emphasis on empirical and analytical techniques used in investigating structures, conduct, and performance. 6351-62—Public policy in the United States with respect to industrial structure and business conduct; examination, appraisal and proposals for change. Sp, A; W, A

ECONOMICS OF CENTRALLY PLANNED ECONOMIES

5310 Economic Systems (3) Study and appraisal of command economies; capitalism, socialism, communism, and other economic systems. W

6331 Theory and Practice of Economic Planning (3) Learning and thought tools of analysis, evaluative and indicative planning. Prereq: Consent of instructor. May be repeated with consent of department. F

ECONOMICS OF LABOR AND MANPOWER

4420 Manpower Problems and Policy (3) Current manpower problems and examination of possible solutions. Problems include unemployment-
inflation, manpower training and education, poverty and economic development, and other. Emphasis on analytical basis for understanding manpower problems. Prereq: 2110-20. Sp

5420-30 Investments (3, 3) Investment decision processes, including portfolio principles; time value of money, capital budgeting, market efficiency. Prereq: Economics 5010 or equivalent. (Same as Economics 5720.) W

5420 Seminar: Managerial Finance (3) Applications of theory and quantitative techniques to solution of current problems in financial management. Prereq: 5120 or 5130. Sp

5420-30 Investments (3, 3) Investment decision processes, including portfolio principles; time value of money, capital budgeting, market efficiency. Prereq: Economics 5010 or equivalent. (Same as Economics 5720.) W

5430 Financial Analysis (3) Analysis of financial statements; ratio analysis; financial forecasting techniques. Prereq: Economics 5010. (Same as Economics 5710.) F

5440 Corporate Finance (3) Principles of financial management; dividend policy; capital structure; the capital cost of capital; capital budgeting. Prereq: Economics 5010. (Same as Economics 5710.) W

5450-30 Investments (3, 3) Investment decision processes, including portfolio principles; time value of money, capital budgeting, market efficiency. Prereq: Economics 5010 or equivalent. (Same as Economics 5720.) W

5450 Seminar: Managerial Finance (3) Applications of theory and quantitative techniques to solution of current problems in financial management. Prereq: 5120 or 5130. Sp

5450 Seminar: Managerial Finance (3) Applications of theory and quantitative techniques to solution of current problems in financial management. Prereq: 5120 or 5130. Sp
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
5010 Organization Theory and Behavior (3) Basic concepts, organization behavior and management processes.
5020 Operations Management (3) Management processes of planning, operating and control of production systems; management concepts and quantitative techniques with systems framework to processes of planning, operating and control of processes.
5021 Personnel Management (3) Analysis and application of personnel function.
510 Organization Theory (3) Analysis and design of organization structure.
5130 Managerial Planning and Control (3) Processes of management planning and controlling with emphasis on corporate strategic planning.
5210 Personnel Management (3) Analysis and appraisal of the personnel function.
5220 Wage and Salary Administration (3) Analysis of problems, programs, and practices.
5230 Industrial Problems in Administration (3) Review and critique of research in industrial human relations. (Same as Psychology 5450.)
5250-60 Industrial and Organizational Psychology (1-3-3) Readings in industrial and organizational psychology. Available only by arrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.
5320 Independent Study, Project or Research in Management (1-3) Topic of mutual interest to student and faculty member. Available only by arrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.
5320 Problems in Industrial Research (3) Basic administrative problems encountered in management of industrial technological research and engineering programs, and comparable programs in which professional personnel predominate. F, A.
5320-20 Production Management (3, 3, 3) Quantitative approach to solution of production management problems. Prereq: 5020 or consent of instructor.
5360-20 Organizational Behavior (3, 3) Behavioral methodology and perspective, including review of empirical behavioral research in organizations. Must be taken in sequence. F, W.
5710 International Business Management (3) Analysis of environment of international business firms and impact of internal and external factors on managerial decisions. Sp.
5810 Energy Management: Theory and Practice (3) Management of energy resources in operating systems; decision criteria, trade-offs, system analysis, energy audits, technical parameters, conservation methods, worldwide energy supply and demand, new energy technologies.
6000 Doctoral Research and Dissertation (3-15) E
6110 History of Management Thought (3) Significant historical ideas leading to present state of art of management.
6120 Advanced Organizational Theory (3) Analysis of organization of complex organizations: structure, culture, and adaptation.
6130 Seminar in Contemporary Management Issues (3) Contemporary management policy issues. May be repeated.
6250-60-70 Seminar in Industrial and Organizational Psychology (3, 3, 3) Advanced problems in organizational psychology. Areas include performance evaluation, executive development, group process, and morale. (Same as Psychology 6250-60-70.)
6300 Seminar in Industrial and Organizational Psychology (3) (Same as Psychology 6380.)
6900 Field Work in Industrial and Organizational Psychology (1-15) Supervised practice. One credit hr for each 30 hrs of such practice. Maximum 15 credits. (Same as Psychology 6900.) E
management Science
MAJOR
Ph.D.
Management Science
Professor: R. G. Garfinke1, Ph.D. Johns Hopkins.
Associate Professor: R. E. Rosenthal, Ph.D. Georgia Institute of Technology.
Management Science Committee: Members of the Management Science faculty and in addition: R. W. Boling, Management; J. U. Bradshaw, Mathematics; R. E. Church, Civil Engineering; G. Glustoff, Economics; W. J. Morse, Accounting; R. A. Squires, Finance; C. C. Thigpen, Statistics; M. D. Weinberg, Computer Science.
MBA CONCENTRATION
For students whose MBA concentration area is Management Science, the MBA Core is revised as follows: substitute Management Science 5310 for 5010, Statistics 5110 for 5010, and with approval of student's advisor, substitute Management Science 5320 for 5020. The concentration area must include Management Science 5330 and 5340.
MASTER OF SCIENCE PROGRAM
See page 98 for details of the Master of Science program in Management Science.
THE DOCTORAL PROGRAM
The Ph.D. program in Management Science is designed to prepare students for management positions, research, and teaching related to the application of mathematical tools in the administration of complex organizations. Three primary objectives of the program are:
(1) to provide a broad background science course work, a thorough knowledge of common Management Science/Operations Research mathematical models and their uses;
(2) to provide sufficient advanced study in a supporting area to qualifity the graduate for a joint faculty position in the supporting area and management science. The candidate may choose from the following functional areas (accounting, finance, marketing, production management, and transportation and logistics) or other disciplines, (e.g., computer science, statistics, forestry, ecology, and public administration);
(3) to develop in the student, through course work in mathematics, statistics, and computer science, a high degree of mathematical maturity which will serve the student throughout a life-long career, whether in management, research, or teaching.
Degree Requirements: General University requirements for the doctoral degree are stated on page 21.
Course Work. A minimum of 72 quarter hours of course work taken for graduate credit (exclusive of thesis or dissertation) is required. The candidate must complete a minimum of 36 quarter hours at The University of Tennessee, Knoxville, at least 9 of which must be at the 6000 level. Entering students who have completed graduate studies in applicable fields will be granted course credits for work which is equivalent to required courses in the program. The program includes approximately 24 to 30 quarter hours of course work in the applied concentration area.
Qualifying Examinations. The student must demonstrate mastery of calculus, probability theory and statistical inference (Statistics 5110-20-30) by passing a written qualifying examination.
Mastery of 18 to 21 quarter hours in mathematics course work must be demonstrated by passing a written qualifying examination. Topics normally include numerical analysis (either Mathematics 4225, 4245, 4060 and 5655, or Mathematics 5565-65-75) and real analysis (Mathematics 4510-20-30). Other options may be approved. In exceptional circumstances the faculty will consider waiving the mathematics and/or statistics qualifying examinations.
There is no foreign language requirement. These requirements generally are completed by the end of the first year of the program.
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 36 quarter hours of Management Science 6000, 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 doctoral committees deems appropriate. This effort, which is beyond the minimum 72 hours of course work, normally is completed in the third year of the program. 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 course work does not match the prerequisites are encouraged to seek the instructor's guidance and consent to enrollment.
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
5010 Quantitative Analysis for Management Decisions (3) Assignment, transportation and general linear programming problems; decision theory.
Marketing and Transportation

G. N. Dicer (Head), DBA Indiana.

Marketing

Professors:
D. W. Cravens, DBA Indiana; E. O Dille (Emeritus), Ph.D. Ohio State; E. E. Garrison (Emeritus), Mark, Ohio State; G. E. Hills, DBA Indiana; R. B. Wooduff, DBA Indiana.

Associate Professors:
D. J. Barnaby, Ph.D. Purdue; E. R. Cadotte, Ph.D. Ohio State; R. L. Jenkins, Ph.D. Ohio State; J. R. McMillan, Ph.D. Ohio State; R. C. Ranzen, Ph.D. Cornell; G. D. Sartell, DBA Indiana; R. L. Spio, Ph.D. Georgia.

Assistant Professors:
F. L. Barbour, Ph.D. Illinois; L. R. Duft, M.S. Purdue.

MBA Concentration: Marketing.

DBA Concentration: Marketing.

Minimum Course Requirements for MBA Concentration:
5300, 5350, 5400, 5410.

5002 Non-Thesis Graduation Completion (3-15) Required for the "non-thesis" student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is conferred, may be used toward degree requirements. May be repeated. S/NC only.


5020 Marketing Strategy and Decision Making (3) Management of basic marketing functions. Integration of functional decisional areas into development of marketing strategy, both domestic and international. System concepts and analytical decision process. Prereq: Accounting 5010; Economics 5020. F, Sp, Su.

5210 Sales Force Management (3) Basic communication theory affecting objectives and problems of sales force management. Recruitment, selection, training, motivation, evaluation, and control of sales force; sales forecasting, territory design, and routing. Prereq: 5020. F.


5330 Analysis and Design of Marketing Systems (3) Macromarketing approach to marketing system. Conceptual framework for examining marketing agency and channel interrelationships, public policy, cost and efficiency, and innovation in marketing from viewpoint of decision maker. Prereq: 5020.

5300 Marketing Research (3) Investigation and solution of problems; application of research methods to functional areas of marketing. Research concepts, methods, and techniques. Prereq: 5020; Statistics 5010. F, W.


5400 Analyzing Market Opportunity for Marketing Decisions (3) Basic determinants of opportunity within markets, framework for identifying and organizing information required to assess market opportunity. Approaches to analyzing buyers in markets, forecasting extent of demand, analyzing industry competition for service. Emphasis on applying market opportunity analysis results to marketing decisions. Prereq: 5020. W.

5410 Advanced Marketing Strategy (3) Components of major marketing decisions involved in growth of business. Components of alternative strategic alternatives, coordination and control of marketing activities. Prereq: 5020 and 5350.

5450 International Marketing Management (3) Development and management of international marketing programs. Problems involving marketing goods and services in foreign markets. Political, cultural, ecological, and economic conditions in different countries. Prereq: 5020. W.

5990 Research in Marketing (3) Directed research on subject of mutual interest to student and staff member. Prereq: 5020 and 5350. May be repeated. Maximum 6 hrs.

6000 Doctoral Research and Dissertation (3-15) E, F, W.

6050 MacroeTheoretical Foundations of Marketing (3) Fundamental nature and history of marketing processes. Role of marketing theory in developing marketing discipline and in research process. Environmental/public policy dimensions of marketing decision making. Prereq: Consent of Instructor. A.

6100 Design and Measurement in Marketing Research (3) Advanced design and measurement issues. Theoretical scaling considerations, applications of multidimensional scaling techniques, and conjoint analysis. Prereq: Consent of Instructor. A.

6150 Marketing Research Applications (3) Application of marketing research principles and techniques to marketing problems. Advanced research methods and techniques. Prereq: Consent of Instructor. A.

6200 Buyer Behavior (3) Behavioral processes of individuals and groups in roles as buyers of goods and services. Prereq: Consent of Instructor. A.

6250 Selected Problems in Consumer Behavior (3) Information search processes, attitude models, attitude theory, and consumer satisfaction. Prereq: Consent of Instructor. A.

6300 Marketing Decision Models (3) Model building process including application of variety of models to marketing decision making. Bayesian analysis, simulation models, brand switching models, stochastic models, dynamic models, and mathematical models. Prereq: Consent of Instructor. A.

6350 Current Topics in Marketing (3) Specific topics will vary with each course offering, but could include: nonbusiness marketing applications, macroenvironmental issues, market segmentation, children's television advertising, international marketing issues, marketing channels, and related issues. Prereq: Consent of Instructor. A.

Transportation and Logistics

Professors:

Associate Professors:
F. L. Hendrix, Ph.D. North Carolina; R. B. Woodruff, DBA Indiana.

Assistant Professor:
J. H. Foggin, DBA Indiana.

MBA Concentration: Transportation and Logistics.

DBA Concentration: Transportation and Logistics.

Minimum Course Requirements for MBA Concentration:
18 credit hours required including 5010, 5110, 5130, 5220.

Transportation 5010 is prerequisite to all other graduate courses in this area.

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only.

5010 Survey of Transportation and Logistics (3) Intensive survey of logistical demands made by society and specific users on national transportation system; problems facing carriers and government.

Sp
5110 Theory and Functions of Economic Regulation (3) Development of economic and philosophical basis of regulation. Critical analysis of impact of regulation with emphasis on managerial options. F

5120 Management and the Pricing Problem (3) Critical analysis of application of economic theory and regulatory restraints to pricing of carrier services. Sp

5130 Carrier Transportation Management (3) Analysis of major transportation modes and their managerial strategies. Consideration of how social, technical, legal, and financial environment affect top level decision making. Application of general business, marketing, finance, and statistical decision processes to transportation decision making in uncertain environment. F

5220 Logistics Systems Management (3) Development of strategy for management of logistical systems. Emphasis on executive level integration of logistics operations with marketing, production, and other decision areas. Practical applications through a case approach and simulation game. Pre-req: Management 5020. W

5510 Urban Transportation Policy (3) Movement of people, goods and information in urbanized areas with special emphasis on formulation of national, state, and local policy. Emphasis on evolving new urban transportation concepts. W

5610 International Transportation Policy (3) Comparative analysis of transport systems in other countries. Analysis of U.S. policy relative to international transportation. Sp

5910 Advanced Law and Regulation (3) Legal rights and responsibilities of shippers and carriers. Analysis of decisions of regulatory commissions, courts, and principles of law arising from these decisions. Sp

5990 Independent Study in Transportation/Logistics (1-6) Directed study in surface and air transportation, national transportation policy, transportation/logistics research developments, or subject of particular interest to student and faculty. May be repeated. Maximum 6 hrs. E

6000 Doctoral Research and Dissertation (3-15) E

6110 Seminar In National Policy (3) Critical analysis of contemporary national transportation policy issues. Pre-req: Doctoral level. D

6210 Seminar in Transportation and Logistics Models (3) Analysis of contemporary models and methodologies in transportation and logistics research. Relative emphasis on topical coverage at discretion of instructor. Pre-req: Management Science 5010; Statistics 5010 or equivalent. Sp

6220 Research Methodology in Transportation and Logistics (3) Research and design of research in transportation and logistics.

Office Administration
J. Stalliard, Program Director

Professors:  
E. W. Davis (Emeritus), M.S. New York University;  
D. Risse, Ph.D. Iowa; E. H. Smith, Ph.D. Ohio State; O. A. Helfer, M.S. Indiana.

Associate Professors:  

Assistant Professors:  
P. D. Campbell, M.S. Austin Peay; H. Petrea, M.S. Tennessee.

Courses numbered below 5000 are not available for credit in the MBA program.

4310 Business Letter Writing (3) Principles, practices, and mechanics of effective business letters and memoranda; principles applied in solving communication cases; emphasis placed on letters and memos as initial sources of ideas in communication system of the business firm. E

4320 Business Report Writing (3) Basic principles and procedures of originating and disseminating business reports, both formal and informal in style, writing techniques for short and long reports; graphic presentation and interpretation; use of primary and secondary data for reports. E

4420 Advanced Transcription (3) Improvement of ability to transcribe dictation from dictation, or from a wide variety of correspondence; emphasis on competencies needed to meet occupational standards. Pre-req: 4310.

4510 Office Management (3) Strategic and operational planning of office objectives; relating tasks and human resources to objectives; recruiting, selection, training, and development of office staff; directing of office staff through leadership, motivation, communications; measurement of office performance, comparison to standards, and corrective actions; and applications of decision making to the office. Sp

4520 Office Systems (3) Synthesis of systems and subsystems applicable to centralized and decentralized office functions. Emphasis placed on cost analysis in contemporary office environment, technology, and research analysis. Sp

4810-20-30 Problems in Office Administration (1-3, 1-3, 1-3) Subject and title vary each quarter. May be repeated. Maximum 3 hrs for each course.

5011 Problems in Lieu of Thesis (3)

5050 Data Processing in Business (3) Fundamentals of data processing, computer programming and applications, data design. (Available only as stated on page 36.) E

Statistics

MAJOR

Statistics

DEGREE

M.S.

Professors:  
C. C. Thigpen (Head), Ph.D. Virginia Polytechnic Institute; D. S. Chambers, MBA Texas; R. A. Mealon, Ph.D. Purdue; J. W. Philpot, Ph.D. Virginia Polytechnic Institute.

Associate Professors:  
H. A. Lasater, Ph.D. Rutgers; R. D. Sanders, Ph.D. Texas; D. J. Wheeler, Ph.D. Southern Methodist; M. S. Younger, Ph.D. Virginia Polytechnic Institute.

Assistant Professors:  

THE MASTER'S PROGRAM

The M.S. program in Statistics is designed to provide students a basic foundation in theoretical and applied statistics for meaningful careers as consulting and practicing statisticians. A candidate should possess an undergraduate degree with a strong background in calculus, but no restrictions are imposed regarding the undergraduate major. The typical Master of Science degree program in Statistics is as follows:

Statistics Major Area 
Quarter Hours 

Probability theory 
3

Theory of statistical inference 
6

Additional coursework in statistics as approved by the student's committee 
9

Additional coursework as approved by the student's committee 
9

Minor Area 
Selected with the approval of both the Department of Statistics and the department in which the work is to be taken 
9

Total minimum hours 
45

MBA CONCENTRATION

For students whose concentration area is Statistics, the MBA Core is revised to substitute Statistics 5110 for 5010. The concentration area must include 5120 and 5130. Normally, Statistics 5250-60-70 are also included which may also be prerequisites. Statistics courses numbered 4000 and above presuppose familiarity with the basic probability distributions in statistics and with the general concepts of statistical estimation and hypothesis testing. Students unfamiliar with these concepts should seek advice from a statistics advisor concerning prerequisite course work.

3450 Statistics for Engineering (3) Survey of statistical methods with special application for engineering students; frequency distributions, selected sampling distributions, some tests of significance. Cannot be taken for credit concurrently with 2100. Pre-req: Mathematics 2840. E

4250 Nonparametric Methods (3) Measures of association, two-sample tests, analysis of variance with ranked data, paired multiple comparisons in nonparametric testing, nonparametric regression. Sp

4310 Regression Analysis (3) Linear regression and correlation, multiple regression, stepwise methods, polynomial regression, use of dummy variables. Use of standard regression computer programs. Elementary theory and applications. E

4410 Design of Experiments (3) Principles and procedures for efficient experimental design. Randomization, choice of size and number of experimental units, utilization of blocking arrangements, interpretation of experimental data. W, Su

4415 Sampling Techniques and Theory (3) Procedures used in probability sampling for a variety of arrangements of statistical universes and development of estimators and standard errors associated with these sampling schemes. Some properties of estimators. Determination of sample size. Not available for credit to students with credit for 3410. F, W,

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May be repeated. E, NC only. E

5010 Probability and Statistical Inference (3) Fundamentals of probability, discrete and continuous probability models, estimation and inference concerning means. Pre-req or coreq: Mathematics 5052 or equivalent and a computer programming course. Pre-req or coreq: Mathematics 4150. May not be taken for credit by students who receive credit for 5110. F, W

5020 Statistical Methods (3) Regression and correlation models, basic time series analysis and forecasting; confidence intervals, hypothesis testing, and tests for independence. Pre-req: 5010. W, Sp


5110 Introduction to Probability Theory (3) Classical probability and distribution theory. Pre-req: Elementary linear algebra and calculus of several variables. F

5120-30 Theory of Statistical Inference (3, 3) Introductory theory underlying common statistical procedures of hypothesis testing and estimation. Pre-req: 5110. W, Sp

5211 Elementary Statistics (3) Introductory statistics for graduate students. Probability, sampling distributions, estimation, and hypothesis testing. Emphasis on interpretation and decision making. Not available for credit in any College of Business Administration degree program. F, Su


5610 Special Topics in Statistics (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

6060 Applied Multivariate Analysis (3) Canonical correlation; discriminant analysis for several groups, and for equal and unequal covariance matrices; principal component analysis; Hotelling’s T², multivariate analysis of variance and covariance. Prereq: 1 yr applied statistics including analysis of variance and multiple regression analysis. W

6070 Factor Analysis (3) Principal component analysis and principal factor analysis; estimates of communalities; methods of rotation; interpretation of factors; cluster analysis. Prereq: 6060. Sp

6210 Stochastic Processes II (3) Special analysis, time series, linear and nonlinear systems. Prereq: 5210.
The College of Communications offers two graduate degrees with a major in Communications, the Master of Science (M.S.) degree and the Doctor of Philosophy (Ph.D.) degree.

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

The M.S. program (professional track) is accredited by the American Council on Education for Journalism. The College is a member of the American Association of Schools and Departments of Journalism and the Broadcast Education Association.

The doctoral program in Communications is listed in the Academic Common Market of the Southern Regional Education Board. Students residing in Alabama, Georgia, Kentucky, South Carolina, Virginia, and West Virginia can normally qualify for in-state fee status by applying to the Academic Common Market coordinators in their state capitals.

MASTER OF SCIENCE

The Master of Science degree with a major in Communications is offered for students who primarily desire (1) advanced preparation in effective communication for mass media and other fields of applied communications, or (2) a deeper understanding of the communication process and the social role of the mass media.

The prospective student who is interested only in acquiring basic skills in journalism, advertising, or broadcasting is advised to consider a second baccalaureate rather than an advanced degree. (Note: There is no M.S. in Journalism or Advertising or Broadcasting at this institution. Students desiring a major in one of these fields must take the B.S. program.)

Applicants must meet admission requirements of the University Graduate School. In addition they must complete the Graduate Record Examination, the California Psychological Inventory, and application forms as required by the College of Communications. All application materials will be screened by an admissions committee authorized by the Graduate Studies Committee of the College of Communications.

New students may be admitted to the program at any time; however, beginning enrollment is limited to the summer and fall quarters each year. Unless necessary materials are received at least six weeks before registration, applications may not be processed in time for admission to full potential candidate status in the first quarter. In these cases, the student may still qualify for non-degree or provisional status.

The student may choose either of two tracks, both leading to the M.S. in Communications and both requiring a thesis:

The academic track is designed for the student who wishes to emphasize advanced study of the theory and effects of communications. A minimum of 45 hours of approved graduate work is required:
- 12 hours of core courses:
  Communications 5100, 5120, 5140 and 6100,
  the first three of which must be taken during the first two quarters of the student's program, except with written approval of the Assistant Dean for Graduate Studies for the College.
- 24 hours of selected courses within the College, including at least 9 hours at the 5000 level;
- 9 hours of thesis work (Communications 5000).

The professional track is designed for the student who desires the graduate degree but wishes to emphasize a particular professional area, such as advertising, broadcasting, journalism, or public relations. A minimum of 45 hours of approved graduate course work is required:
- 9 hours of core courses:
  Communications 5100, 5120 and 5140, which must be taken during the first two quarters of the student's program, except with written approval of the Assistant Dean for Graduate Studies for the College.
- 15 hours in a major area within the College, including at least 6 hours at the 5000 level;
- 9 hours of thesis work (Communications 5000);
- at least 12 hours in a minor area approved by the major advisor, of which at least 6 hours must be at the 5000 level.

In addition, students with Bachelor's degrees in other cognate areas will be required to complete prerequisites as designated by their advisors. Advising for the professional track will be supervised by the chairperson of the appropriate department of the College. Students who have had no courses in their major areas of concentration may expect to spend six or more full-time quarters in the program.

After the formal program of courses and research in either track is completed, the student must pass an oral examination conducted by his/her graduate committee.

Communications majors in the M.S. program must demonstrate ability to use a typewriter proficiently within their first quarter in residence.

DOCTOR OF PHILOSOPHY

The Ph.D. degree with a major in Communications is intended to prepare scholars for teaching, research, administration, and service in the field of human communications.

The program is interdisciplinary, consisting of a required core curriculum and
Committee.

The Master's degree is not required for entry into or completion of the doctoral program. Program planning, however, will permit the Master's degree to be earned if desired. Students lacking academic or professional experience in communications will require the completion of prerequisite courses. In general, however, the program may be completed within three academic years of full-time study beyond the Bachelor's degree.

The following are normally minimal requirements for admission to full potential candidate status: (a) a 3.0 (4.0 system) grade point average in undergraduate studies, or 3.5 for graduate work if applicant holds a Master's degree; (b) above the fifteenth percentile in verbal and quantitative aptitude on the Graduate Record Examination; (c) completion of the California Psychological Inventory; (d) endorsement by at least three former teachers or professional colleagues if the applicant is a Ph.D.; (e) a statement of the applicant's goals and reasons for pursuing the doctorate. Personal interviews with members of the Ph.D. Admissions Committee may be required. Professional experience in some field of communications is a highly desirable criterion for admission.

The following program represents work normally required for an individual with only the Bachelor's degree and no technical competence: (a) prerequisite courses offered by the College of Communications and approved by the major advisor for applicants lacking the necessary academic and/or professional background; (b) core curriculum: 33 hours of course work; (c) primary concentration in communications: 15-18 hours of course work; (d) secondary concentration in a cognate minor subject normally outside communications: 12 hours of course work; (e) technical competence area in either teaching, research, or administration: 15-18 hours of course work and, for those who lack appropriate professional experience, an internship the equivalent of 9 credit hours; (f) research tool: 12 hours of course work, e.g., statistics, foreign language, or computer science; (g) dissertation: 38 hours of Communications 6000.

The following courses represent the required core curriculum (beyond the Bachelor's degree): Communications 5100, 5120, 5140, 6100, 6200. One of the following: Communications 6300, 6310, 6320.

For the teaching or administrative technical competence area a one-week, non-credit computer program course and Statistics 5211, or Sociology 5320 and Statistics 4250; for the research technical competence area: Statistics 5010 and 5020.

Continuing and Higher Education 5450. Two courses in organizational theory from a group approved by the Graduate Studies Committee. Admission to candidacy must be obtained at least three quarters prior to graduation and requires successful completion of a comprehensive examination.

REQUIRED SCHOLASTIC AVERAGE

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 quarter hours of graduate course work attempted which is specified in the student's degree program. Exceptions to this policy may be made only with the approval of the Assistant Dean for Graduate Studies of the College of Communications upon the recommendation of the student's faculty committee.

Communications Research Center

The Communications Research Center is a vital adjunct to the communications graduate program. Objectives of the Center are: (a) to conduct original research in mass and public communication; (b) to disseminate research-generated information; and (c) to provide research services to faculty and students, professional communicators, and others interested in improving the quality of human communications.

Departments of Instruction

Planned course offerings in the College of Communications for a full calendar year are published in the College newsletter the preceding November. This information is available from the Dean's Office, 302 Communications Building, 974-3031.

Communications

MAJOR Communications

DEGREES M.S., Ph.D.


Associate Professors: G. A. Evrett; Ph.D. Iowa; E. F. Shaw, Ph.D. Stanford.

Assistant Professor: J. P. McKena, Ph.D. Minnesota.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a 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

5100 Introduction to Graduate Studies (3) Scope and methods of advanced study in communications. Information sources, literature review methods, scholarly style, thesis and degree requirements, overview of traditional and behavioral research methods. Su, F

5120 Research Methods (3) Communications research, statistical, and qualitative process, bases for derivation and verification of hypotheses, and basic methods of designing research in communications. Su, F

5130 Advanced Principles of Mass Communications (3) Prospecting over all phases of mass communications including history, development and current status of communication industry, principles of broadcasting, and principles of advertising.


5150 Seminar in Communications Issues (3) Contemporary topics in communications. Prereq: 5100 and 5140, or consent of instructor. May be repeated. Maximum 6 hrs.

5970 Independent Study (3) Reading, research, or projects on special topics in communication. On individual basis, under faculty direction, with consent. May be repeated.

6000 Doctoral Research and Dissertation (3-15) E

6100 Seminar in Communications Theory (3) Intensive analysis of selected theories and supporting research data dealing with source, message, media, receiver, or situations variables in process of communication. Prereq: 5140.

6200 Seminar in Communication Topics (3) Identity, presentation and analysis of special issues and problems in communication. Organization and strategy in writing research proposals. Prereq: 5100, 5120, 5140. Recommended prereq: 6100 or consent of instructor.

6300 Survey Research Methods in Communications (3) Survey methods applied to opinion and communications media research problems. Planning, sampling, questionnaire construction, data gathering (personal, mail, and telephone), data processing and interpretation. Attitude measurement and message pretesting applications. Prereq: 5120 or consent of instructor.

6310 Experimental Research Methods in Communications (3) Experimental methods applied to communications research problems. Causal inferences from various research designs. Control, single-factor, and multifactor experimental designs. Latent and field experiment situations. Prereq: 5120 or consent of instructor. Prereq or coreq: Basic statistics.

6320 Seminar in Historical Research Methods in Communications (3) Materials and methods in historical, descriptive, and theoretical research in communications theory and behavior. Prereq: 5100, 5120. Recommended prereq: 5140, 6100. A

Adverting

Professors: R. J. Oates (Head), M.A. Wisconsin; A. D. Fletcher, Ph.D. Illinois; D. G. Hileman, Ph.D. Illinois; S. K. Zeigler, Ph.D. Michigan State.

Assistant Professor: J. B. Dunlap, Ed.D. Akron.

3630 Advertising Copy and Layout (4) Ideas and their translation into persuasive words and pictures. Principles and techniques of copy and layout. Lecture and labs. Prereq: 3000 with grade of "C" or better or consent of instructor. F, W, Sp

4000 Advanced Advertising Copy and Layout (4) Creative strategy and execution of advertisements for mass media. Problems in idea creation for advertising. Lectures and labs. Prereq: 3630 with grade of "C" or better or consent of instructor. F, W

4360 Advertising Media (3) Media, markets, and audiences. Evaluation of media in relationship to communication needs of advertisers. Prereq: 3000 with grade of "C" or better or consent of instructor. F, W

4460 Cases and Problems (3) The case approach to the study of advertising problems. Analysis of cam...
paigns and trends. Prereq: 3630, 3650 and 4360 with grade of “C” or better or consent of instructor. F, W

4470 Advertising Campaigns (4) Application of theory in planning and execution of campaigns. Marketing, consumer research, development and allocation of budgets. Choice of appeals and approaches; media selection; preparation of advertise-
ments. Prereq: 3630 and 4360 with grade of “C” or better or consent of instructor. W, Sp

5310 Current Issues in Advertising (3) Current socio-economic, legal, ethical and cultural issues in advertising and communication to determine advertising’s role in and responsibility toward society. Emphasis on both marketing and behavioral science aspects of advertising. Consideration of creativity, media, management, and research. Ex-
tensive individual reading; preparation and delivery of papers.

5360 Advanced Advertising Research (3) Nature, scope, and application of research including meas-
urement of advertising, media audiences, and evaluation of messages. Prereq: 4460 or consent of instructor.

5510 Creative Projects (3) Creative or problem solving interests related to advertising. Designed for the advanced student who wishes to apply theory and skills to specific problems. Prereq: 4000 and 4460 or grade of “C” or better or consent of instructor. May be repeated.

5970 Independent Study (3) E

Broadcasting

Professors:
D. W. Holt (Head), Ph.D. Northwestern; H. H. Howard, Ph.D. Ohio.

Associate Professor:
I. G. Simpson, M.S. Syracuse.

Assistant Professors:
F. A. Lester, M. A. Tennessee; M. C. Rounds, M.S. Syracuse; R. A. Sherry, M.A. University of Tennessee; M. K. Sidel, Ph.D. Northwestern.

Communications Specialist:
J. H. Carr, M.S. Tennessee.

3680 Television and Radio Advertising (3) Princi-
ples of successful radio-television advertising; em-
phasis on media research, rate structure, program-
ming, creativity; television commercials. F, Sp

3850 Radio-Television Writing (3) Theory and tech-
nique of writing broadcasting scripts except news and dramas. Special events, interviews, musical s,
scripts, radio talks, documentaries, and promotion
writing in-depth articles for mass circulation maga-
azines. Prereq: 2220. W

4010 Speech for Broadcasting (3) Fundamental broadcast conditions affecting the announcer; pro-
nunciation and oral interpretation of general Ameri-
can English. Emphasis on broadcast English. Prereq:
Speech 2311. F, W

4020 Radio Production (3) Study of radio produc-
tion, past and present. Familiarization with produc-
tion tools and techniques. Group and individual production activities. Prereq: 2750 or consent of instructor. Cannot be taken for graduate credit by communications majors. F

4030 Television Production (3) Overview of ele-
ments of television production: camera, sound, lighting, film, videotape recording, optics, and studio production. Emphasis on the use of production with the layperson and professional broadcast student in mind. Prereq: 4020 or consent of instructor. Cannot be taken for graduate credit by communications majors. F

4040 Advanced Television Production (3) A semi-

independent course in program origination, produc-
ing, directing and performing with orientation to the professional broadcast student. Prereq: 4030 or consent of instructor. Sp

4610 Broadcast News Operation (3) Theory and practice in covering local news and public events through radio and television. Gathering and pro-
duction of news broadcasts, using tools of broad-
cast newpaper. Prereq: 3610 and 3670 or consent of instructor. 2 hrs and 1 lab. Sp

4670 Radio-Television Management (3) Business policies and practices of networks and stations. De-
partmental functions, cost and income figures, sales techniques, promotion, advertising agencies, and govern-
mental regulations. Lectures by commercial broadcasters. Prereq: 2750 or consent of instructor. F, Sp, Su

4680 Broadcast Sales Management (3) Problems and practices of television and radio sales, case studies in sales development, pricing, promotion, and other areas of sales management. Prereq: 2750 or consent of instructor. Sp

5410 Educational Broadcasting (3) Summary, analysis, application, and evaluation of television and radio broadcasting for educational pur-
poses. Sp

5510 Creative Projects (3) For students having spe-
cialized broadcasting interests or those who wish
extensive directed study in creative writing or pro-
duction projects. May be repeated. E

5610 Public Affairs Broadcasting (3) News and pub-
ic affairs function in broadcasting stations and net-
works, including management, economics, person-
nel utilization, sources of program materials, ethical and legal aspects. Public affairs program development, particularly press conferences, interviews, and news specials. Prereq: 3610 or consent of in-
structor. W

5620 Broadcast Law and Regulations (3) Sociopolitical control of broadcasting; effect of laws, regulations, and public policies upon station operations. Emphasis on unique situation of broadcast-
ing as a business activity. Prereq: 3610 or consent of Journalism 4410 or 5210 or consent of instructor. F

5630 Broadcast Documentary Writing (3) Role of documentary in radio and television. Research, writ-
ing, and editing techniques. Prereq: 4410 or consent of instructor. F, W

5650 Radio-Television Program Development (3) Planning basic program structures for broadcasting stations. Historical trends in programming and cur-
rent programming practices as related to audience requirements, governmental policy, and competi-
tive conditions. Individual studies of program de-
velopment on both local station and network levels. Prereq: 2750 or consent of instructor. Su, F

5970 Independent Study (3) E

School of Journalism

Professors:
J. A. Crook (Director), Ph.D. Iowa State; J. B. Flowers, Ph.D. Minnesota; B. K. Leiter, Ph.D. Southern Illinois; J. R. Lynn, Ph.D. Southern Illinois; D. N. Nimmo, Ph.D. Vanderbilt.

Associate Professors:

Assistant Professors:
M. L. Kinn, M.S. Florida State; J. P. McKerns, Ph.D. Minnesota.

3120 Writing Feature Articles (3) Selection of topics and practice in writing feature articles for newspa-
pers, magazines, and company publications. Prereq:
2220 or consent of instructor. E

3410 Communications Law (3) Statutory law and judicial precedents affecting mass communications media. Libel, contempt of court, invasion of privacy, copyright. Broadcasting, advertising and postal regulations. E

3710 Public Relations (3) Theories and principles of public relations. Overview of PR as a management tool of business, government, institutions, and or-
ganizations. Cannot be taken for graduate credit by communications majors. E

3720 Advanced Public Relations (3) Preparation of communications materials to gain support from var-
ious publics; planning public relations programs. Prereq: 3710. F, Sp

3810 Specialized Publications (3) Editorial and de-
gn design of specialized magazines and newspapers. Prereq: 2230 and 3310 or consent of instructor. W, Sp

3990 Journalism Research Methods (3) Use of so-
cial science research methods in journalism with emphasis on survey techniques. Interpretation and communication of research findings to public. W, Sp

4130 Editorial Writing (3) Analysis of editorial policies, practices, pages. Writing of editorials and columns, with emphasis on study and use of rhetori-
cal devices and logical arguments. Prereq: 3120.

4150 Issues in Journalism (3) Topics vary. May be repeated. Maximum 6 hrs.

4310 Reporting Public Affairs (3) Reporting news of courts, politics, and government. State, county and local coverage. Prereq: 2230 and senior standing. F, Sp

4410 Mass Media and Society (3) Roles and respons-
ibilities of mass media in society. Critique of mass media performance. Media codes and controls on the media. E

4420 Newspaper Management (3) Daily and weekly business operations. Developments in newspaper management. Sp

4560 Investigative Reporting (3) Investigative and interpretive reporting of complex or specialized sub-
jects to place news in perspective or to clarify situa-
tions. Emphasis on writing for publication. Prereq:
2220, W

4710 Public Relations Cases (3) Case studies and application of public relations principles to prob-
lem situations in business and industry. Prereq: 3710. Em-
sions, trades and professions; solving problems in public relations situations. Prereq: 3720. F, Sp

4810 Journalism in the High School (3) Functions and methods of high school journalism. Staff or-
ganization, writing and editing techniques, editorial problems, and business management. Su

4890 News and Feature Photography (3) Advanced principles and methods in black-and-white photog-
raphy. Emphasis on news and feature photography, and picture stories. Prereq: 3910 or consent of in-
structor.

4950 International Communications (3) Commu-
nication of news and opinion among nations and under varying types of political and economic sys-
tems; world news organizations, the press as a fac-
tor in international affairs; barriers to the flow of information; comparison of world press systems. E

4970 Independent Study (3) May be repeated. Maximum 6 hrs.

5210 Government and the Press (3) Historic and current problems in the relations of executive, judi-
cial, legislative, and regulatory segments of gov-
ernmental and press. Prereq: 3110 or consent of instructor. W

5250 Public Opinion and Mass Media (3) Nature of public opinion with emphasis on role of press in its formation and how the press in turn is influenced by public opinion. Prereq: 4410 or consent of instructor. F

5510-30 Writing and Editing Projects (3, 3, 3) Specialized writing or editing interests, such as ag-
culture, politics, labor, finance, science, for tech-
nical as well as general publications. Prereq: 2220 or 2300.

5560 Magazine Article Writing (3) Techniques of writing in-depth articles for mass circulation maga-
azines. Organizing and presenting material. Prob-
lems in specialized areas, such as business, science, agriculture, the humanities. Prereq: 3120 or consent of instructor. Sp

5710 Studies in Public Relations Communications (3) Problems of communication between institu-
tions and organizations and their publics. Case his-
tories and evaluations of programs. Prereq: 3710 or consent of instructor. W

5810 Magazine Editing and Production (3) Analysis of editorial and production problems of general, re-

gional, and specialized publications. Reader inter-
est evaluation, individual editorial projects. Prereq:
College of Communications

5950 Communications and International Develop-
ment (3) Seminar emphasizing mass media in na-
tional and international development. Communications and change in developing countries. Problems in international and cross-cultural communications. Prereq: 4950 or consent of instructor.

5970 Independent Study (3)
College of Education

William H. Coffield, Dean
E. Dale Doak, Associate Dean for Undergraduate Programs
Glennon Rowell, Associate Dean for Graduate Studies
Medge M. Phillips, Director, School of Health, Physical Education, and Recreation
Charles M. Peccolo, Director, Bureau of Educational Research and Service

The faculty of the College of Education is committed to performing three major functions: (1) to provide professional preparation for teachers, administrators, and school service personnel at 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 experimental and research studies in education.

The College of Education holds membership in the American Association of Colleges for Teacher Education. 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.

The College of Education, through the Graduate School, offers programs leading to the Master of Arts in College Teaching, the Master of Science degree, the Specialist in Education, the Southern Association of Colleges for Teacher Education. 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.

The College of Education offers programs of advanced study leading to the Doctor of Education degree in the major areas listed on page 8, and to the Doctor of Philosophy degree in Health Education.

The College of Education offers programs of advanced study leading to the Doctor of Education degree in the major areas listed on page 8, and to the Doctor of Philosophy degree in Health Education.

The Ph.D. program with a major in Education provides five options for study in the departments of Curriculum and Instruction, Educational Administration and Supervision, Educational and Counseling Psychology, Physical Education, and Vocational-Technical Education. The program requirements and the options and emphases are:

The Program

Research Area

Options and Emphases

Option I. Administration Theory and Practice

The Administration of Higher Education
Contemporary Economics
and Educational Finance
Educational Planning
Facility Planning
Maintenance of School Plants
Organizational Theory
Personnel Administration
The Politics of Education
The Principalship
School Law
The Superintendency
Supervision

Option II. Theories of Curriculum Development and Foundations of Education
Anthropological, Historical, Philosophical, and Sociological Bases for Educational Planning and Curriculum
Principles and Models for Planning, Developing, and Evaluating Educational Programs
Research Design for Educational Programs

Option III. Instructional Theory and Practice
Principles and Models for Instructional Improvement
Subject Areas of Instruction and Practice: i.e., English, Foreign Languages, Mathematics, Science, Social Studies, etc.
Elementary and Early Childhood Instruction and Practice
Learning Media Services
Physical Education Instruction and Practice
Adapted Physical Education
Vocational-Technical Fields of Instruction and Practice

Option IV. Theories, Practices of Educational and Personal Adjustment
Assessment (Educational, Vocational, Personality)
Bureau of Educational Research and Service

Four major types of activities—research, development, educational services, and publications—are channeled through the Bureau of Educational Research and Service (BERS), located in Claxton Education Building. The research activities relate to the development of research proposals, conducting research, and assisting others in development of research proposals in the Colleges of Education. Developmental activities relate to change efforts in curricular content and instrumental methodology. Educational services include a wide list of activities such as in-service educational programs, consultant services, 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.

The Educational Opportunities Planning Center and the School Planning Laboratory are integral parts of the Bureau of Educational Research and Service.

EDUCATIONAL OPPORTUNITIES PLANNING CENTER

The Educational Opportunities Planning Center (EOPC) works with school districts in the Tennessee-Kentucky area to help meet their desegregation and sex discrimination needs by assisting with needs assessment and by helping develop plans to meet the needs. Staff members provide in-service training for local district personnel. Such training is directed toward solutions of curricular, human relations, and other types of problems created or compounded by school desegregation and sex discrimination.

On-site evaluation of locally installed practices and continuing cooperative evaluation of the progress of local programs are additional major efforts. This program is funded by the U.S. Office of Education.

SCHOOL PLANNING LABORATORY

The School Planning Laboratory (SPL), located in Claxton Education Building, assists schools and colleges in integrating curriculum offerings with architectural designs, organizing regional institutes to promote innovative construction concepts, encouraging full staff utilization to secure an optimal learning environment, facilitating renovation projects within existing buildings, and conducting custodial clinics on proper maintenance techniques. Course work relating specifically to school planning is offered through the Department of Educational Administration and Supervision, while two-year graduate assistantships are under the administrative auspices of the Laboratory.

Departments of Instruction

Art and Music Education

C. H. Ball, Head

Art Education

MAJOR

Art Education DEGREE M.S.

Professor: J. W. Robertson, Ed.D. Columbia.

Associate Professor: H. N. Null, Ed.S. Peabody.


The Master of Science degree in Art Education is offered for art teachers, supervisors, and art-trained persons holding the baccalaureate degree. The program provides both thesis and non-thesis options. Moreover, it is possible to achieve Tennessee Certification in art while pursuing the Master's degree program.

The thesis option requires 45 quarter hours as follows:

<table>
<thead>
<tr>
<th>Quarter hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Art Education 5310, 5320 and electives</td>
<td>18</td>
</tr>
<tr>
<td>2. Education Curriculum and Instruction 5710, and electives</td>
<td>18</td>
</tr>
<tr>
<td>3. Minor (selected with committee)</td>
<td>9</td>
</tr>
<tr>
<td>4. Thesis (Art Education 5000)</td>
<td>9</td>
</tr>
</tbody>
</table>

The non-thesis option requires 45 quarter hours as follows:

<table>
<thead>
<tr>
<th>Quarter hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Art Education 5210, 5310, 5320, and electives</td>
<td>21</td>
</tr>
<tr>
<td>2. Education Curriculum and Instruction 5800, and electives</td>
<td>9</td>
</tr>
<tr>
<td>3. Minor (selected with committee)</td>
<td>9</td>
</tr>
<tr>
<td>4. Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

The thesis option requires satisfactory completion of an oral examination prior to awarding the degree, while the non-thesis option requires satisfactory completion of a final written comprehensive examination. Both the oral and written exams are conducted by the student's Master's degree committee.

Not all courses in art education are offered regularly each quarter, so the student should plan his or her program carefully with a faculty advisor.

3210 Art in the Secondary School Program (3) Program planning; materials and equipment; relation to other school experiences. Classroom observation. Prereq: 9 hrs art education. 1 hr and 2 labs. F, Sp

3920 Clay in School Program (3) Exploring methods of hand-built forms; history, firing procedures. Prereq: 2100. 1 hr and 2 labs. F, Sp

3930 Textiles in School Program (3) Exploration of processes of weaving, stitching, batik, and silk screens. Prereq: 2100. 1 hr and 2 labs.

4120 Designing of Teaching Aids for Art in School Program (3) Design and preparation of charts, exhibits, slides, films, and other teaching aids for grades one through twelve. Prereq: 2100 or consent of instructor. 1 hr and 2 labs. W, Su

4130 Three-Dimensional Design in School Program (3) Exploration of wood, wire, metal, plastics, and other sculptural materials. Prereq: 2100 or consent of instructor. 1 hr and 2 labs. F, Sp

4150 Lettering, Posters, and Displays in the School Program (3) Design and layout; techniques and procedures. Prereq: 2100 or consent of instructor. 1 hr and 2 labs. W, Su

4160 Appreciation of the Arts in the School Program (3) Prereq: 2100 or consent of instructor. 1 hr and 2 labs. Su

4350-60-70 Problems in Art Teaching (3, 3, 3) Prereq: Consent of instructor. E

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a 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

5210 Organization, Administration, and Supervision of Art in the School Program (W) 3

5310 Art in Education (3) Historical background, current philosophy, theory, and trends; nature and function of aesthetic behavior in visual arts; relationships to psychology, sociology, and anthropology. F

5320 Program Development in Art Education (3) Objectives, organization, content selection, facilities, and equipment; supervision; evaluation; professional growth; leadership and community relationships; art for special student. Sp

5650-60-70 Problems in Music Education (3, 3, 3) Prereq: Consent of instructor. E

Music Education

MAJOR

DEGREE M.S.


Assistant Professor: M. C. Moore, Ph.D. Michigan.

Thesis and non-thesis programs lead to the Master of Science degree in music education. Prerequisite preparation: undergraduate degree or equivalent in music education.

All graduate students in music education must pass proficiency examinations in music theory and applied music.

Requirements for thesis program: 45 quarter hours including thesis (9 hours), the music education major (18 hours), minor areas in music (9 hours), and professional education (9 hours). Required courses: Music Education 5000, 5210, 5220, 5230; Curriculum and Instruction 5710.

Requirements for non-thesis option:

1. Minimum of 51 quarter hours of course
College of Education

work with a minimum of 26 hours at the 5000 level.

2. Evidence of ability to understand and interpret research through completion of:
   a. Curriculum and Instruction 5610 or equivalent.
   b. Music Education 5710.
   c. Satisfactory performance of research activities in required courses in music education listed below.

3. Curriculum:
   a. Major: at least 27 quarter hours in music education.
   b. A minor: at least 15 quarter hours in music.
   c. 9 quarter hours in professional education (Refer to Curriculum and Instruction 5610 and Educational Psychology 4760 or equivalents and a 3-hour elective.

With the exception of the required courses listed and with approval of the student’s advisor, courses may be selected as described more fully above. This provides flexibility for the student to pursue in some depth specialized interests and needs in the following areas of music teaching and learning: Secondary (Junior and Senior High); Vocal (Choral); Instrumental (Band and Orchestra); and Supervision.

4. Specific course requirements:
   a. Music Education Foundation (15 quarter hours) including: 1 Seminar (3 hours), 5210, 5240, 5250, 5710.
   b. Music: Six quarter hours in applied music (piano; voice; a band or orchestra instrument; theory and composition).
   c. Education (limited elective of 6 quarter hours): Educational Psychology 4760 or 5050, 5320, or other appropriate course in educational psychology with 3 hours credit.
   d. Plan, rehearse and conduct a full public performance of music by junior or senior high school music groups. This shall be worked out as a long-term project under the supervision of the student’s advisor.

5. Pharmacy, or voice.

6. Evaluation procedures below (with approval of advisor and committee):
   a. Oral examinations in major and minor fields.
   b. The student shall elect one of the evaluation procedures below (with approval of advisor and committee):
      (1) Oral examinations in major and minor fields.
      (2) A public recital in principal Instrument, piano, or voice.

7. The presentation in public performance of an original musical composition(s) accepted by the committee as music suitable for school music performing groups.

8. Planning, rehearsing, and conducting a full public performance of music by junior or senior high school music groups. This shall be worked out as a long-term project under the supervision of the student’s advisor.

9. Student’s Committee: A minimum of three faculty members—the advisor from music education; one member from music; one member from education.

4441-42-43 Teaching Class Piano (1, 1, 1) For majors in music, music education, or elementary education. Prereq: Consent of instructor. F, W, SP


4460 Marching Band Techniques (3) Functions, organization, and direction of a school marching band. Prereq: Consent of instructor. Coreq: 3511: F, S.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5150 Studies in Secondary School Music (3) Development of understandings of teaching growth patterns and processes through music experiences; cultural and community influences on secondary school music, problems in administration and teaching of music in secondary school; relationship of music with humanities in curriculum. Sequel to 3150.

5210 Psychological Foundations of Music (3) Perception; function; aesthetics; talent measurement; implications for teaching theory and practice. A review of classic and current experimental studies. Prereq: consent of instructor. F

5220 The Administration and Supervision of School Music (3) Improvement of teacher-learning, child-learning process in music education. Problems of supervision, administration, service education, teacher preparation, and guidance.

5230 Comparative Teaching Procedures in Music Education (3) Modern teaching theories and their implications in music. Prereq: consent of instructor. F

5240 Evaluation Procedures in Music Education (3) Tests, measurements, and evaluation of musical development of students at all levels. Standard educational measurements and teacher-made tests applicable to music and specialized evaluative techniques for use in classroom situations. Uses of musical aptitude and achievement tests. Statistical measures applied to learning music. Prereq: General psychology, educational psychology, and elementary statistics. S

5250 The Role of Music in Education (3) For school personnel, other than music teachers, on the role of music in public education. No previous experience in music required. Su

5260 Music for Early Childhood (3) Prereq: 3120 or 3130 or consent of instructor.


5320 Advanced Choral Literature and Conducting (3) Reading, conducting, and interpreting band scores and selection. Prereq: Undergraduate degree with a major in music or music education; 4450, 4610 or equivalent.

5350-56-70 Special Problems in Music Education (3, 3, 3) Current problems in music education at all levels of instruction and in various specialized areas of music curriculum. Prereq: 5710 or equivalent and consent of instructor. E

5410 Advanced Harmony and Counterpoint (3) Reading, writing, and conducting with an emphasis on 19th century and Baroque. Prereq: Undergraduate degree with a major in music or music education; 4430 or equivalent.

5510-20-30 The Talent Education Program of Shinichi Suzuki (2, 2, 2) Study of the psychology, procedures and literature utilized by Shinichi Suzuki in Talent Education program in Japan. Prereq: Consent of instructor. F, W, Sp

5710 Research in Music Education (3) Prereq: Consent of instructor. Su


5820 Seminar (3) Music teaching in vocal and general music areas of junior high school curriculum. Survey of research, professional literature and development of bibliography. Laboratory activities. Projects. Prereq: Admission to M.S. program.

5830 Seminar (3) Music teaching in instrumental areas of the elementary, junior high, and senior high school curriculum. Survey of research, professional literature and development of bibliography. Laboratory activities. Projects. Prereq: Admission to M.S. program.

5840 Seminar (3) Music teaching in vocal, theoretical, historical, and appreciation areas of the secondary school curriculum. Survey of research, professional literature and development of bibliography. Laboratory activities. Projects. Prereq: Admission to M.S. program.

Continuing and Higher Education

MAJOR DEGREE COLLEGE STUDENT PERSONNEL

M.S. M.S.

Professors:
M. C. McNamara, (Head), Ph.D. Florida State;
W. M. Coffelt, Ph.D. Iowa;
J. P. Goodrich, Ed.D. Tennessee;
J. M. Peters, Ed.D. North Carolina State;
E. M. Ramer (Emeritus), Ed.D. Columbia.

Associate Professors:
O. K. McCollough, Ph.D. Florida State.

Assistant Professor:

The Master of Science degree in Adult Education is offered for teachers, administrators, counselors, and community specialists. The degree program has two options: a thesis option requiring a minimum of 45 hours, and a non-thesis option requiring a minimum of 51 hours. For each option, 9 hours must be completed in the behavioral sciences.

The Master of Science degree in College Student Personnel is designed for individuals interested in entering the field of student personnel administration in colleges and universities or community or junior colleges. The program has both a thesis and non-thesis option. A minimum of 60 hours, which includes 9 hours of practicum experience, is required.

For further information write the Department of Continuing and Higher Education.

4554-55-56 Student Leadership Workshops (1, 1, 1) Small group experiences in leadership and development.

5545-56-57 Leadership Workshops (1, 1, 1) Small group experiences in leadership and development.

Laboratory activities. Projects. Prereq: Admission to M.A. program.

5600-Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5600 Adult Education: A General Survey (3) Historical development, philosophies of adult education, agencies, programs, current issues, and literature of adult education. F, Sp

5610 Seminar in College Teaching (3) Effective college teaching, testing and measurement; recent research in college instruction; major problems and issues in higher education. Required of candidates for the M.A.T. degree. S/NC only. Sp

5360-70-80 Problems in Continuing and Higher Education (1-3, 1-3, 1-3) Independent study of problems and special institutes. S/NC only. E
5410 College and University Law—The Legal Environment (3) Legal precedent affecting organization, administration, and control of public higher education. Academic freedom, faculty termination, taxation, private support, religion, tort liability, and related federal regulations. W

5420 College and University Law—Constitutional Rights and Responsibilities of Students (3) Legal precedents affecting student personnel services in public higher education. Student discipline, housing, dress, organizations, activities, fees, tuition, and related federal regulations. W

5430 College and University Law—Tort Liability and Risk Management (3) Legal precedent concerning liability exposure of public institutions of higher education. Personal and institutional liability. Basic principles of risk management and liability insurance. Prereq: 5410 and 5420, or consent of instructor. W

5440 American Higher Education (3) Purposes, functions, organizations, and programs. W

5450 Instruction in Higher Education (3) Problems, procedures, and techniques. W

5460 Adult Development (3) Changes in characteristics of the adult over the life span and implications for adult education. F

5470 The Curriculum of Undergraduate Higher Education (3) Background, content, and organization of instructional programs, trends, and evaluation processes, including accreditation activities. F

5510 Governance of Colleges and Universities (3) Development, change, trends, process, and structure of collegiate governance. F

5550 Fiscal Problems in Higher Education (3) Revenue sources and fiscal management in public and private colleges and universities. Sp

5660 Program Planning in Continuing and Higher Education (3) Theory and method for planning adult education programs. W

5750 Student Personnel in Higher Education (3) Philosophy and scope. W

5770 Case Studies in College Student Personnel (3) Prereq: 5750 or consent of instructor. W

5860 The Community-Junior College (3) History and role of two-year college, major functions, organization and administration, problems, and issues. E

5955-65-75 Practicum in Continuing and Higher Education (1-3, 1-3, 1-3) Supervised practice in selected areas of instruction or administration of continuing or higher education programs. S, N, C only. E

5960-70-80 Seminar in Continuation and Higher Education (1-3, 1-3, 1-3) Problems and issues confronting professionals in fields of adult or higher education. E

5990 Practicum in College Student Personnel (3) Prereq: 5750, 5770. Educational Psychology 5560, or consent of instructor. May be repeated with consent of instructor. Maximum 9 hrs. E

6450 Advanced Seminar in Program Planning (3) Concepts and theories related to program planning in continuing and higher education. Prereq: 5660 or equivalent. E

See also course listings under the Departments of Curriculum and Instruction, Educational Administration and Supervision, and Educational and Counseling Psychology.

### Curriculum and Instruction

#### MAJORS

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREES</th>
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<tbody>
<tr>
<td>Curriculum</td>
<td>M.S.</td>
</tr>
<tr>
<td>Elementary Education</td>
<td>Ed.S., Ed.D.</td>
</tr>
<tr>
<td>English Education</td>
<td>M.S.</td>
</tr>
<tr>
<td>Foreign Language Education</td>
<td>M.S.</td>
</tr>
<tr>
<td>Instructional Media and Technology</td>
<td>M.S.</td>
</tr>
<tr>
<td>Mathematics Education</td>
<td>M.S.</td>
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<tr>
<td>Reading Education</td>
<td>M.S.</td>
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</tbody>
</table>

### Education

<table>
<thead>
<tr>
<th>Field</th>
<th>Degree</th>
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<tbody>
<tr>
<td>Science Education</td>
<td>M.S.</td>
</tr>
<tr>
<td>Social Science Education</td>
<td>M.S.</td>
</tr>
</tbody>
</table>

Prerequisites:

- J. J. Bellon (Head), Ed.D. California (Berkeley); E
- J. E. Alexander, Ed.D. Tennessee; E
- C. B. Allison, Ph.D. Oklahoma; K. J. Blank, Ph.D. Ohio State; B. L. Bronan, Ed.D. Tennessee; P. D. Burnham, Ph.D. Iowa; W. L. Butech, Ed.D. Texas Tech; M. A. Christiansen, Ph.D. Kansas; E

### Associate Professors


### Assistant Professors


Graduate programs are designed to improve scholarship and educational competence in a number of areas leading to the Master of Science degree, the Specialist in Education degree, the Doctor of Education degree, and the Doctor of Philosophy in Education degree.

### THE MASTER'S PROGRAM

For the Master of Science degree, thesis and non-thesis options are available in the following majors: Curriculum, Elementary Education, English Education, Foreign Language Education, Instructional Media and Technology, Mathematics Education, Reading Education, Science Education, or Social Science Education. The non-thesis option requires the completion of 51 quarter hours of coursework.

### THE SPECIALIST PROGRAM

The Educational Specialist degree program with a major in Curriculum and Instruction encompasses concentrations in the following areas: curriculum, elementary education, English education, foreign language education, instructional media and technology, mathematics education, science education, social science education.

### THE DOCTORAL PROGRAM

The Ed.D. program in Curriculum and Instruction may include emphasis upon the following fields: curriculum, social foundations, educational research, elementary education, English education, foreign language education, mathematics education, science education, social science education. The Doctor of Philosophy degree with a major in Education includes options and emphases as listed on page 8.

For further information, write the Department of Curriculum and Instruction.

4010 International Education Europe and the Americas (3) Historical, philosophical, and sociological foundations; special reference to England, USSR, France, and Germany.

4110 Education in Cultural Perspective (3) Contributions of anthropological concepts (primarily concepts of culture) to understanding of education processes, problems, and thought in our society and others. (Same as 4110). W

4111 Non-Western Education: Anthropological Approaches (3) (Same as Anthropology 4111) W

4150 School Library Administration (3) (Same as Library and Information Science 4150) W

4216 Curriculum in Elementary School Social Studies (3) Survey of current curriculum approaches and trends in elementary school social studies. Prereq: Teaching experience or student teaching. Sp, Su

4217 Teaching Elementary School Science (3) Methods and materials used in teaching science in elementary school. Developmental and diagnostic/curriculum programs. Not open to students with recent courses or background in teaching elementary school science. W

4218 Teaching Elementary School Mathematics (3) Methods and materials used in teaching mathematics in elementary school. Developmental and diagnostic/or corrective programs. Not open to students with recent courses or background in teaching elementary school mathematics. W, Su

4219 Elementary School Language Arts (3) Methods and materials used in teaching elementary school language arts. Development of functional relationships with other curriculum areas, diagnostic programs, and corrective work. Not open to students with recent courses or background in teaching elementary school language arts. W

4230 Introduction to Diagnosis and Correction of Classroom Arithmetic Difficulties (3) Classroom strategies for diagnosis and correcting arithmetic difficulties grades 1-8. Prereq: 3350 or 3371 or 4216 or equivalent. W

4240 Classroom Instructional Organization (3) Developing understandings and skills relating to grouping, individualization, space utilization, organization, grading, integration, and achieving an effective social environment. For elementary classroom teachers. Prereq: Consent of instructor.

4250 Initiating the Activities Program (3) Prereq: Educational Psychology 2430. 6 hrs of methods of teaching in elementary school. W

4260 Philosophy of Education (3) Truth, knowledge, and valuation in relation to work of the schools. Prereq: 3010. Educational Psychology 2430 or 3810, or equivalents. E

4261 Educational Classics (3) Discussion of selected writings on education from Plato to Dewey. W

4280 Diagnosis and Correction of Classroom Reading Problems (3) Prereq: 3280 or equivalent. E

4300 Developmental Reading in Secondary School and Community College (3) Approaches and materials for teaching reading and preparing reading classrooms and/or laboratories at middle school, secondary school, and community college level. Prereq: Consent of instructor.

4301 Teaching Developmental Reading (3) Methods and materials used in teaching reading in the elementary school. Includes development of functional relationships with other curriculum areas, diagnostic procedures and remedial work. Not open to students with recent course work or background in the teaching of reading. W

4300 Language Development of Children: Birth-Preadolescence (3) In-depth view of language development from birth through preadolescence; application of procedural knowledge to instructional programs for early and middle childhood.
4304 Developing Reading Skills in Content Fields (3) Approaches and techniques for teaching reading skills in content areas of school program. Emphasis on workshops and secondary school programs. Prereq: Consent of instructor.

4340 The Junior High School and Middle School (3) To identify and analyze distinguishing characteristics of the Junior High and Middle School curricula.

4350-60-70 Problems in Teaching English (3, 3, 3) Prereq: Consent of instructor.

4351-61-71 Problems in Teaching Mathematics (3, 3, 3)

4352-62-72 Problems in Teaching Social Studies (3, 3, 3)

4353-63-73 Problems in Teaching Science (3, 3, 3)

4354-64-74 Problems in Teaching Language Arts (3, 3, 3)

4355-65-75 Problems in General Curriculum (3, 3, 3)

4356-66-76 Problems in Instructional Materials (3, 3, 3)

4357-67-77 Problems in Teaching Foreign Languages (3, 3, 3)

4359-69-79 Problems in Teaching Conservation (3, 3, 3)

4381 Problems in Early Childhood Education (3) May be repeated. Maximum 9 hrs. 6 hrs can be taken concurrently.

4400 Problems in Improvement of Instruction (1-3) Special conferences, workshops, or in-service programs designed for improvement of instruction. May be repeated. Maximum 9 hrs. S/NC only.

4410 Educational Sociology (3) (Same as Sociology 4410.)

4450 Teaching in Kindergarten: Overview (3) Relationship of kindergarten to total elementary program; goals, historical settings and current developments.

4451 Teaching in Kindergarten: Program Development (3) Curriculum planning and organization; classroom management. Prereq: Consent of instructor.

4630 Current Educational Problems (3)

4654 Programs, Methods and Materials in Environmental and Science Education (3) Instructional materials, teaching methods, curricular programs and issues in environmental and science education.

4750 Utilization of Instructional Media (3) Introduces the basic communications process, media, instructional media, instructional development, selection and utilization of media, and basic sound media and techniques. (Same as Library and Information Science 4750 and Vocational Technical Education 4750.)

4840 Introduction to Data Processing in Education (3) Analysis of current activities in field of educational data processing. Emphasis on curricular, administrative, and research opportunities in education, using modern electronic data processing methods and machines.

4860 Programmed Learning (3) Theories of learning as related to technology of programmed instruction; techniques and applications of programming. Prereq: Psychology 3210, Educational Psychology 3730, or consent of instructor. (Same as Psychology 4860.)

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student unilaterally agrees to fulfill all faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5040 Seminar in Elementary School Language Arts (3) Analysis of current issues related to elementary school language arts education. Emphasis on individual student presentations, projects, and investigations. Prereq: At least 1 yr teaching experience (K-9), or consent of instructor.

5070 Seminar in Intercultural Education (3) Analysis of selected problems: political factors in creation of educational policy; social stratification and its bearing on education in elite and mass societies; relation of education to manpower planning and technological change; and others.

5100 History of European Education (3) Ancient Greece to development of national school systems.

5110 History of Education (3) Foundations for American education. E


5140 Comparative Philosophies of Education (3) Educational theory and policy proposals of the major philosophic schools of thought. Prereq: 4260 or equivalent.

5141 Pragmatism in Education (3) Effects of American pragmatist tradition on educational policy and practice. Prereq: At least one course in history or philosophy of education.

5142 The Existential Student (3) Literature of existentialism as source harmonizing student's educational goals and curriculum. E

5143 Supervised Readings in Philosophy of Education (3) Prereq: At least 9 hrs history or philosophy of education.

5150-60-70 Seminar (1-3, 1-3, 1-3) Curriculum, educational development, and social foundations as they relate to goals of students' programs. Maximum 9 hrs. S/NC only.

5180-90-200 Seminar Educational Specialist Research (3, 3, 3)

5210 Seminar in International Education: Asia and Africa (3) Historical, philosophical, and sociological foundations; special reference to Japan, China, India, and Africa.

5211 Instructional Strategies in Elementary School Social Studies (3) Specific teaching methods and instructional procedures for organizing social studies learning. Prereq: Undergraduate social studies course or equivalent.

5220 Supervised Readings in International Education (3) Supervised readings and research in any area of international education on emphasis on historical, philosophical, and sociological foundations. Prereq: Consent of instructor.

5230 Advanced Study and Pracitcum in Diagnosis and Remediation of Arithmetic Difficulties (3) Assessment and remediation experience with students having corrective and remedial arithmetic needs. Prereq: 4260 or equivalent. F, Su

5240 Creative Thinking and Expression in the Elementary School (3) Prereq: 5280 or equivalent, or consent of instructor. E

5250 Secondary School Instruction (3)

5270 The Elementary School Curriculum (3) Theoretical background and experimental approaches.

5280 The Teaching of Language Arts in the Elementary School (3) Trends, issues, and research in content and method for the language arts program, grades 1-8. Prereq: 3280 or consent of instructor.

5281 Teaching Social Studies in the Elementary School (3) Recent trends, issues, and research findings. Credit cannot be earned for both 5281 and 5570.

5282 Teaching Science in the Elementary School (3) Trends, issues, and research in content and method for elementary program.

5283 Programs and Materials in Teaching Elementary Science (3) Analysis of new and innovative science program materials, instructional strategies inherent in teaching of these materials. Prereq: 5282 or equivalent, or consent of instructor.

5384 Seminar in Teaching Elementary Science (3) Analysis of current curriculum issues related to elementary science education. Emphasis on individual student presentations, projects, and investigations. Prereq: 3720, 4215, or 5282 or equivalent, or consent of instructor. At least 1 yr teaching experience (K-9).


5291 Programs and Materials in Elementary School Language Arts (3) Programs and special instructional aids associated with language arts. Prereq: 3350 or consent of instructor.

5292 Seminar in Research and Theory in Teaching Mathematics in the Elementary School (3) Systematic study of research and their applications to teaching of mathematics. Prereq: 3350 or equivalent, consent of instructor, and 1 yr of teaching experience.

5302 Psychology of Reading (3) The reading act, relationship between learning theory and reading, role of reading in child's overall intellectual development. Prereq: Undergraduate reading course or consent of instructor.

5303 Methods and Materials for Teaching Critical Reading (3) Instructional techniques, methods, and materials for development of higher level comprehension skills, critical reading, and attitudes for creative (or productive) and critical (or evaluative) reading. Prereq: 3260, 4300, 4301, or at least one course in fundamentals of teaching.

5304 Programs and Materials for Reading Instruction (3) Examination of the evolution, and use of materials in reading program, distinguishing between approaches and materials for teaching reading. Prereq: 3251 or 4300 or consent of instructor.

5305 Trends and Issues in Teaching Reading (3) Critical analysis of new programs, materials, innovations, and developments in reading. Prereq: An undergraduate course in reading or consent of instructor.

5306 Teaching Reading to the Linguistically Different Learner (3) Language characteristics and special reading problems pertaining to linguistically different learner. Prereq: Undergraduate reading course, 4300 or 4301 or consent of instructor.

5307 Assessment and Correction of Classroom Language Arts Difficulties (3) Classroom approaches to assessing and correcting language arts (other than reading) difficulties. Prereq: 5040 or 5280.

5350 Curriculum Development and Evaluation (3)

5360-70 Curriculum Development in the Local School (3, 3)

5365 Mathematics Laboratories in Elementary School (K-9) (3) For elementary school teachers dealing with activities, problems, and materials laboratories and pedagogical strategies. Theoretical considerations and development of curricula and materials for laboratory. Prereq: Consent of instructor.

5366 Seminar in Research and Theory in Teaching Sciences (3) Theoretical background and experimental approaches.

5370 Remedial Reading Practicum (3) Prereq: 5381.

5381 Remediation of Remedial Reading Problems (3) Prereq: 5380 or consent of instructor.

5382 Development Reading Practicum (3) Diagnosing and teaching remedial reading problems. Prereq: 4260.

5383 Remedial Reading Practicum (3) Prereq: 5381.

5390 Organization and Administration of Reading Programs (3)

5400 Problems in Improvement of Instruction (1-3) Special conferences, workshops, and inservice programs. May be repeated. Maximum 9 hrs. S/NC only.

5410 The High School Curriculum (3) Theoretical background and experimental approaches.

5530 Curriculum Laboratory for High Schools (3) Production of syllabi, courses of study, source units, and other materials.

5580 Curriculum Planning and Development (3)
5610 Educational Statistics (3) 
5620 Problems in Direction and Supervision of Student Activities (3) 
5630 Practicum in the Individualization of Instruction (3) Prereq: 4810-20. 
5640 Newer Trends in Elementary Education (3) Trends in classroom procedures, equipment, and materials of instruction; problems involving improvement of instructional procedures. W, S, Su 
5650-60 Curriculum Laboratory for Elementary Schools (3, 3) Production of syllabi, courses of study, source units, and other materials. 
5670 Curriculum Laboratory for Early Childhood (3) Sp, Su 
5680 Teacher-Parent-Community Relations (3) Development of techniques for effective relations between parents and teachers, roles and expectations of parents and teachers, parent involvement, and influence of community on educational process. W 
5690 Design of Instructional Media (3) Design and application of instructional development model to arrive at solutions to instructional problems, development and design of a learning sequence or module, using appropriate media in actual learning situations. Prereq: 2600 or consent of instructor. 
5691 Advanced Production of Audiovisual Software (3) Lettering, overhead projectals, mounting-preserving, synctaping, photocopiting, non-photographic slides, and videotaping for producing classroom audiovisual software. Prereq: 5690 or consent of instructor, Library and Information Science 5691. 
5692 Evaluation of Instructional Media (3) Evaluating and recycling media prototype to meet needs and objectives of learners. Prereq: 5691 or consent of instructor. 
5693 Administering Instructional Media Programs (3) Duties, functions, and responsibilities of media professionals developing and administering media program in various organizational and learning settings. Prereq: 5691, 5692, or consent of instructor. 
5694 Utilization of Educational Television and Radio in Curriculum Development. Use of noncommercial educational TV and radio in schools and colleges. Prereq: Consent of instructor. 
5695 Research in Instructional Media (3) Media research and its application toward improvement of instruction and learning. Prereq: Consent of instructor. 
5696 Practicum Experience in Instructional Media (3) Practicum experience in professional media role as identified by student in various organizational and learning settings. Prereq: Consent of instructor. 
5710 Techniques of Research in Education (3) Study and application. 
5720 Classroom Observation and Analysis (3) Classroom observation and analysis procedures; development of objective observation and analysis skills, examination of existing observation systems. 
5790 Career Development: Workshop (1-8) (Same as Educational Psychology 5790). 
5800 Seminar in Cooperative Curriculum Research (3) Action research procedures and their application to programs. E 
5820 Seminar in the Teaching of Mathematics (3) Analysis of teaching materials related to subject matter and learner problems. Student presentations initiate discussion sessions. Prereq: At least 1 yr teaching experience (mathematics grades 7-12) or consent of instructor. Sp 
5825 Teaching Mathematics in the Middle and Junior High School (3) Problems related to teaching mathematics in middle and junior high schools. Understanding structure of mathematical concepts, strategies, methods, and materials for teaching. Material arrangement, individualized instruction, mathematical laboratories, and independent study. Opportunities for individual projects. Prereq: 3350 or 3751-52 or equivalent. Su 
5830 Seminar in Mathematics Education (3) Current curricular issues. Emphasis on individual student projects and investigation. W 
5835 Teaching Mathematics in the Senior High School and Community/Junior College (3) Curriculum and teaching problems. Methods of teaching "analytical" courses such as Algebra II, triangleometry, analytic geometry and calculus. Prereq: 3751-52 or equivalent. Su 
5841 Trends and Issues in Early Childhood (3) Historical background, trends, and issues as basis for evaluating current programs; materials and techniques of teaching. F, Sp 
5842 Problems in Education: Early Childhood Education (3) May be repeated. Maximum 9 hrs. Six hrs may be taken concurrently. 
5843 Seminar in Early Childhood Education (3) Analysis of research in early childhood education (K-3) with emphasis on application to programs and methods of instruction. Prereq: 5710 or 5800 or equivalent. W 
5844 Mathematics in Early Childhood Education (3) Behavioral characteristics of children in regard to mathematics, content materials and functional instructional settings, and teaching strategies for development of mathematical ideas. Prereq: 3350 or equivalent. Su 
5845 Social Studies and Science in Early Childhood Education (3) Integrative approaches to and substantive classification systems of content areas of social studies and science for early childhood years. Emphasis on selection of appropriate social studies and science content and approaches for the young child. Prereq: 3270 and 3720 or equivalent. F, Su 
5846 Language Arts in Early Childhood Education (3) Language development of young learner with emphasis on teaching methods, procedures, program and materials in early childhood language arts program. Prereq: 3260 and 3280-81 or equivalent. 
5850-60-70 Problems in Education: English (3, 3, 3) 
5851-61-71 Problems in Education: Mathematics (3, 3, 3) 
5852-62-72 Problems in Education: Social Studies (3, 3, 3) 
5853-63-73 Problems in Education: Science (3, 3, 3) 
5854-64-74 Problems in Education: Language Arts (3, 3, 3) 
5855-65-75 Problems in Education: General Curriculum (3, 3, 3) 
5856-66-76 Problems in Education: Instructional Materials (3, 3, 3) 
5857-67-77 Problems in Education: Foreign Languages (3, 3, 3) 
5859-69-79 Problems in Education: Conservation (3, 3, 3) 
5890 Field Experience (1-6) Application of curricular and instructional principles, methods, and materials in schools. Program prerequisites must be met, and consent of instructor required. May be repeated. Maximum 12 hrs. S/NC only. 
5900 Seminar in the Teaching of English in the Secondary School (3) Su 
5901 Linguistics and the Teacher of English (3) Analysis and application of linguistics in the classroom. Su 
5902 Teaching Composition in the High School (3) Techniques of teaching rhetoric. W 
5903 Teaching Fiction in the Secondary School (3) Reading, study, and analysis of literary selections. F 
5904 Teaching the Mass Media in the English Classroom (3) Nature of mass media and important influence of American education and life. Sp 
5905 Teaching English in the Community/Junior College (3) Emphasis on thorough understanding of communication needs of community/junior college students and development of instructional strategies, and materials for meeting these needs. Su 
5906 Teaching Poetry in Grades 7-12 (3) Materials and strategies for teaching poetry. F
and Supervision Education


Associate Professors: N. F. Altgeld, Ph.D. Tennessee; G. W. Harris, Jr., Ph.D. Michigan; P. M. Husen, Ed.D. Stanford.

Assistant Professor: J. T. Mertz (Adjunct), Ed.D. Columbia.


Programs are planned for (1) students preparing for administrative positions normally found in the educational structure of the state; (2) students preparing for the position of supervisor of education; (3) administrators and supervisors in service who wish to improve their professional competence; (4) students and teachers preparing for teaching positions involving administrative responsibilities; and (5) students preparing for teaching educational administration or for administrative positions in higher education.

In addition to M.S. and Ed.D. degrees, a special two-year graduate program is offered which leads to the Ed.S. (Specialist in Education) degree and which provides advanced preparation for applicants judged to be potentially competent school administrators.

The Doctor of Philosophy degree with a major in Education includes options and emphases as listed on page 8.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5100 Internship in Educational Administration (3) May be repeated with consent of department. Maximum 6 hrs.

5130 Introduction to Educational Administration (3) Tasks, functions, and processes of educational administration; organization and structure of educational programs and institutions. Ed.D. Ph.D.

5220 Philosophy and Theory in Educational Administration (3) Philosophical and theoretical foundations of educational administration, programs, and institutions, within the framework of American culture. F, W, Su

5230 Seminar in the Behavioral Sciences in Educational Administration (3) Key behavioral science concepts/concepts and their application in administration such as semantics, communication, leadership, change, administration, and organizational behavior, motivation and morale, role theory, W, Sp, Su

5290 The Politics of Education (3) Special emphasis on leadership structures, operational beliefs, and communication of ideas with regard to community decisions concerning education. E

5310 School Administration and Civil Rights Issues (3) To develop in students a greater appreciation of the problems and the role of the administrator in solving problems stemming from civil rights legislation pertaining to race, sex, and the handicapped. A

5420 District Level Administration (3) Role of central administrative team and relationships, behaviors, and competencies to develop an effective school organization. F

5430 Building Level Administration (3) For beginning school principals and administrators, and for those operating in rural elementary, secondary, or consolidated schools. W, Su

5440 Introduction to Law, Finance, and Business Management (3) Orientation for beginning principals for basic foundations of the American legal system; how case law effects daily building level operations; building level methods of fiscal and logistical support measures. F, W, Su

5450 Organization of the School Program (3) For principals and supervisors; conceptual and technical skills in organizing school program including curriculum, instruction, student grouping, staff, schedules, and space, F, Sp, Su

5460 Personnel Administration: Local School (3) Planning personnel needs; job analysis; recruitment; selection; placement; orientation of new staff; fair employment and dismissal; and contract administration for both professional and supporting staff. W, Su

5470 Introduction to School Facility Planning (3) For school administrators; facility planning; skills in building planning, use and evaluation. F, Su

5480 Instructional Supervision—Local School (3) Development of a comprehensive instructional supervision; support, and service for teachers; supervision of curriculum; staff development; and staff evaluation. F, W, Su

5530 Introduction to Educational Planning (3) Processes for improving decision-making function through both quantitative and qualitative planning techniques. Relating educational policy analysis to educational planning. F, Su


5560 Research for Educational Administrators (3) Descriptive, experimental, and quasi-experimental designs to help student without qualitative background to read and understand technical literature. Primarily for nonthesis option students. Should be taken early in M.S. or Ed.S. program. W, Sp

5580 Seminar in Communication Skills for Educational Administrators (3) Identification, development and use of interpersonal and group related communication skills. F, Sp

5711 Problems in Educational Administration and Supervision: School Operation (3) May be repeated. E

5712 Problems in Educational Administration and Supervision: Higher Education (3) May be repeated. E

5713 Problems in Educational Administration and Supervision: State School Administration (3) May be repeated. E

5714 Problems in Educational Administration and Supervision: Preparation Programs (3) May be repeated. E

5715 Problems in Educational Administration and Supervision: Community Education (3) Independence of administrative problems. May be repeated. E

5751 Problems in Educational Administration and Supervision: Theory (3) May be repeated. E

5752 Problems in Educational Administration and Supervision: Finance (3) May be repeated. E

5753 Problems in Educational Administration and Supervision: Transportation (3) May be repeated. E

5754 Problems in Educational Administration and Supervision: Business Management (3) May be repeated. E

5756 Problems in Educational Administration and Supervision: Personnel (3) May be repeated. E

5757 Problems in Educational Administration and Supervision: School Plant (3) May be repeated. E
5757 Problems in Educational Administration and Supervision: Organization and Structure (3) May be repeated. E
5758 Problems in Educational Administration and Supervision: School Law (3) May be repeated. E
5759 Problems in Educational Administration and Supervision: Supervision (3) May be repeated. E
5770 Maintenance of School Plants (3) Skills in operation, school custodial and maintenance programs. Sp
5810 Survey Research Methods (3) Overview of descriptive studies, data collection, analysis, and interpretation; and school survey strategies for descriptive research in education. W, Sp, Su
5850-60-70 Independent Study in Educational Administration (3, 3, 3) Prereq: Consent of instructor. E
5890 Decision Making and Decision Theory in Educational Organizations (3) Theoretical constructs underlying executive decision making; direct application of decision theory problem-solving activities for preservice and practicing administrators. Executive decision making at several administrative levels in complex educational organizations. S/N only. A
5900 Special Topics (3) May be repeated. E
5910-20-30 Problems in Lieu of Thesis (3, 3, 3) E
5950 Elementary Administrators Seminar (3) For in-service training of elementary school administrators. Developments, problems, programs, and trends of elementary schools and management skills of elementary school administrators. Prereq: Presently an elementary school administrator or consent of instructor. May be repeated. S/N only. F
5960 Middle School Administrators Seminar (3) For in-service training of middle school administrators. Development, problems, programs, and trends of middle schools and management skills of middle school administrators. Prereq: Presently a middle school administrator or consent of instructor. May be repeated. S/N only. F
5970 Secondary Administrators Seminar (3) For in-service training of secondary school administrators. Developments, problems, programs, and trends of secondary schools and management skills of secondary school administrators. Prereq: Presently a secondary school administrator or consent of instructor. May be repeated. S/N only. F
6000 Doctoral Research and Dissertation (3-15) E
6040 Seminar in Educational Administration and Supervision (1) Required three consecutive quarters. S/N only. F
6100 Internship in Educational Administration (3) May be repeated. Prereq: Consent of student's committee. Opportunity for doctoral students and advanced graduate students to gain experience in performance of advisory roles of educational administration under supervision of practitioner and University representative. E
6110 Administrator Update (3) Current topics of concern to practicing school administrators; selected each quarter and presented by a specialist. Prereq: Presently a school supervisor or administrator, or consent of instructor. May be repeated. S/N only. E
6190 Administration in Higher Education (3) Developing conceptual understanding of administrative theory and practice in higher education. F, Sp
6220 Programs for the Professional Preparation of Educational Administrators and Supervisors (3) Logical arrangement of case and statutory material for public school administration; in-depth examination of problems concerning the law and public education. W, Su
6340 Current Trends in School Law (3) Logical arrangement of case and statutory material for public school administration; in-depth examination of problems concerning the law and public education. W, Su
6380 Instructional Supervision—School District (3) Definition and analysis of instructional supervision at the organizational and interpersonal level. Supervisory operations, including goal development; curriculum development; instructional support, help, and service for teachers and administrators; personnel development; program evaluation. W, Su
6420 School Board-Superintendency Relationships (3) The local unit of school administration, school system, and its governing body, board of education or school board. Sp
6440 School Business Management (3) Emphasizes superintendency team concept; planning, procurement, and utilization of fiscal resources. F, Su
6450 Grant and Contract Proposal Preparation (3) Grants and contracts processes in education. Basic concepts applicable to other special agencies. Sp
6460 School Personnel Administration (3) Personnel administration functions for professional and supporting staff in educational organizations. Recruitment, selection, placement, personnel policies, employee wage and salary administration, fringe benefits, collective negotiations, human relations, staff development, and staff evaluation. F, W, Su
6480 Special Topics in School Personnel Administration (3) Human problems in school personnel administration: staff planning, record systems, personnel policies, employee wage and salary administration, fringe benefits, collective negotiations, human relations, staff development, and staff evaluation. F, W, Su
6530 Futuristic Educational Planning Methods (3) Methods for describing alternative futures. W
6540 Contemporary Economics and Educational Finance (3) Contemporary educational finance policies and their influence on educational service and program, national economy, welfare of individuals, and welfare of the nation. F, Su
6550 State-Federal Relations in Education (3) Purposes and functions of federal/state/local educational structures, organizational control and political variables. Major education laws, rule and regulation-making process, grants and contracts as inter-level policy instruments. F, Su
6560 Legal Foundations of Public Education (3) Legal framework and theoretical concepts that impinge on operation of schools within present legal structure of the United States. Sp
6580 Seminar in Managing Conflict (3) Learning about and experiencing various forms of conflict. W, Su
6750-60-70 Independent Studies in Educational Administration and Supervision (3, 3, 3) Prereq: Consent of instructor. May be repeated. E
6800 Administration of Complex Educational Organizations (3) Concepts and theoretical formulations to understand, analyze, evaluate, and change complex educational organizations. W, Sp
6870 Advanced Study in School Facility Planning (3) In-depth experiences in development of educational specifications and techniques of leadership in space treatment and design. W
6890 Special Topics (3) May be repeated. E
6981 Specialized Seminar: School Operation (3) E
6982 Specialized Seminar: Higher Education (3) Current policy development, organizational relationships, and administrative issues in higher education. W, Su
6983 Specialized Seminar: State School Administration (3) E
6984 Specialized Seminar: State School Administration (3) E
6990 Specialized Seminar in Politics of Education (3) Political theories and practices as they affect the operation of the public school system. Appropriate interdisciplinary discussions based on literature and research from education, sociology, and political science. One field inquiry. Prereq: Consent of instructor. A
5920 Specialized Seminar: Theory (3) E
6992 Specialized Seminar: Finance (3) E
6994 Specialized Seminar: Business Management (3) E
6995 Specialized Seminar: Personnel (3) E
6996 Specialized Seminar: School Plant (3) Theory and practice in planning and operating educational facilities: related research in education and other disciplines; implications for further research, applications, existing knowledge to known school facility settings. Prereq: Consent of instructor. A
6997 Specialized Seminar in Organization and Structure (3) Organizational theories in education including systematic review of status of organizational and leadership research in education and related disciplines; implications for further research; applications of existing theory and research to known educational settings. Prereq: Consent of instructor. A
6998 Specialized Seminar: School Law (3) E
6999 Specialized Seminar: Supervision (3) Sp

Educational and Counseling Psychology

MAJORS
DEGREES
Guidance
M.S.
M.Ed.
Educational Psychology
M.S.
Ph.D.
Educational Psychology and Guidance
Ed.D, Ed.D.
Ph.D.
Education

Graduate programs (thesis or non-thesis option) lead to the Master of Science degree with majors in Educational Psychology (with concentrations in school psychology or community agency counseling), or Guidance, (with concentrations in elementary or secondary guidance); to the Specialist in Education degree, and to the Doctor of Education degree, both with concentrations in educational psychology, guidance, school psychology, counseling in higher education, counseling in community agencies, and counseling psychology. Professional emphases are available in educational measurement and research, career development, and sex-fair counseling and teaching. The Doctor of Philosophy degree with a major in Education includes options and emphases as listed on page 8. Appropriate courses taken in this department and in the Department of Psychology will satisfy requirements for certification as a school psychologist. Write the department for information concerning the program requirements. Application deadlines to Ed.D./Ph.D. are February 1 and May 1; Ed.S. and M.S. deadlines are October 15, February 1, May 1, and July 15.

4110 Psychology of Sex Role Development (3) Examination, from both a theoretical and research base, of factors which contribute to sex role development and definition in society and role of education in these changes. For student with minimal background in behavioral sciences. F, Sp, Su

Part-time
Adjunct
4130 Mental Health (3) Studies and exploration of positive mental health. Application of mental health criteria to a study of one's self based on a battery of personality assessment instruments.

4350-60-70 Special Topics and Problems (1-6, 1-6, 1-6) May be repeated. S/N or letter grade.

4440 General Evaluation Procedures for Public School Personnel (3) Prereq: 2430 or consent of instructor. E

4640 Standardized Testing (3) Use and interpretation of standardized group instruments in assessment of intelligence, aptitude, achievement, vocational interests, and personality adjustment. E

4650 The Construction of Classroom Tests (3) Concerned with teacher-made classroom tests: instructional objectives, principles of test construction, item analysis, evaluating test reliability and validity, interpretation of test scores, relationship between testing and grading. W, Su

4760 Advanced Child Study (3) Prereq: 2430 or 8310 or consent of instructor. W, Su

4800 Psychology of the Disadvantaged Child (3) Significant behavioral differences and causes; appropriate intervention approaches. F

4810 Psychocultural Aspects of Appalachian People (3) Exploration of psychology of people of Appalachian region through examination of history, culture, and role of education. W, Su


4890 Differential Psychology (3) Nature and sources of individual differences in behavioral characteristics, and differences between racial, ethnic, socioeconomic, sex, and other groups. B

4910 Diagnostic and Corrective Teaching (3) Practical procedure for improving pupil's learning. F

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis graduate not registered during any quarter when such a 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

5040 Guidance and Personnel Services in Education (3) Same as Vocational-Technical Education 5040. F, Su

5050 Children and Adolescents (3) Mental, social, physical, and emotional growth, development, and learning of children and adolescents; prevention, identification, and remediation of learning problems. W, Su

5060 Group Approaches with Students (3) Knowledge and skills appropriate to functioning with group counseling; psychological and parent education. F, W, Su

5070 Seminar in Elementary School Guidance (3) Trends, role, function, and administration of guidance in elementary school. Sp

5090 Field Work (1-6) Practical experience in departmentally approved field placement. Supervision by field and University personnel. Program prerequisites to field work must be met. May be repeated. Maximum 6 hrs. S/N only.

5100 Developmental Psychology (3) Same as Psychology 5100. F, W, Su

5101 Advanced Psychology of Adolescence (3) Theory and research on problems of the adolescent development: application to individual adolescents. Prereq: 3810 or equivalent.

5110 Psychology of Women (3) Past and current educational and psychological theory and practice with special attention to assumptions and practice in regard to women: social context in which various theories were developed and current theories and research focused on gender and sex differences. Prereq: 4130 or basic course in personality theory. E

5111-12-13 Seminar in Current Issues in School Psychology (1, 1, 1) (Same as Psychology 5111-12-13) S/N only.

5120 Seminar in Bias-Free Counseling (3) Feminist psychology, bias-free education, and counseling. Prereq: 4110 and 5110 or consent of instructor. May be repeated. Maximum 9 hrs.

5140-50-60 Psychoeducational Assessment (3, 3, 3) Same as Psychology 5140-50-60.

5149-59-69 Educational Psychology in School Psychology I, II, III (2, 2, 2) (Same as Psychology 5149-59-69) S/N only.

5180-90-200 Educational Specialist Research and Thesis (3, 3, 3) E

5210 Interpreting Published Articles: Statistics (3) Descriptive and experimental research in educational psychology, guidance, and counseling, and college student personnel. Prereq: Non-thesis option students only or consent of instructor. F, W, Su

5220 Interpreting Published Articles: Research Design (3) For students not conducting research projects; interpret and evaluate statistical tables and statistical tests as reported in journals. Prereq: 5210 or consent of instructor. W, Sp, Su

5319 Field Work in School Psychology: Level I (2)

5320 Advanced Classroom Behavior Modification (3) Current research in psychology and its application to educational problems. E

5330 Theory and Research in Human Learning (3) Contemporary research and theories of learning and its influence upon school practice. F

5331 Current Developments in Human Learning (3) Sp

5340 Group Dynamics (3) Principles of group dynamics as they apply to a variety of group settings. Group counseling, community, business, and group leadership skills. (Same as Psychology 5340.) E

5350 Educational Applications of Cognitive Theories (3) Developmental theory of Jean Piaget and implications for education. Related theories such as Bruner and Ausubel. E

5560 The College Student (3) Nature, characteristics, and needs.

5720 Evaluation in Education (3) Techniques and instruments for evaluating social values, the thinking processes, social adjustment, emotional needs, personal interests, and problems.

5760 Career Development: Theory and Research (3) F, Su

5785 Career Development: Program Development Implementation and Evaluation (3) Career development and prescriptive programs and projects. K-adult with emphasis on development, implementation, and evaluation. Prereq: 5780 or equivalent, or consent of instructor. Sp

5790 Career Development: Workshop (1-6) Designed for in-service training of school personnel. Developments, problems, and programs and trends related to career development. May be repeated. Maximum 6 hrs. (Same as Curriculum and Instruction 5790 and Special Education 5790.)

5840 Student Appraisal (3) Gathering, interpreting, and using data for development of guidance programs and individual counseling. Prereq: Educational Psychology or Psychology 5840 or equivalent in standardized testing. (Same as Psychology 5840.) W

5850-60-70 Special Topics and Problems in Educational Psychology and Guidance (1-6, 1-6, 1-6) May be repeated. May be taken for letter grade or S/N. E

5880 Career Development: Occupational and Educational Resources (3) Gathering, interpreting, and using educational, occupational, and community information in the guidance program; sources, types of materials, and occupational filing plans. For use both in group and individual guidance programs. W, Su

5885 Career Development: Field Experience (1-3) Application of career development principles and practices in school, community, business, and/or industry. May be taken concurrently or separately. 5760, 5780, 5785, 5880, and/or consent of instructor. May be repeated. Maximum 6 hrs. E

5890 Counseling Theories and Techniques (3) Presentation, demonstration, and application of counseling theories and techniques. Open to students interested in the counseling process. (Same as Psychology 5890.) F, W, Su

5897 Practicum (3) Didactic experiences and counseling simulations in learning laboratory. Coreq: 5890. E

5910-20-30 Problems in Lieu of Thesis (3, 3, 3)

5940 Counseling Practicum (3) Supervised practice in counseling in elementary or secondary school guidance and/or student personnel work. Prereq: 4640, 5060 (or 5340), 5890, 5897 or consent of instructor. May be repeated with consent of department. Maximum 6 hrs. E

5945 Group Counseling Practicum (3) Supervised practicum in group counseling with children and/or adults. Prereq: 5340, 5890, 5897, and 5940 and consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

5950-60 Theory and Practice of Counseling (3, 3) (Same as Psychology 5950-60.)

5959-69 Practicum in Consultation (2, 2) (Same as Psychology 5959-69.) S/N only.

5960 Organization and Administration of Counselor Programs (3) Basic principles, procedures, and policies. Prereq: 4130, 4640 or consent of instructor. W, Su

6000 Doctoral Research and Dissertation (3-15) E

6040 Seminar in Educational Psychology and Guidance (1) Required in fall quarter. Maximum 3 hrs. S/N only. F

6099 Internship (1-6) Supervised employment at departmentally-approved internship sites. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. S/N only.

6110 Application of Research Design in Educational Psychology and Guidance (3) Research design and statistical analysis unique to educational psychology, counseling, and college student personnel. Emphasis on designs "experimental in nature. Prereq: 2 courses in statistics or consent of instructor. F, Sp

6120 Application of Experimental Research Design in Educational Psychology and Guidance (3) Experimental designs used by researchers in educational psychology, counseling, and college student personnel. Prereq: 6110 or equivalent. W, Sp

6319 Field Work in School Psychology: Level II (3) (Same as Psychology 6319.)

6550-60-70 Seminar in College Student Personnel (2, 2, 2) Issues in college student personnel, college counseling, student development, etc. Prereq: Consent of instructor, admission to the doctoral program. S/N only.

6610-20-30 Seminar in Dissertation Proposal Writing (2, 2, 2) Preparation and evaluation of dissertation proposals. Prereq: Two consecutive statistics courses or consent of instructor. F, W, Sp

6650-60 Systems Approaches in Psychological Services (3, 3) (Same as Psychology 6650-60.)

6669 Practicum in School Psychology III (2) (Same as Psychology 6669.) S/N only.

6750-60-70 Problems in Educational Psychology and Guidance (3, 3, 3) S/N only. E

6810 Seminar in Counseling (3) Selected counseling theory, topics, issues. Prereq: 5890 or consent of instructor. May be repeated. F, W, Sp

6840-50-60 Seminar in Professional Issues I, II, III Job selection, convention participation, publishing, writing grant proposals, consulting, etc. For final year doctoral students only. S/N only. F, W, Sp

6910 Special Topics Seminar (3) Exploration of special research or practical topics with students who have necessary background. Topic will vary from quarter to quarter, depending upon instructor.
Special Education and Rehabilitation

MAJORS

Special Education

Special Education Counseling

PROFESSORS


ASSOCIATE PROFESSORS


INSTRUCTORS


LECTURERS


The Department of Special Education and Rehabilitation provides competency-based programs and experiences to prepare regular, special education, and rehabilitation personnel to work with exceptional persons and their families. Facilities are available for continuous observation and participation in direct relationships with handicapped children and adults who are hospitalized, homebound, or in residential schools, special classes, or regular classes. Course sequences may be planned in specialized areas to include (1) hearing impaired; (2) gifted; (3) learning disabilities; (4) mentally retarded; (5) multiple disabilities; (6) socially or emotionally maladjusted; (7) rehabilitation counselor education; (8) disability evaluation education; (9) general special education and rehabilitation.

Programs lead to the Master of Science degree in Special Education with an emphasis in one of the specialized areas.

Under the sponsorship of Special and Rehabilitation Services, a specialized institute for the preparation of professionals to adapt their skills toward services to hearing impaired and deaf people is provided.

For further information write the department head.

EDUCATION OF THE HEARING IMPAIRED

4000 Rehabilitation Practicum (3) Evaluation of client data, practicing rehabilitation prognosis. Pre-req: 4230. F, Sp

4100 Speech Development of Hearing Impaired (3) Anatomy and physiology of speech system. Relationship of language development to hearing impaired. Theories and techniques of speech development and improvement for hearing impaired children. Pre-req: Audiology and Speech Pathology 4100. F, Sp

4200 Practicum in Speech Development of Hearing Impaired (3) Applications of theories and techniques of speech development and improvement with hearing impaired children. Pre-req: 4100 and consent of instructor. (Same as Audiology and Speech Pathology 4200). W, Sp

4210 Language Development of Hearing Impaired I (3) Systems by which formal language is presented. (Same as Audiology and Speech Pathology 4210). F, Su

4220 Language Development of Hearing Impaired II (3) Techniques; various systems by which formal language is presented. Pre-req.: 4210 or consent of instructor. (Same as Audiology and Speech Pathology 4220). W, Su

4230 Communication Processes for the Hearing Impaired (3) Skills and techniques required by hearing impaired person; speech and language development; auditory training, speech reading, visual language, and other forms of communication. Observations and practicum. (Student must acquire a degree of proficiency in use of manual language.) Pre-req: Consent of instructor.

4231 Communication Processes for Hearing Impaired II (3) Intermediate course in manual communications skills and techniques with emphasis on vocabulary development with receptive and expressive fluency. Pre-req: 4230 or consent of instructor. A

4240 Nature of Hearing Impairments (3) Basic principles of audiology; anatomy and physiology of hearing; nature and causes of hearing loss; methods and instrumentation for assessment of hearing level; interpretation of audiograms; selection and use of hearing aids; relation of audiologic services to medical and other rehabilitation disciplines. Observations and practicum. F, Sp

4250 Introduction to the Psychology and Education of the Hearing Impaired (3) For those planning to enter field of teaching deaf and hard-of-hearing. Survey of professional literature in area of deaf child and adult. (Same as Audiology and Speech Pathology 4250). F

4280 Curriculum Development in Elementary and Secondary Schools for Hearing Impaired (3) Adaptation of curriculum development and methods in public school education to meet needs of deaf and hard-of-hearing students in residential and integrated settings. W, Su

4290 The Teaching of Reading to Hearing Impaired Children (3) Readiness activities, developmental approaches, theories, and specialized materials for curriculum in teaching reading. Survey of history of education of deaf. Research studies relating to psychology, social adjustment, and learning of deaf and hard-of-hearing children. (Same as Audiology and Speech Pathology 4290). E

4280 Seminar in Language Remediation for the Hearing Impaired (3) Current and recent developments in educational methodologies and research pertaining to teaching language to hearing impaired. Research and materials current in use of various sign language systems and adaptations. Emphasis on approaches which accommodate and assist integration of hearing impaired children in regular classrooms. W, Su

5280 Seminar on Educational Implications of Language Deficiency (3) Readings, discussion, and projects on impact of language deficiency on educational programming for children with language deficiency. Sp, Su

5310-30 Manual Communication (2, 2, 2) Basic and advanced sign systems: finger-spelled and signed forms of communication. Emphasis on ability to express and receive the manual forms. Pre-req: Consent of instructor. Must be taken in sequence. F, Su; W, F; Su.

5490 Educational and Vocational Guidance of the Deaf and the Hard of Hearing (3) Evaluation; test techniques for diagnosis and guidance; social and personality adjustment; occupational opportunities. F, Sp

5540 Seminar in Language Pathology (3) (Same as Audiology and Speech Pathology 5540)

5820 Curriculum Development Applied to Programs for the Hearing Impaired (3) Current curriculum trends adapted for hearing impaired individuals. New curriculum options in education of these children. Current education theories for programs for hearing-impaired children. Pre-req: Curriculum and Instruction 5580 or equivalent and consent of instructor. Sp

EDUCATION OF THE MENTALLY RETARDED

4110 The Nature and Concept of Mental Retarda- tion (3) Identification, description, and study. E

4120 Education of the Mentally Retarded Child (3) Philosophy and rationale underlying teaching and guidance of mentally retarded, methods and materials in special and regular classes. Prereq or coreq: 4110. E

4440 High School Program for the Mentally Retar- ded (3) Trends, issues and research relating to core and work study programs. E

4810 Student Teaching Mental Retardation (3) Pre- req: Major in education of mental retardation. S/N only. F, W, Sp

4811 Student Teaching Mental Retardation (9) Pre- req: Major in education of mental retardation. S/N only. F, W, Sp

4922 Student Teaching of the Educable Mentally Retarded (3) Observation and supervised practicum. S/N only. E

5111 Psychology of Mental Retardation (3) Intellec- tual functioning, psychological theories and learning theories, implications emphasized. Pre-req: Psych. 4110. F, Su

5112 Psychology of the Severely Mentally Retar- ded (3) Program and curriculum development for training educationally retarded students. Pre-req: Psychology 5111. E

5113 Advanced Curriculum for the Mentally Retar- ded (3) Educational models, methodologies, and curriculum in education of mentally retarded children and adults. Emphasis on curriculum alternatives to retarded child's education. Sp, Su

5114.0:20.21 Multiple Disabilities (3) Review and analysis of characteristics and educational implications of various disabilities. Pre-req: 3114. F, Sp

5115 Education of the Brain-Injured Child (3) Nature of brain-injured child; skills for indentifying educational, physical, and emotional characteristics; special educational techniques. E

5150 Education of Children with Crippling and Special Health Conditions (3) Medical and educational characteristics; appropriate educational modifications and associated services. Pre-req or coreq: 3150 or consent of instructor.

5140 Educational Problems of the Cerebral Palsied Child at Home and School (3) Physical, social, and educational needs of the cerebral palsied; evaluative techniques; related services. E

4921 Student Teaching in Crippling and Special Health Conditions (3-15) Observation and super-
Academic tutoring in a teacher/aide capacity within W, Su

teaching techniques and materials, and teacher-pupil interpersonality relationships as basic to academic achievement for the pupil. Prereq: 4610. W, Su

4620 Education of the Emotionally Disturbed Child (3) Managing behavior, modeling for instruction, teaching techniques and materials, and teacher-pupil joint interpersonal relationships as basic to academic achievement for the pupil. Prereq: 4610 and 4620 or consent of instructor. A

4630 Practicum in Residential Settings Serving Children with Disturbing Behavior (3) Practice in scientific observation, insight, diagnosis, and disturbing behaviors. Initiating behavior changes regarding academic and social behaviors. To perform in a residential setting within a residential classroom; and to take part in discussion and evaluation of relevant academic curriculum and instructional feedback. Prereq: 4610 and 4620 or consent of instructor. A

4640 Practicum in Public School Systems Serving Children with Learning and Behavior Problems (6) Academic tutoring capacity within regular classrooms. Particular emphasis and practice in individualizing instruction for learning and behavior problems in the regular classroom setting. Discussion and evaluation of relevant methods and materials unique to each teaching situation. Prereq: 4610 and 4620 or consent of instructor. A

4924 Student Teaching of the Emotionally Disturbed (3) Individual tutoring and classroom observation experience in classroom teaching and instruction. Prereq: Curriculum and Instruction 4720 or 4820. S/N only. A

REHABILITATION COUNSELOR EDUCATION

5100 Orientation to Rehabilitation (3) History, philosophy, and legal bases for rehabilitation movement; understanding of physical, social, psychological, and economic development of disabled individual. Process and principles of rehabilitation; facilities and programs in hospitals, institutions, community agencies, and service groups. Attention to specialization in disability categories such as mentally ill, mentally retarded, and blind. F

5115 Caseeload Management in Rehabilitation (3) Techniques and procedures involved in managing case loads for rehabilitation agencies and public/private rehabilitation facilities; analysis of appropriate industrial management models related to rehabilitation programs; and simulated experience in work planning, decision making, and case selection. W

5120 Psychosocial Aspects of Disability (3) Medical aspects and psychological impact of major disabilities; rehabilitation processes including implications of family and community. Sp

5121 Job Development and Placement in Rehabilitation (3) Identification of job seeking and job seeking persons; utilization of occupational resource materials and techniques including field experiences for analyzing jobs, procedures necessary for helping a handicapped individual successfully adjust to a work environment and assessment of future trends within labor market. Su

5130-40 Seminar in Rehabilitation (3, 3) Diagnostic Vocational Evaluation in Rehabilitation (3) Process, principles, and techniques used to diagnose vocational assets and liabilities of handicapped individual. Prereq: diagnostic evaluation of individual includes functional analysis of biographical data and use of evaluation interview. W

5142 Prognostic Vocational Evaluation in Rehabilitation (3) Process, principles, and techniques used to determine and predict work behavior and vocational potential. Includes rationale underlying selection and use of vocational exploration program, job sampling, work experience, and job tryouts in vocational evaluation. Prereq: 5141 and 5143. W

5143 Interpretation of Vocational Evaluation Data in Rehabilitation (3) Procedures, principles, and techniques used in interpretation of vocational evaluation data. Tutoring and training in the referral agency, and to faculty staff. Interpretation of data through the formal staff conference, vocational counseling, and written and follow-up. Prereq: 5141 and 5142. Su

5144 Development and Supervision of Client Evaluation Programs (3) Procedures involved in establishing and maintaining effective vocational evaluation programs. Determining and planning amount of floor space, type of equipment, type and number of staff, and rates of communication essential to maintenance of vocational evaluation programs. Effective supervisory, referral, recording, and follow-up. Prereq: 5141 and 5143. or consent of instructor. Su

5145-46-47 Practicum in Rehabilitation (3, 3, 3) Supervised experience in area of rehabilitation with emphasis on application of concepts, principles, and skills acquired in previous or concurrent course work. Prereq: Consent of instructor. W; Sp; Su

5150-50 Internship in Rehabilitation (9, 9) Systematic Human Relations Training (3) Active listening, observing verbal and nonverbal behavior, empathic understanding, and communicating with handicapped individuals. F

5180 Approaches to Rehabilitation Counseling (3) Approaches and techniques in individual and group counseling with handicapped adults to further develop student's counseling skills. Problem-solving techniques and utilization of alternative modes of counseling procedures in rehabilitation. Prereq: 5170 or consent of instructor. W

DISABILITY EVALUATION EDUCATION

5700 Evaluation and Mobilization of Community Resources (3) Issues, processes, and programs relating to coordination and interaction with emphasis on social and rehabilitation facilities and agencies. Assessment utilization and mobilization of community resources to facilitate development of innovative service programs for handicapped. W

5710 Medical Aspects of Disability I (3) Etiology, clinical signs, symptoms and diagnostic procedures related to musculoskeletal, neurological, circulatory, and respiratory diseases/disorders. Effect on structure and function of human body. Restorative measures to eliminate or minimize resulting handicaps; skills necessary to communicate effectively with lay persons and medical community on evaluation of impairments and administration of appropriate rehabilitation services. W

5720 Medical Aspects of Disability II (3) Etiology, clinical signs, symptoms and diagnostic procedures related to neoplastic, skin, digestive, genito-urinary, endocrine, mental, visual and hearing disorders. Effect on structure and function of the human body. Restorative measures to eliminate or minimize resulting handicaps; skills necessary to communicate effectively with lay persons and medical community on evaluation of impairments and administration of appropriate rehabilitation services. Sp

5730 Vocational Assessment in Disability Evaluation (3) Vocational assessment: resource materials and criteria for vocational assessment of disability in insurance claims under Social Security; on-site job analysis and case file vocational assessment experiences. Prereq: Admission to program in disability evaluation or consent of instructor. Sp

5740 Disability and Work in Society (3) Relationship of work to physical, social, psychological, and economic development of disabled individual. Process and techniques of vocational evaluation, work adjustment, and employment. Prereq: 5730. W

5750 Principles and Problems of Disability Evaluation (3) Individual identification and analysis of principles and problems of disability evaluation process or structures; analysis of problems of data evaluation process or structures, and innovation exploration of alternatives, and sharing experience within group. Prereq: 5760 or consent of instructor. W

5760 Seminar: Functional Capacity Assessment (3) Criteria for residual functional capacity assessment in disability insurance claims evaluation; problems in achievement or acquisition of residual functional capacity assessments. Prereq: 5710-20 or consent of instructor. W

5770-71 Current Problems in Disability Claims Evaluation (1-3, 1-3) Current problems in process, content, or administration of disability claims evaluation; workshops and simulation and proposal of alternative solutions. May be repeated with consent of instructor. S/N only, A

SCHOOL SPEECH AND HEARING THERAPY

4030 The Public School Speech and Hearing Program (3) Organization, administration, and procedures. F, Sp

4040 Appraisal of Speech and Language Disorders (4) (Same as Audioloj and Speech Pathology 4040)

4130 Student Teaching of the Partially Seeing (3) (Same as Audiology and Speech Pathology 4130)

4320 Introduction to Clinical Practice in Speech Pathology (3) (Same as Audiology and Speech Pathology 4320)

4330 Clinical Practice in Speech Pathology I (4) (Same as Audiology and Speech Pathology 4330)

4340 Clinical Practice in Speech Pathology II (4) (Same as Audiology and Speech Pathology 4340)

4341 Clinical Practice in Communication Disorders in Schools (3) Prereq: 4300, 4320-30-40 and consent of instructor. S/N only. F, W, Sp

4342 Seminar in Communication Disorders in Schools (3) Prereq: 4300, 4320-30-40 and consent of instructor. F, W, Sp

4400 Voice Disorders (4) (Same as Audiology and Speech Pathology 4400)

4720 Audiology I (4) (Same as Audiology and Speech Pathology 4720)

4830 Aural Rehabilitation: Speechreading and Auditory Training (3) (Same as Audiology and Speech Pathology 4830)

4940 Introduction to the Verbo-Tonal System (4) (Same as Audiology and Speech Pathology 4940)

5040 Advanced Clinical Practice in Audiology Study and Practice (1-6) (Same as Audiology and Speech Pathology 5040)

5380 Cerebral Palsy (3) (Same as Audiology and Speech Pathology 5380)

5390 Cleft Palate (3) (Same as Audiology and Speech Pathology 5390)

5540 Seminar in Language Pathology (3) (Same as Audiology and Speech Pathology 5540)

EDUCATION OF THE VISUALLY HANDICAPPED

4160 Education of Partially Sighted Children (3) Curricular adjustments and materials; home visits for parents' cooperation in medical care and special needs. A

4850 Eye Problems Encountered by the Teacher (3) Eye anatomy and hygiene; common diseases and defects; testing and treatment; educational adjustments for specific eye conditions; related service resources. A

4823 Student Teaching of the Partially Seeing (3) Observation and supervised practicum in special and regular classes. S/N only. A

GENERAL COURSES

3333 Education of the Exceptional Child (3) Principles, characteristics, and special needs; local and state programs for diagnosis and care; educational provision in regular or special classes; home teaching; social and vocational guidance. E

3520 Language-Speech Handicapped Child in the
importance of public attitude. Social guidance and personality development. Consideration of voca-
tional programmes opportunity to expand study upon a particular group of exceptional children. F. Su
5790 Career Development: Workshop (1-6) (Same as Educational Psychology 5790). A
5830 Seminar: Issues and Theories in the Educa-
tion of the Exceptional Child (3) Current trends in education of exceptional child, analysis of cur-
rent theories of integration as applied to exceptional child. Current research concerning educa-
tional therapy and rehabilitation of exceptional persons. Pre-
req: Curriculum and Instruction 5800 or Educational Psychology 5210 and consent of instructor. A
5910-20-30 Problems in Lieu of Thesis (3, 3, 3) E
5970 Juvenile Delinquency and the School (3) Re-
sponsibilities of school in studying sources of maladjustment; school function in community pro-
grammes for children's welfare; curricular adjust-
ments; directed study of socially maladjusted chil-
dren, environment, and programs for meeting needs. A

Vocational-Technical Education

MAJORS
Agricultural Education
Business Education
Distribution Education
Industrial Education
Vocational-Technical Education

DEGREES
M.S., M.A.
M.S.
M.S.
M.S.
M.S., M.Ed., Ed.D.
M.S., Ed.D.

Professors:
J. I. Matthews (Head) Ph.D. Arizona State,
J. Woodin (Emeritus), Ph.D. Ohio State.
Agricultural Education: D. G. Craig, Ed.D.
Cornell; G. W. Wiegars, Jr., Ed.D. Missouri.
Business Education: G. A. Weggens, (Chairperson), M.S. Indiana. Home
Economics Education: I. Brown (Emeritus),
Ph.D. Ohio State; N. P. Logan
(Chairperson), Ed.D. Tennessee. Business
Education: J. B. Brown (Coordinator), Ed.D.

Distribution Education: D. E. McNelly,
Ed.D. Missouri. Business
Education: J. H. McClone, Ph.D. Florida State;
S. W. Miller, Ph.D. Ohio State; H. Stark (Emeritus), M. T. Colorado State Industrial
Education: J. Bies, Ph.D. Missouri;
D. V. Brown, B.S. Utah, P.E.; G. D. Cheek,
Ph.D. Kansas State; R. Hanson, Ph.D. Purdue.

Assistant Professors:
Industrial Education: G. K. LaRonde, Ed.D.
Tennessee; T. L. Powell, M.S. Oklahoma.

Instructor:
R. Pierce, M.A. East Tennessee State.

THE MASTER'S PROGRAM

Each vocational service area (agricultural education, business education, distribution education, industrial education and vocational education) offers a similar program leading to the Master's degree. Both thesis and non-thesis options are available. Details regarding the Master's programs of each of the service areas may be obtained from the chairpersons of the different services.

The M.S. degree with a major in Vocational-Technical Education is available with concentrations in agricultural education, business education, distribution education, general vocational-technical education, home economics education, industrial education, and technical education.

Requirements are:

- Concentration
- Research
- Electives
- Thesis Option
- Problems in Lieu
- Course Option

Total 45-51 hrs

All course work must be approved by the student's committee. The M.A.C.T. is also available in the business education area.

The SPECIALIST PROGRAM

The Ed.S. degree program, which is a thesis or non-thesis program, is a cooperative undertaking involving all vocational service areas. Options are available in agricultural, business, distributive, and industrial education and in general vocational-technical education.

The DOCTORAL PROGRAM

The comprehensive Ed.D. program in Vocational-Technical Education is designed to provide for achieving professional objectives, developing needed competencies, and gaining desirable experiences and understanding of vocational-technical areas.

The Vocational-Technical Education doctoral curriculum consists of the following:

- professional education core, 9 hours; service area, 19 hours; vocational-technical education, 18-27 hours; cognate fields, 9-16 hours; research techniques, 15 hours (consul/tutor for details); and dissertation, 36 hours. A minimum of 120 hours above the baccalaureate is required.

The Doctor of Philosophy degree with a major in Education includes options and emphases as listed on page 8.

4750 Utilization of Instructional Media (3) (Same as Curriculum and Instruction 4750 and Library and Information Science 4750).

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5010 History and Organization of Vocational-
Technical Education (3) Vocational and technical education in public schools through analysis of so-
cial forces, legislation, and organization models.

5011-21-31 Problems in Lieu of Thesis (3, 3, 3)

5020 Competency Based Vocational Education (3) Introductory, comparative, and practical ap-
proaches to competency-based curriculum and ma-
rivocational and technical education.

5040 Guidance and Pupil Personnel Services in
Education (3) (Same as Educational Psychology 5040).

5180-90-200 Educational Specialist Research and
Thesis (3, 3, 3) Selection, analysis, and completion of a problem necessitating original investigation, beneficial to investigator and vocational-technical field.

*Student must meet the service area entrance requirements for the concentration selected. General vocational-technical education requires 6 hrs.

**Irs course work approved by graduate committee in area of emphasis outside of area of concentration.
follow-up procedures, evaluation, and curriculum development in vocational-technical education.

5270 Placement, Follow-up and Evaluation Procedures in Vocational-Technical Education

5300 Occupational Program Development for Disadvantaged Persons

5310 Supervision of Vocational-Technical Education

5810 Principles and Objectives of Vocational-Technical Education

5850-60-70 Problems in Vocational-Technical Education

6040 Seminar in Vocational-Technical Education

6111-12-13 Graduate Seminar: Current Problems in Business Education

6120 Graduate Seminar in Tests and Measurement

6210 Curriculum Planning in Vocational-Technical Education

6220 Program Planning and Development in Vocational-Technical Education

6230 Evaluation of Vocational-Technical Education Programs

6310 Administration of Vocational-Technical Education

6411-12-13 Internship in Vocational and Technical Education

Agricultural Education

4510-20-30 Problems in Agribusiness Education

4710-20-30 Seminar in Agricultural Education (1, 1, 1) Prereq: 4350 or consent of head of department.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5011 Problems in Lieu of Thesis (3)

5110 Graduate Seminar in Current Problems (3)

5111-12-13 Graduate Seminar: Current Problems in Business Education

5120 Graduate Seminar in Tests and Measurement

5340 Agricultural Education for First-Year Teachers

5410 Supervised Occupational Experience in Agriculture

5490 Supervised Occupational Experience in Agricultural Education

5620 Teaching Agricultural Mechanization in Vocational Agriculture

5750-60-70 Special Problems in Agricultural Education

5900 Thesis (1-15) E

6020 Teaching Agricultural Mechanization in Vocational Agriculture

6120 Problems in Business Education: Typing

6233-33 Problems in Business Education: Bookkeeping and Accounting

6244 Problems in Business Education: Clerical Practice

6519 Organization and Management of Vocational Office Education Programs

6526 Problems in Business Education: Administrative Problems

6550-60-70 Problems in Business Education

6610-20-30 Current Issues in Business Education

6620-30 Advanced Studies in Business Education

6640 Higher Education for Business

Distributive Education

4130 Areas of Distribution

4140 Supervised Distributive Experience

5410 Organization and Operation of Distributive Education Programs

5520 Teaching Home Economics in College

5818 Organization and Management of Vocational Office Education Programs

5918 Organization and Management of Vocational Office Education Programs

6518 Methods and Materials for Vocational Office Education

6528 Problems in Business Education: Administrative Problems

6710-20-30 Current Issues in Business Education

6720-30 Advanced Studies in Business Education

6740 Higher Education for Business

6810-20-30 Current Issues in Business Education

6918 Organization and Management of Vocational Office Education Programs

7018 Organization and Management of Vocational Office Education Programs
5810 Supervision of Home Economics in the Public Schools (3) For teachers with successful experience in vocational home economics preparing for supervisory positions in vocational education. Program planning, organization, and administration. Field contacts with urban and rural programs.

5620 Wage Earning Programs in Home Economics (3) Planning, establishing, and implementing wage earning programs in home economics.

5710-20-30 Special Problems for Non-Thesis Students (3, 3)

5810-20-30 Problems in Home Economics Education (1-3, 1, 1-3) May be repeated. Maximum 3 hrs per content.

5810-20 Seminar in Home Economics Education (3, 3) Research literature and techniques. Prereq: Consent of instructor.

Industrial Education
3110 History and Philosophy of Industrial Education (3)

3210-20-30 Part-Time Programs in Cooperative Industrial Training (3, 3, 3) Principles of organization, methods, and materials.

3320-30 Materials and Methods for Teachers of Industrial Training (3, 3, 3) Principles of organization, methods, and materials.

3110-20-30 Part-Time Programs in Cooperative Industrial Training (3, 3, 3) Principles of organization, methods, and materials.

3410 Administrative Principles, Practice, in-vocational positions in vocational education. Program planning, organization, and administration.

4120-30 Job Analysis (3, 3) Principles, practice, instructional methods.

4310-20 Curriculum Building in Trade and Industrial Subjects (3, 3) Course material in trade subjects, results of job analysis, checking sheets and individual job sheets in both trade and related subjects. Prereq or coreq: 4120.

4410-11 Seminar in Industrial Education (3, 3, 3) Educational innovations, current events, problems, and other topics associated with the field of industrial education.

4510-21-22 New Developments in Industrial Education (3, 3, 3) Developments, pressing problems, and recent trends in field of industrial education as presented by a coordinating instructor in conjunction with knowledgeable resource persons.

4520-21-22 New Developments in Industrial Education (3, 3, 3) Developments, pressing problems, and recent trends in field of industrial education as presented by a coordinating instructor in conjunction with knowledgeable resource persons.

4582 Power and Energy (3) Development, control, transmission, conversion, interrelationship of power and energy in industry and in relation to increasing technically oriented society. Prereq: B.S. in Industrial Education and teaching experience.

4590 New Developments in Industrial Technical Education (3) Prereq: B.S. in Industrial Education and teaching experience.

School of Health, Physical Education, and Recreation
Madge M. Phillips, Director

Graduate programs are available to students preparing for (1) teaching and research positions in colleges, high schools and elementary schools; (2) administrative and supervisory work in athletics, health education, physical education, and recreation; (3) recreation specialist positions in various public, voluntary, private, and commercial agencies and institutions; and (4) public health positions in community health education, health planning, and administration, and environmental health.

THE MASTER'S PROGRAM

Four programs leading to the Master of Science degree are available: Physical Education, Recreation, Safety Education and Service, and School Health Education. Forty-five quarter hours are required for the M.S. Approximately 23 quarters hours of work selected from courses numbered 5000 and above are included in the M.S. requirement. Course selection shall be made according to each student's professional interests in health, physical education, safety, or recreation with the approval of the major professor. Non-thesis options are available in all M.S. degree programs. A 3 quarter-hour course in research techniques and/or statistics and/or a seminar in research will be required. Each non-thesis degree candidate will take a final comprehensive examination.

Programs leading to the Master of Public Health are also available in community health education, health planning/administration, and occupational/environmental health and safety. Fifty-four quarter hours are required for the M.P.H. degree. One full quarter of field practice is required. During field practice, no student shall hold a full-time job except by special permission of the division chairperson. Students may be placed in all parts of this country.

DOCTORAL PROGRAM

The Doctor of Education and the Doctor of Philosophy degrees are offered in Health Education. See further description under Health Education.

The Doctor of Education degree is offered with a major in Physical Education and two collateral areas of study. Concentrations are available in exercise physiology, motor behavior, adapted physical education, and philosophical and sociological foundations. The curriculum to be pursued will be determined by the student and a doctoral committee. Selection of this curriculum will be based on the past training, experience, and interest of the student.

The basic requirements for admission are:

a. A minimum of 40 (physical education) or 50 (health education) quarter hours.

b. Submission of satisfactory scores on the aptitude section of the Graduate Record Examination is required for all doctoral and specialist programs.

c. A superior grade point average.

do. Submission of satisfactory references relating to training, employment, and character.

e. Evidence of successful teaching or professional success in the major area of study.

The Doctor of Philosophy degree with a major in Education includes options and emphases as listed on page 5.

Graduate Assistantships. A variety of graduate assistantships are offered in health education, physical education, safety education, and recreation to qualified women and men who are graduates of accredited colleges or universities. These assistantships are open to students in the Master's and doctoral programs.

Assistantships are made available by local schools, agencies, and the School of Health, Physical Education, and Recreation in return for part-time services rendered. The services may consist of teaching physical education classes, teaching health classes, teaching safety classes and recreation classes, leading recreational activities, supervising recreation field work students, and/or directing or helping to manage extracurricular programs.

Students interested in these opportunities should file their applications before February 1. (Letter should be addressed to: The School of Health, Physical Education, and Recreation, The University of Tennessee, Knoxville, Tennessee 37916.)

Public Health Traineeships. A few Public Health Traineeships are offered for Master of Public Health candidates concentrating in community health education. These are provided by the United Public Health Service. Letters should be addressed to: Health and Safety Division, The University of Tennessee, 9114 Andy Holt Avenue, Knoxville, Tennessee 37916.
Explores problems of alcoholism regarding overall health of community. Emphasis placed on factors making alcoholism a serious public health problem. Various types of educational programs to control the disease covered. F

4130 Community Health Problems—Suicide (3) Explores problems of suicide regarding overall health of community. W

4140 Community Health Problems—Death Education (3) Exploration of ramifications of death and dying as related to personal and community health. E

4210 Urban and Industrial Health (3) Health problems created by a burgeoning population and the megalopolis; industrial health problems of concern to management, supervisor, and industrial worker, control of occupational diseases, poisons, accidents, and other conditions incidental to industry. Sp

4220 Communications for Better Health (3) Selective study of communications in health enterprise. Consideration in logical progression of the problems created by a burgeoning population and the megalopolis; industrial health problems of concern to management, supervisor, and industrial worker, control of occupational diseases, poisons, accidents, and other conditions incidental to industry. Sp

4410 Consumer Health and Safety Education (3) Survey of major consumer health and safety problems; selection in consumership, and financing of safety and medical services. E

4411 Instructor's Advanced First Aid and Emergency Care (3) Designed to teach first aid. Satisfaction of completion qualifies one for American National Red Cross Certification as an Advanced First Aid and Emergency Care Instructor. (Applicant must be at least 21 years of age.) Prereq: 3210 or valid Advanced First Aid and Emergency Care Certificate. F, W, Sp

4420 Drug Abuse Education (3) Drug abuse problem and suspected causes; pharmacology of drugs and their effect on society and methods of drug abuse education. F, Sp

4700-10-20 Field Practice in Public Health (3, 3, 3) Field practice in public health under supervision of public health profession. S/NC only. E

4730 Workshop in Public Health Education (3-5) For teachers, nurses, case workers, sanitarians, and others voluntary and public health agency personnel, emphasizes the problem-solving approach through small group interaction, case method, and critical incident technique. May be repeated. Su

4840-50-60 Problems in Public Health Education (1, 1, 1) Individual identification and study of current problems in public health education. Extensive reading of literature required. E

5002 Non-Thesis Graduation Completion (3-19) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May be taken to reach degree requirement. May be repeated. S/NC only. E

5010-20-30 Workshop in Public Health (3-4, 3-5, 3-6) Designed to deal with specific public health problems in short or extended period of time. Su

5070-80-90 Field Practice and Seminar in Public Health (3-5, 3-5, 3-5) Internship or field experience under professional supervision in public health. S/NC only. E

5110 Environmental Health (3-5) Varied environmental factors within general framework of air, food, water, shelter, transportation as they affect humani- ty's survival, prevention of disease, performance and enjoyment. Lecture, demonstrations, laboratory, and field practice. Prereq: Consent of instructor. Su


5510 Industrial Toxicology (3) Elements of industrial toxicology as they relate to the improvement of occupational safety and health. Prereq: Consent of instructor. Sp

5520 Health and Sickness (3) Formulation of models of positive health within life cycle and within community: types of sickness afflicting individuals and groups. Su

5410 Epidemiology (3) Incidence and prevalence of disease in man. W, Sp

5420 Administration of Public Health (3) Administration of various public health agencies, from local, to state, to national level. Prereq: Considerations of public health agencies, both government and non-governmental, the different types of programs, and the different types of health professionals. F, W, Sp

5430 Vital and Medical Statistics (4) Application of basic statistical principles to living things. F, W, Sp

5440 Methods and Materials in Public Health Education (4) Theory and practice in use of communication techniques and materials in community health education. 3 hrs and 2 labs. W

5540 Factors in Problem Solving for Community Health (5) Tests skills in communications and group process in route to problem identification, objective setting, problem solving and planning for health education. 4 hrs and 2 labs. W

5550 The Public Health Educator in Community Organization and Development (4) Overview of health organizations and agencies in the community facing exploration of conflicting theories and divergent styles of practice. Influence of community organization and development. Laboratory to delineate a community near campus and to practice. 2 hrs and 4 labs. F

5560 Functions and Roles of the Public Health Educator (3) Professional science is examined with special attention to roles and functions. Consideration of philosophy and motivation and differences between health education service and health education program for community learning levels. 1 2-hr lecture-seminar session per week. F

5580 Physical Activity and Health (5) (Same as Physical Education 5580) F

5705-10-15 Advanced Professional Health Education: Health Planning I, II, III (3-5, 3-5, 3-5) Theory and practice in selected areas. F, W, Sp

5730 Dental Health Education (3-5) E

5735 Emergency Medical Services (3-5) Sp

5745 Family Health Unit (3-5) W

5750 Health and Medical Care Legislation and Law (3-5) Su

5755 Health Facilities Administration (3-5) W

5770 Health Services Administration (3-5) F

5785 Occupational Health Unit (3-5) Sp

5790 Self-Care Unit (3-5) Sp

5795 The Training of Paramedical Personnel (3-5) E


6000 Doctoral Research and Dissertation (3-15) E

6030 Critical Analysis of Writing and Research in Health Education (3) (Same as School Health Education 6030) F

6050-60 Seminar in Health Education (3, 3) (Same as School Health Education 6050-60) W, Sp

6210 Health Aspects of Gerontology (3) Su

6220 Seminar on the Nation's Health (3) F

6230 International Health (3) W

Safety

3820 Principles of General Safety (3) Deals with principles, practices, and procedures in general safety. Covers safety problems in school, traffic, recreation, industry, home, and other public areas. E

4010-20-30 Problems in Safety (1-3, 1-3, 1-3) Individual identification and study of current problems in safety. E
Preparation and presentation of health topics.
3420 School Health Services (3) Development, simulation, and multi-car driving range. Emphasis placed on teaching skills and supervision. Prereq: 4410. E
4430 Sports Safety (3) Accident prevention and injury control in sports activities; philosophy of sports safety; human environmental factors and interrelationship in sports injury and control; risk-taking and decision solution strategies; and contributions of sports medicine to safety, 3 hrs and 2 labs. Su
4720 Workshop in Safety (3-6) Deals with special safety education problems. For advanced under-graduate students, graduate students, teachers, supervisors, and administrators. May be repeated. Su
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May not be repeated. Su only.
5320 Behavioral Problems in Safety Education and Accident Prevention (3) Problems of behavior, causes of accidents, and application of principles of psychology in development of safe behavior in all segments of our environment. F
5330 Problems and Research in Accident Prevention (3) Analysis of safety problems found in wide variety of accidents that occur in community; findings of current research in behavioral sciences as related to variation incidence of accidents. Sp
5340 Organization, Administration, and Supervision of Safety Programs (3) National, state, and local level programs including administrative, instructional, and supervisory aspects. Basic emphasis on implementation of relevant programs. W
5350 Civil and Defense Education (3) Civil and defense problems: tornadoes, floods, fires, mass civil disorders, and nuclear personnel attack by alien countries. Special emphasis given to public education problems. For advanced students, teachers, school administrators, nurses and other paramedical school personnel. Lectures, demonstrations, films, field trips, and supervised research in special health problems. May be repeated. Su
4810-20-30 Problems in School Health Education (1, 1, 1) Individual identification and study of current problems in school health education. Extensive reading of literature. E
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May not be repeated. Su only.
5100 Problems and Practices in School Health (3) Comprehensive study and analysis of the principles, problems, systems, and trends of and in school health. W
5200 Teaching of Sex Education and Human Sexuality (3) Analysis and explanation of theory, methods and materials for planning, organizing and teaching sex education with human sexuality in schools and other community settings. Sp
5510 Curriculum Construction in School Health Instruction (3) Analysis of school health instruction programs in elementary and secondary schools. Planning and construction of health curricula to meet needs, interests, and abilities of pupils. Su
5520 Evaluation in School Health Instruction (3) Principles of objective tests construction; place of behavior and attitude scales, check lists, questionnaires, surveys, and inventories in evaluation of health instruction. Includes criticism of several commercially prepared tests and construction and standardization of test. F
5530 School Health Program Surveys (3) Techniques and standards of surveying total school health program; relative contribution of health instruction, health services, and healthful environment for each contributes to well being of individual students. Survey of existing school health program. Sp
5620 School Health Administration and Supervision (3) Analysis of various types of administrative control; budgetary problems; education-public health dilemma; responsibilities of school health personnel. Resource material includes case studies of on-going school health programs. Sp
5630-40 Workshop in School Health Education (3, 3) Designed for graduate students, inservice teachers and other health professionals. Emphasis in any workshop to be placed on one critical health issue. Su
4570-30-40 Graduate Workshop in Health Education (3-6, 3-6, 3-8) Deals with specific health problems designed to expand professional knowledge. Special health problems in a concentrated period of time. Su
5810-20-30 Problems in School Health Education (1, 1, 1) Individual identification and study of current issues in school health education. Extensive reading and critical analysis of safety literature. E
5870-80-90 Current Issues in Safety Education (1, 1, 1) Individual identification and study of current issues in safety education. Extensive reading of literature. E
5910-20-30 Problems in School Health Education (1, 1, 1) Individual identification and study of current issues in school health education. Extensive reading and critical analysis of safety literature. E

School Health
3210 First Aid and Emergency Care (4) (Same as Public Health 3210.) E
3410 School Health Instruction (3) Selection of health topics and preparation of the curriculum. Prereq: 3210. E
3420 School Health Services (3) Development, maintenance, and protection of health of students including examination, screening, special services, communicable disease control, emergency care, and school health records. F, W, Sp
3510 The School in Community Health (3) Role of teacher in community health education; school's responsibility through use of simulation, multimedia in place of existing media and agencies in program. Not open to health and physical education majors. E
3610 Methods in Elementary Health Instruction (3) Preparation of lessons and presentation of health topics. Teaching method emphasized and student participation stressed. Required for elementary teachers.

Preparatory course for major in Physical Education.
3620 The Teaching of Sex Education (3) Trends, content, methods, and materials in sex education. F, W, Sp
3650 Methods in Secondary Health Instruction (3) Preparation and presentation of health topics. Teaching method emphasized and student participation stressed. E
4710 Workshop in School Health Education (3-6) For advanced students, teachers, school administrators, nurses and other paramedical school personnel. Lectures, demonstrations, films, field trips, and supervised research in special health problems. May be repeated. Su
4810-20-30 Problems in School Health Education (1, 1, 1) Individual identification and study of current problems in school health education. Extensive reading of literature. E
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May not be repeated. Su only.
5100 Problems and Practices in School Health (3) Comprehensive study and analysis of the principles, problems, systems, and trends of and in school health. W
5200 Teaching of Sex Education and Human Sexuality (3) Analysis and explanation of theory, methods and materials for planning, organizing and teaching sex education with human sexuality in schools and other community settings. Sp
5510 Curriculum Construction in School Health Instruction (3) Analysis of school health instruction programs in elementary and secondary schools. Planning and construction of health curricula to meet needs, interests, and abilities of pupils. W
5520 Evaluation in School Health Instruction (3) Principles of objective tests construction; place of behavior and attitude scales, check lists, questionnaires, surveys, and inventories in evaluation of health instruction. Includes criticism of several commercially prepared tests and construction and standardization of test. W
5530 School Health Program Surveys (3) Techniques and standards of surveying total school health program; relative contribution of health instruction, health services, and healthful environment for each contributes to well being of individual students. Survey of existing school health program. Sp
5620 School Health Administration and Supervision (3) Analysis of various types of administrative control; budgetary problems; education-public health dilemma; responsibilities of school health personnel. Resource material includes case studies of on-going school health programs. Sp
5630-40 Workshop in School Health Education (3, 3) Designed for graduate students, inservice teachers and other health professionals. Emphasis in any workshop to be placed on one critical health issue. Su
4570-30-40 Graduate Workshop in Health Education (3-6, 3-6, 3-8) Deals with specific health problems designed to expand professional knowledge. Special health problems in a concentrated period of time. Su
5810-20-30 Problems in School Health Education (1, 1, 1) Individual identification and study of current issues in school health education. Extensive reading and critical analysis of safety literature. E
6000 Doctoral Research and Dissertation (3-15) E
6030 Critical Analysis of Writing and Research in Health Education (3) (Same as Public Health 6030.) F
6050-60 Seminar in Health Education (3, 3) (Same as Public Health 6050-60.) W, Sp

Division of Physical Education
MAJOR
Physical Education Education
DEGREES
M.S., Ed.D. Ph.D.

Professors:
J. E. Ackerman, M.D. Tennessee; G. B. Brady (Emeritus), Ph.D. Idaho; E. K. Hagen (Emeritus), Ph.D. Iowa, B. D. Franks (Emeritus), Ph.D. North Carolina; A. J. Kosar, Ph.D. Michigan; W. P. Lienhein, Ph.D. Iowa; M. P. Peterson, Ph.D. Iowa; E. A. Petschnigg (Emeritus), Ed.D. Boston; H. Watson (Emeritus), Ph.D. Michigan; H. G. Welch, Ph.D. Florida.

Associate Professors:
E. T. Howley, Ph.D. Wisconsin; N. E. Lay, Ph.D. Wisconsin; B. J. Mead, Ph.D. Purdue; C. A. Witteberg, Ph.D. Michigan.

Assistant Professors:

The Physical Education Division offers the following degree programs:

Master of Science degree in Physical Education (thesis and non-thesis programs).
Doctor of Education degree in Physical Education with concentrations in exercise physiology, motor behavior, adapted physical education, and philosophical and sociological foundations.

The Doctor of Philosophy degree with a major in Education includes options and emphases as listed on page 6.

3050 Rhythmic Analysis (2) Emphasis on analysis of organic movement. Prereq: Consent of instructor. A
3090 History of Dance and the Related Arts I (2) Dance history and the arts related to it from beginnings in primitive societies through the nineteenth century. F
3151 History of Dance and the Related Arts II (2) Survey of dance and the arts related to it, tracing their development in the twentieth century. W
3430 Adaptive Physical Education Laboratory I (1) Practical work, including student teaching, supplementing 4110. E
4010 Advanced Modern Technique (2) Development, integration, and synthesis of previous dance vocabulary on advanced practice and principles. Prereq: 3030. May be repeated. Maximum 6 hrs. Available to dance majors and minores or with consent of instructor. F, W
4020 Practicum in Dance Production (3) Prereq: Consent of instructor. W
4060 Advanced Composition (4) Application of compositional, production, and administrative skills culminating in presentation of two complete choreographic works. Prereq: 3062. 4020. A
4070 Stagecraft for Dance Production (2) Equipment, light design, properties, sets, and stage management.
4130 Adaptive Physical Education (3) Classification of atypical students who require modified programs in physical education; activities and class organization suitable for required or special physical education classes.
4140 Measurement and Evaluation in Physical Education (3) Relationship of measurement and evaluation in physical education. Administration and critique of methods and measures of physical fitness, sports skills and knowledge. W, Sp, Su
4150 Creative Rhythms for Children (3) Methods and materials for grades 1-6. 3 hrs and 1 lab. F
4880 Motor Behavior: A Theoretical Perspective (4)
Examine motor behavior from information processing perspective and applies current research to support theoretical base. Prereq: Senior or graduate standing or consent of instructor. F

4980 Motor Behavior Laboratory (2) Beginning experience in methodology and instrumentation for assessing factors related to or affecting motor learning/performance. Prereq: or coreq: 4880 or consent of instructor. Prereq: 4140 and/or 5320 or consent of instructor. W

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5110 Administrative Problems in Health and Physical Education (3)

5120 Problems of the Curriculum in Physical Education (3)

5130 Methods in Physical Education (3) Characteristics of different school age levels, and applications of learning procedures in physical activities at these levels.

5140 Advanced Philosophy of Sport (3) Critical examination of most rigorous and sophisticated essay pieces concerning metaphysical, epistemological, and axiological status of sport. Prereq: Consent of instructor. W

5150 Systematic Philosophical Analyses of Sport (3) Critical examination of most comprehensive, systematic approach to revealing key metaphysical, epistemological, and axiological status of sport. Prereq: 5140 or consent of instructor. Sp

5220 Readings in Physical Education (3) Comprehensive review of literature in physical education and related areas. Sp

5230 Supervisory Problems in Physical Education (3) For students interested in supervision of physical education, 1 credit for each semester of intern experience.

5310 Analysis of Basic Motor Skills (3) Mechanical analysis of basic motor skills, emphasizing application of these skills to physical education and athletics. W

5320 Seminar in Research Techniques in Physical Education (3) Evaluation of appropriate research techniques in physical education. F

5330 Psychology of Sport (3) Human behavior in sport context. Prereq: General psychology course and consent of instructor. W

5340 Motor Behavior and Skill Acquisition (3) Application of research on human movement behavior to sport and physical education. Prereq: 4880 or consent of instructor. Sp

5410-20-30 Specialization Study in a Selected Physical Education Area (1-3, 1-3, 1-3) Advanced comprehensive study in selected specialization within general fields of physical education. Prereq: Consent of instructor. E

5500 Advanced Kinesiology (3) Action of muscles involved in fundamental movements, calisthenics, sports, and gymnastics. Prereq: 3300 or equivalent, Sp

5510 Selected Topics in Anatomy (3) Intensive study of various systems of human body. Prereq: 5500 or equivalent. May be repeated with consent of instructor. S/NC only. Su

5550 Physical Rehabilitation (3) Physical disabilities and rehabilitation techniques. Prereq: 5500 or equivalent. Sp

5580 Physical Activity and Health (5) Relationship of physical exercise to longevity, weight control, cardiovascular diseases, low back pain and other diseases, mental health, growth, and aging. Applications for maintenance of health. Prereq: Course in physiology of exercise or consent of instructor. S lecture for fall. (Same as Public Health 5580.) Su

5600 Applied Physiology (6) Principles of physiology with special emphasis on application of physiological findings to practical problems related to human function. Prereq: 1 yr general chemistry, or consent of instructor.

5610 Advanced Exercise Physiology (4) Principles of energy transfer in human and animal systems with special emphasis on integration of organ systems in adapting to requirements of muscular exercise. Prereq: Zoology 4400 or equivalent. Recommended: 1 yr chemistry, physics, and mathematics. 3 hrs and 1 lab. W

5620 Experimental Techniques in Applied Physiology (3) Laboratory course in experimental methodology and instrumentation. Respiratory and blood gas analysis, human calorimetry, blood chemistry, and pulmonary function tests. May be repeated with consent of instructor. S/NC only.

5650 Social-Psychological Dimensions of Physical Activity (3) Examination of social-psychological factors which influence performance in physical activity with emphasis on research. Prereq: Psychology 3120 or equivalent.

5810-20-30 Seminar in Physical Education (1, 1, 1) Current issues and problems in physical education with emphasis on outstanding studies and research in field. E

5810-20-30 Problems and Projects in Physical Education (1-3, 1-3, 1-3) Problems of professional interest and value to the individual student, selected by the student and approved by the major professor. S/NC only. E

6000 Doctoral Research and Dissertation (3-15) Directed investigation of the doctoral candidate. S/NC only.

6220 Independent Research (3) Selection of topic, development of procedure, and conduct of study including final writing of research paper. S/NC only. E

6330 Advanced Motor Behavior (3) Theoretical issues of contemporary significance in human motor behavior. Prereq: 5340 or consent of instructor. Sp

6410 Practicum in Kinesiology (3) Electromyography laboratory and film analysis of sports skills. Prereq: 5310, 5500 and Physics 2210 or equivalent. May be repeated with consent of instructor. S/NC only. E

6510-20 Issues and Problems in Physical Education (3, 3) Critical examination and evaluation of current issues and problems in physical education. W

6610 Seminar in Applied Physiology (2) Prereq: 5610. May be repeated with consent of instructor. S/NC only. F, Sp

8640 Research Participation in Applied Physiology (1-4) Advanced research techniques under supervision of faculty member whose research area coincides with interests of student. Prereq: Consent of instructor. May be repeated with consent of instructor. S/NC only. F

8610-20 Practicum (2, 2) Intern experience in areas of major interest. S/NC only. E

Division of Recreation

MAJOR

Recreation

DEGREE

M.S.

Professor: M. L. Peters (Chairperson), Ph.D., Illinois.

Assistant Professors: M. J. Carter, Re.D., Indiana; K. L. Krick, Re.D., Indiana.

The Recreation Division offers the following degree program:

Major of Science degree in Recreation (thesis and non-thesis programs) with concentrations in general recreation, recreation administration, and therapeutic recreation.

4130 Recreation Administration (3) Introduction to recreation administration, including planning, personnel, areas and facilities, program services, financial, and public relations. Prereq: 3140, 3200, 3880, or consent of instructor. F, W

4200 Survey of Recreation for Special Populations (3) The applicability of recreation to the leisure needs of groups whose leisure opportunities and needs may require special services. Prereq: 3140, 3200, 3880, or consent of instructor. F, Sp

4310 Camp Administration (3) Program planning and organization, personal management, camp site development and maintenance, camp operation for administrators and supervisors.

4500 Specialized Study in a Selected Area of Recreation (4) Comprehensive study in a selected specialized area within the broad field of recreation. For recreation students only. Prereq: Consent of instructor. Mays be repeated with consent of division. Maximum 9 hrs. E

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5150 Current Issues in Recreation (3) Identification and consideration of broad issues-social, environmental, ethical—which currently have greatest impact on use of leisure, and implications for recreation administration. Prereq: Consent of instructor. Sp

5420 Therapeutic Recreation (3) Role of recreation in the lives and treatment of persons with disabilities mental, physical and medical. Possibilities for helping ill and disabled realize their fullest potential. Prereq: Consent of instructor. W

5250 Implementation of Recreation Services for the Ill or Disabled (3) Policies and guidelines for organizing and implementing programs of recreation for ill or disabled in treatment centers and other community agencies. Prereq: 4200 or consent of instructor. Sp

5260 Leisure and Mental Health (3) Relationship between leisure activity and mental health, with emphasis on its use in therapeutic recreation. Prereq: Psychology 3650 or equivalent, and consent of instructor. W

5300 Seminar in Recreation (1) Presentation and general discussion of articles, studies, projects, and thesis in recreation. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. S/NC only. W, Sp

5340 Administration of Recreation Funds (3) Development and management of budgets for recreation agencies with special emphasis on obtaining federal funds appropriated specifically for recreation, management of revenue received, and exploration of funding alternatives. Prereq: 4130. Sp

5350 Organizational Policies for Recreation (3) Advanced study in the analysis of organizational policies and functions of management in recreation. Prereq: 4130. W

5360 Management and Operation of Recreation Facilities (3) Development, management process as it pertains to operation of recreation facilities. F

5440 Problems and Projects in Recreation (1-9) Individual research on problem of special significance for student. May be repeated. Consists of limited studies undertaken in lieu of thesis. May be repeated. Maximum 9 hrs. New problem must be undertaken for each repetition. Sp

5450 Specialized Study in Recreation (1-9) Advanced comprehensive study in selected specialized area within leisure and recreation field. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E
College of Engineering

W. K. Stair, Acting Dean
W. A. Miller, Associate Dean

Graduate degree programs of the College of Engineering provide opportunities for advanced study leading to the Master of Science degree, the Master of Engineering degree, and the Doctor of Philosophy degree. For a listing, consult majors and degrees available on page 8.

OFF-CAMPUS GRADUATE INSTRUCTION BY VIDEOTAPE-ELECTROWRITER

Since 1966, the College of Engineering has made use of electronic communication techniques to reach students beyond the confines of Knoxville classrooms. These remotely-taught classes make the specialized talents of engineering college faculty available to students at off-campus centers and industrial sites. This effort makes use of videotapes prepared from a regular on-campus class in specially-equipped classrooms. The tapes contain a visual and audible record of a professor’s lecture and discussions with the on-campus classes and are played back at remote locations. Telephone/Electrowriter contact is established periodically between the professor and the off-campus class to allow full discussion and questions. Occasional visits by the professor are made to each remote class and students visit the Knoxville campus at selected times.

Graduate courses have been offered to students at other campuses and established centers of the UT System (Chattanooga, Kingsport, Martin, Nashville, and Tullahoma). Graduate courses have also been made available to engineers in industrial plants. Such courses are also offered to students using classroom facilities at Jackson State and Columbia State Community Colleges.

The remotely-taught courses offered by UTK carry full graduate credit toward the Master’s degree under authorization of the regional accrediting agency, the Southern Association of Colleges and Schools.

YEARG-IN-JAPAN M.S. PROGRAM

This is a unique program allowing American engineering students to develop some understanding, both scientific and cultural, of Japan. It allows an M.S. candidate to obtain a degree from UTK while carrying out research work at a Japanese university. The program requires approximately two years, one year being spent in Japan and the remaining period being spent at UTK to fulfill the course requirements and to write the thesis or project report, as appropriate to the particular department. The program is administered in the framework of each department’s regular graduate program except that the research is done in Japan. Although the language of communication in Japan would be English, cultural understanding is one of the important objectives of the program and as such a participant would be asked to begin Japanese language study. At the option of the department, up to 6 hours of graduate credit may be allowed for language study, either at UTK or in Japan.

Financial support for living expenses in Japan and for the roundtrip transportation can usually be arranged through fellowships from the Japanese Ministry of Education.

Engineering Experiment Station

W. K. Stair, Associate Director

The Station is organized to conduct investigations in fundamental engineering science and to aid in the development of the state’s resources and industries as far as funds available will permit.

The Station may also make special arrangements with any person or company to study any technical question within the capacity of its resources, and to report the results exclusively to the company requesting the study. In such case, the whole expense will be carried by the parties requesting the investigation.

Engineering Administration

MAJOR Engineering Administration

DEGREE M.S.

Committee:

A program of study leading to the degree of Master of Science with a major in Engineering Administration is offered. This program is aimed at providing education for graduate engineers in the organization and direction of work in engineering functions, at a level which requires understanding of such areas as marketing, finance, and industrial relations. It should be emphasized that this is an engineering program, aimed at preparing individuals for line management positions in construction, design, development, and manufacturing where both technical and nontechnical factors exert significant influence on the success of a given activity. The program does not provide the opportunity for in-depth study of any of the traditional areas of business administration. Students with such interests are advised to consider graduate programs available in the College of Business Administration.

To be admitted to The Graduate School as a potential candidate for a Master’s degree with a major in Engineering Administration, the applicant should have graduated from an A.B.E.T. accredited undergraduate institution in engineering with a satisfactory grade point average. In addition, applicants must satisfactorily meet one of the following experience requirements: (1) at least two years of engineering experience after graduation if a full-time student or (2) current employment in engineering work if a part-time student.

THE MASTER’S PROGRAM

Minimum requirements for the Master’s degree are the satisfactory completion of the following courses:
1. An Engineering Core, 27 hours of
graduate credit consisting of Engineering Administration 5900, at least three courses chosen from Industrial Engineering 4150, 5110, 5520, and 5710, and a complement of engineering courses normally selected from the student's undergraduate major department or from courses of other departments pertinent to the program.

2. A Business Administration Core, 15 hours of graduate credit consisting of Accounting 5030, Finance 5010, Management 5010, Management 5130, and other Business Law 5010 or Transportation 5210. A student may take both the business law and transportation courses and count one of them as a general elective.

3. General Electives, 9 hours of graduate credit chosen from computer science, economics, engineering, management science, mathematics, psychology, statistics, and other program-related disciplines.

The program requirement totals 51 hours of graduate course credit. No thesis is required. A final oral and written examination must be passed on the work offered for the degree.

Course prerequisites for the program are Accounting 2110-20 or 5010, Computer Science 3150, Economics 2110-20-30 or 5010, Economics 5020, Industrial Engineering 4520, and Statistics 3450 or their equivalents. None of these prerequisites, except Economics 5020, may be counted as part of the 51 hours of credit offered for the degree. These course prerequisites may be waived by the department offering the course upon presentation of evidence of competency in the course subjects. Other prerequisite courses may be required, depending upon the student's background and the electives chosen.

5902 Non-Thesis Graduation Completion (3-15)
Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5900 Project in Engineering Administration (3)
Study and formal report of engineering administration topics, normally performed during last quarter of graduate study. S/NC only. May be repeated. Maximum 3 hrs credit to be applied toward degree. Must register for 5900 until project is complete. S/NC only. E

Departments of Instruction

Chemical, Metallurgical and Polymer Engineering

MAJORS DEGREES
Chemical Engineering M.S., Ph.D.
Metallurgical Engineering M.S., Ph.D.
Polymer Engineering M.S., Ph.D.

Professors:
H. F. Johnson (Head), D. Eng., Yale; D. F. Bogus, Ph.D., Ohio State; D. Borie, Ph.D., Massachusetts Institute of Technology; C. R. Brooks, Ph.D., Tennessee; E. S. Clark, Ph.D., Caltech (California Institute of Technology); L. W. Crawford,* Ph.D.; D. Cincinnati; C. L. Culberson, Ph.D., Texas; F. F. Fellers, Ph.D., Akron; G. C. Franze, Ph.D.; Johns Hopkins; J. M. Holmes, Ph.D., Tennessee; H. W. Hau, Ph.D., Wisconsin; S. H. Jury (Emeritus), Ph.D., Penn. State; C. D. Lundin, Ph.D.; D. Rensselaer Polytechnic; C. J. McHargue, Ph.D.; D. Kentucky; C. F. Moors, Ph.D.; Louisiana State; B. F. Oliver, Ph.D.

Pennsylvania State; J. J. Perona, Ph.D.
Northwestern; J. W. Pradco, Ph.D.
Tennessee; J. E. Sprudell, Ph.D.
Tennessee; Ph.D., Cincinnati; C. O. Thomas, Ph.D., Tennessee; A. Vanderheide, Ph.D., Institute of Technology; J. S. Watson, Ph.D., Tennessee; J. L. White,* Ph.D., Delaware; M. A. Wright,* Ph.D., Delaware.

Associate Professors:
W. T. Becker, Ph.D., Illinois; D. D. Bains, Ph.D., Houston, P. J. Messchter, Ph.D, Pennsylvania.

Lecturers:
L. Dresser, Ph.D., Princeton; H. W. Hoffman, D.Eng., Johns Hopkins, Ph.D., Tennessee; T. D. Parish, Ph.D., Rice; W. H. Seaton, Ph.D., Ohio State; E. von Halle, Ph.D., Pennsylvania; M. E. Whaley, Ph.D., Iowa State.

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

THE MASTER'S PROGRAM
Minimum departmental requirements include the satisfactory completion of:
1. A major consisting of 18 to 27 quarter hours of graduate courses in chemical engineering, metallurgical engineering, or polymer engineering. The polymer engineering major must include Polymer Engineering 5110, 5230, 5310, 5410, and 5120.2
2. One or two minors or collateral work, 9 to 18 hours total in engineering, chemistry, mathematics, physics, or other related fields.
4. Active participation in graduate seminars in the department. Resident students must register for the appropriate 5010 every quarter offered.
5. Final examination covering thesis, related fields, and graduate coursework.

THE DOCTORAL PROGRAM
Students applying for entrance into the doctoral program must display concrete evidence of independent research to the satisfaction of the department. The Master's thesis may be offered as such evidence.
Department requirements consist essentially of the satisfactory completion of:
1. Graduate courses in chemical engineering, metallurgical engineering, or polymer engineering amounting to approximately 36 quarter hours, at least 12 of which must be in 6000 series courses. The polymer engineering major must include Polymer Engineering 5110, 5210, 5230, 5310, 5410, 5120, and Chemistry 5140.
2. Supporting courses in related scientific and engineering fields amounting to approximately 36 quarter 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 materials as chemical, metallurgical, and 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 5010 every quarter offered.
5. Reading knowledge of a foreign language relevant to the candidate's research program; selection of language to be made in consultation with the faculty committee.
Appropriate languages are French, German, Italian, Japanese, Russian.

UTK-JAPAN COOPERATIVE PROGRAM IN POLYMER ENGINEERING
The UTK-Japan Program provides a means for Japanese research students to obtain part-time in the graduate program, and provides a joint Japanese-UTK program for the admission of Japanese students into the polymer engineering graduate program. A cooperative arrangement with Japanese universities makes recommendations for students and a UTK committee acts on them.

PROGRAM OPTIONS IN POLYMER SCIENCE AND ENGINEERING
M.S. and Ph.D. degrees with specialization in polymer science and engineering are possible through two routes—one in the department (through chemical or metallurgical engineering) with an engineering emphasis, and a second in a joint program with the Chemistry Department having a chemical emphasis.

The specialization program in the department requires, for the M.S. degree, a thesis in the field, completion of Polymer Engineering 4910, 5110, 5310, 5410, and either 5230 or 5210 plus active participation in the Polymer Seminar. The Ph.D. candidate must meet the above requirements, pass a special written examination in polymer science and engineering, and complete an additional academic program to be specified by the student's committee.

M.S. and Ph.D. degrees in the joint specialization program with the chemistry department require a thesis or dissertation in the field. Chemical and metallurgical engineering departmental requirements include completion of Polymer Engineering 4910 and 4920, Chemistry 5531 and 5140, plus active participation in the Polymer Seminar. Ph.D. students must also pass a special written examination as well as complete the above requirements.

Chemical Engineering

3410 Flow of Fluids (4) Differential and overall material, energy, and momentum balances; flow in tubes, piping systems, and packed beds; metering devices, pumps. Prereq: Chemical and Metallurgical Engineering 2020, Mathematics 2850. 3 hrs and 1 lab.

3420 Heat Transfer (4) Differential and overall energy balances; steady and unsteady state, heat conduction in simple geometries; heat transfer in tubes and heat exchangers; condensation and boiling; radiation. Prereq: 3410. 3 hrs and 1 lab.

3440 Stagewise Operations (3) Analytical and graphical methods applied to stagewise separatory operations.

3450 Diffusional Operations (3) Diffusion, simultaneous heat and mass transfer, applications including humidification, gas absorption, extraction. Prereq: 3420. Chemical Engineering 3040.
3610 Introduction to Process Dynamics and Control (3) Introduction to concepts of process dynamics and control. Steady-state analysis of chemical processes. Unsteady-state nature of chemical processes. Laplace transform techniques, block diagram algebra and transfer functions. Methods for dealing with processes are developed and analyzed in detail. Prereq: Mathematics 2840.

5010 Thermodynamics and Transport Phenomena in Biological Systems (3) Application of principles of transport processes to biological systems. Transfer of energy, mass, and momentum in living cells; active transport; structure and rheology of biological fluids; membrane and interfacial phenomena; analysis of physiological processes; analysis of organs. Prereq: 3440, 3450 or consent of instructor.

5120 Heat Convection (3) Analysis of heat convection including forced convection, with special emphasis on turbulent and turbulent flow conditions. Prereq: 5310.

5210 Process Dynamics (3) Analysis of recycle operations, steady state simulation and optimization of process equipment from continuous and batch operations. Prereq: 5130.

5250 Chemical Process Industry Economics (3) Analysis of economic components of chemical processes, internal economics of chemical enterprise, decision making for investment in capital facilities. Prereq: 4120-30, 4420.

5310 Thermodynamics of Heterogeneous Equilibriums (3) Phase rule: equilibrium between phases; composition relationship between phases; ideal and nonideal solutions. Prereq: 3040.

5320 Statistical Thermodynamics (3) Basic concept of statistical mechanics and application to evaluation of thermophysical properties. Prereq: 5310.

5510 Chemical Reactor Design (3) Nonideal flow patterns in chemical reactors; diffusion and reaction in two phase systems; introduction to heterogeneous catalysis and reactor stability. Prereq: 4520.

5620 Differential Mass Transfer Operations (3) Differential mass transfer operations; falling film, packed tower and bubble contacting devices, nonisothermal and multicomponent systems; current theories of mass transfer; mass and momentum transfer analyses. Prereq: Math 2840.

5700 Mechanics of Viscous Flow (3) (Same as Engineering and Mechanics 5220)

5900 Special Topics in Chemical Engineering (3) Special topics of current interest to chemical engineers. May be repeated. Maximum 9 hrs.

6000 Doctoral Research and Dissertation (3-15) E

5610 Advanced Diffusional Processes (3) Fixed and fluidized bed operations, stagewise and differential mass transfer bed concepts. Prereq: Consent of instructor.

5750 Microbiological Process Engineering (3) Application of chemical engineering principles and design concepts to microbiological processes; continuous culture of microorganisms, food processing and pharmaceutical processes. Prereq: 3440, 3450 or consent of instructor.

5760 Principles of Biochemical Separation (3) Fundamental aspects and similarities of modern biochemical separation methods; classroom demonstrations, design of production and analytical systems. Prereq: Consent of instructor.

7811-2-3 Topics in Chemical Bioengineering (3, 3, 3) Problems of interest in chemical bioengineering. Prereq: Consent of instructor.

8010 Thesis (1-15) E

5101 Graduate Seminar (1) Prereq: Admission to graduate program. May be repeated. Maximum 9 hrs.

5810 Mechanics of Viscous Flow (3) (Same as Engineering and Mechanics 5220)

5900 Special Topics in Chemical Engineering (3) Special topics of current interest to chemical engineers. May be repeated. Maximum 9 hrs.

6000 Doctoral Research and Dissertation (3-15) E

6130 Process Optimization (3) Optimization of chemical processes, including nonconvex problems; variational methods, maximum principle, dynamic programming, and geometric programming. Prereq: 5510.

6250 Venture Analysis in the Process Industries (3) Interactions among line functions of typical chemical company in application of modern decision theory and mathematical models to achieve optimum product investment decision in face of external competition. Prereq: 5250.

6301 Thermodynamics of Irreversible Processes (3) Thermodynamic treatment of irreversible chemical processes, transport processes, coupling phenomena, with special emphasis on topics and methods of interest to engineering and bioengineering students. Prereq: 5760.


6510 Applied Chemical Reaction Kinetics (3) Chemical reactions in gas and liquid phases, heterogeneous catalysis, catalyst effectiveness and role of transport in kinetics. Emphasis on development of phenomenological description although mechanistic models are discussed. Prereq: 5510.

6520 Catalytic Reactor Design (3) Principles of kinetics; heat and mass transfer applied to design and analysis of heterogeneous catalytic reactors. Prereq: 5510.

6710 Process Dynamics (3) Development of dynamic models of process equipment from fundamental laws, testing of models by frequency, step, and pulse response methods. Prereq: Consent of instructor.

6900 Advanced Topics of Chemical Engineering (3) Advanced topics of current interest to chemical engineers. Prereq: Consent of instructor. Maximum 9 hrs.

7110 Engineering Materials I (4) Introductory course correlating the atomic, crystal, and microstructure of materials with properties of bulk materials. Prereq: 3310 or 3320.
structure of solids with mechanical, physical, and chemical properties of engineering significance. 3 hrs and 2 lab.

3120 Engineering Materials II (3) Extension of 2110 or 3110 with emphasis on control of mechanical properties of materials by specification of composition, deformation, fracture, precipitation, and solid state reactions; control of resultant properties with service performance. Suggested for mechanical, civil, and industrial engineering students.

3130 Engineering Materials III (3) Extension of 2110 or 3110 with emphasis on control of electrical and magnetic properties of materials by specification of composition, microstructure, physical and mechanical treatment; correlation of resultant properties with service performance. Suggested for electrical engineering students.

3140 Engineering Materials IV (3) Extension of 2110 or 3110 with emphasis on materials processing, specification and evaluation. Suggested for mechanical and industrial engineering students.

3150 Engineering Materials V (3) Extension of 3110 with emphasis on the mechanisms and control of reactions of engineering materials with aqueous, gaseous, and other environments. Prereq: 3110 or equivalent.

3160 Engineering Materials VI (3) Extension of 2110 or 3110 with emphasis on materials of significance in nuclear energy. Suggested for nuclear energy majors. Prereq: 2110 or equivalent.

3210 Plastic Deformation (4) Phenomena and theory of plasticity of simple and polycrystalline materials. Kinetics and morphology, precipitation and phase transformations in simple and complex systems. Prereq: 3220. 3 hrs and 1 lab.

3310 Biomedical Applications of Materials for Life Sciences (3) Principles of engineering materials; metals, polymers, and ceramics; methods of fabrication; corrosion; applications of prosthetic devices. Methods to metals and metallurgical reactions. Prereq: Chemistry 1110-20-30 or equivalent.

3520 Materials Behavior and Chemical Process Equipment Design (3) Mechanical, metallurgical, and chemical behavior; behavior of mechanical process equipment. Prereq: Chemical and Metallurgical Engineering 3035 or equivalent; 3150; and Chemical Engineering 3420. (Same as Engineering Science and Mechanical Engineering 3520.)

3710 Metallurgical Applications in Manufacturing Technology (3) Fabrication methods and principles of mechanical/thermal processing for finished and semifinished articles; casting, powder metallurgy, plastic forming, joining, heat treatment. Prereq: 2110 or equivalent.

4340 Engineering Materials Design (3) Property control through composition, heat treatment and transformation in ferrous alloys. Plain carbon steels, alloy steels, and tool steel processing for property selection and service requirements. Prereq: 3220 or consent of instructor.

4350 Design and Analysis (3) Design and laboratory sessions on the selection of materials, requirements and performance in engineering structures and components. Prereq: Senior standing.

4510-20 X-Ray Diffraction and Crystallography (3, 3) X-ray crystallography; projections, x-rays, diffraction phenomena and techniques, introduction to structure determinations. The first quarter serves as an introduction to the subject. 2 hrs and 1 lab.

4540 Fracture-Safe Design (3) (Same as Engineering Science and Metallurgical Engineering 3635) Theory of solids, types of bonding in solids; thermal, electrical, and magnetic properties of materials; relation of structure to properties. 3 hrs or 2 hrs and 1 lab.

4730 Mechanical Metallurgy I (3) Elastic behavior. Description of stress, strain, and elastic constitutive relations of composition, microstructure, and loading on mechanical behavior. Failure by yielding. Prereq: 2110 or 3110 or Chemical and Metallurgical Engineering 3035. Suggested for mechanical engineering, engineering mechanics and engineering science students. 3 hrs or 2 hrs and 1 lab.

4740 Mechanical Metallurgy II (3) Ductile and brittle fracture, creep and stress rupture, fatigue, and residual stresses. Effects of state of stress, loading rate, time, temperature, and metallurgical structure. Prereq: 3120 or 3520, and 4730 or Mechanical Engineering 3650 or consent of instructor. Also suggested for mechanical engineering, engineering mechanics and engineering science students. 3 hrs or 2 hrs and 1 lab.

5000 Thesis (1-15) E

5010 Graduate Seminar (1) Prereq: Admission to graduate program. May be repeated. E

5050 Engineering Analysis (3) (Same as Chemical Engineering 5050.)

5110 Point Defects and Dislocations (3) Theoretical and experimental analysis of point, line, and planar imperfections in solids. Prereq: 4730 or consent of instructor.

5120 Plastic Deformation I (3) Geometry and mechanics of plastic deformation of single crystals; slip and twinning; work hardening; effects of temperature and alloying on short-term loading. Prereq: 5110.

5130 Plastic Deformation II (3) Plastic deformation of polycrystalline materials; theoretical and experimental analyses of deformation and annealing. Prereq: 5120.

5140 Diffusion and Annealing in Solids (3) Analysis of models and experimental observations relating to plastic deformation, precipitation and phase transformations in solids. Prereq: 5120.

5150 Phase Transformations I (3) Analysis of models and experimental observations relating to phase transformations by nucleation and growth; solidification, precipitation, spinodal decomposition. Prereq: 5140.


5210-30 Welding Metallurgy (3, 3) Welding processes and mechanisms. Prereq: 4540. Suggested for mechanical engineering, engineering mechanics and chemical engineering students. 3 hrs or 2 hrs and 1 lab.

5250 Solidification and Crystal Growth II and III (3, 3) Fluid flow, magnetohydrodynamic effects in incompressible liquid metals, morphology, stability of steady state coupled heat and mass transfer processes in liquid to solid transition, multiphase solidification, composites, nonsteady state dendritic phenomena, some nucleation phenomena. Prereq: 5310.

5310 Solidification and Crystal Growth I (3) Solute redistribution, thermodynamic considerations, kinetic, convection and fluid flow effects on the solid to liquid transition. Prereq: 4540.

5340-50 Advanced X-Ray Diffraction (3, 3) Review of crystallography, theoretical aspects, fraction theory, introduction to structure determinations. The first quarter serves as an introduction to the subject. 2 hrs and 1 lab.

5410-20 Advanced X-Ray Diffraction (3, 3) Review of crystallography, theoretical aspects, fraction theory, introduction to structure determinations. The first quarter serves as an introduction to the subject. 2 hrs and 1 lab.

5750 Corrosion (3) Analysis of corrosion processes in terms of polarization measurements and the Pourbaix diagram. Influence of stress, temperature, and environment on pitting, crevice, and stress corrosion.

5810-20 Special Topics in Metallurgy (3, 3) Lectures and recitation on more recent advances in metallurgy and materials science. Prereq: Core curriculum in Metallurgical Engineering 2030.

5840-50 Metallurgy of Deformation and Fracture (3, 3) Theoretical and engineering analysis of effect of stress state, strain rate, environment, temperature, and metallurgical state on mechanical behavior in service, testing, and fabrication.

5910-20 Metallurgical Thermodynamics (3, 3) Application of thermodynamic and physicochemical methods to metals and metallurgical reactions. Relation of theory and experiment to structure of liquid and solid solutions, and to alloy systems.

6000 Doctoral Research and Dissertation (1-15) E

6110-20 Theoretical Metallurgy (3, 3) Phases of metals, physical properties applicable to metallurgy, elasticity, introductory quantum theory, specific heats, electron theory, electrical and thermal conductivity, magnetic properties, theory of alloy formation. Prereq: 4610 or Physics 3720. Mathematics 4550 and consent of instructor.

6210-20 Rate Process in Metallurgy (3, 3) Theoretical and practical considerations of rate process in solids such as diffusion, recrystallization and grain growth, and phase transformations.


6410-20 Thermodynamics of Solids (3, 3) Classical and statistical thermodynamic analysis of stability of solid solutions, compounds and ordered phases. Prereq: 5910-20-30 or consent of instructor.

6810 Mechanical and Physical Properties of Crystals (3, 3) Anisotropic behavior of crystalline materials treated by matrix and tensor techniques. Property classification according to transformation behavior. Prereq: Core curriculum in Metallurgical Engineering and Mathematics 4500 or 4710 or consent of instructor.

6820 Mechanical and Physical Properties of Crystals II (3) Continuation of Metallurgical Engineering 6810 with emphasis on transport phenomena and irreversible thermodynamics. Prereq: 6810 or consent of instructor.

6830 Seminar in Anisotropic Properties of Crystals (3) Selected topics of current interest in the area of anisotropic behavior of crystalline materials. Prereq: Core curriculum or consent of instructor. May be repeated.
Polymer Engineering


5111 Laboratory Methods in Polymer Engineering I (1) Basic experimental procedures for polymer characterization, x-ray diffraction and optical methods. Coreq: 5110 or consent of instructor. 2 labs.

5120 Laboratory Methods in Polymer Engineering II (1) Basic experimental procedures for polymer characterization, polymer melt processing, mechanical behavior of polymers. Prereq: 5410 or consent of instructor. 2 labs.

5130 Laboratory Methods in Polymer Engineering III (1) Basic experimental procedures for polymer characterization, polymer melt processing, mechanical behavior of polymers. Prereq: 5410 or consent of instructor. 2 labs.

5170 Phase Transformations in Polymer Systems (3) Analysis of nucleation and growth of phases in polymer systems, spinodal decomposition, application from the melt, precipitation from solution.

5810 Physical Properties of Polymer Structures (3) Molecular weight and composition distributions in copolymers and graft copolymers, phase behaviors, and polymer mixtures as related to glassy and crystalline phases, thermal compatibility of polymeric materials. Prereq: 5110 or consent of instructor. 2 labs.

5910-20-30 Recent Advances in Polymer Science and Engineering (3, 3, 3) Treatment of latest developments in the science and technology of polymers. May include topics of morphology, structure, and chemical approach. Prereq: Consent of instructor.

Civil Engineering

MAJORS

Civil Engineering

5450 Principles of Injection and Blow Molding Operations (3) Theoretical, technological, and chemical approach. Prereq: Consent of instructor.

5910-20-30 Recent Advances in Polymer Science and Engineering (3, 3, 3) Treatment of latest developments in the science and technology of polymers. May include topics of morphology, structure, and chemical approach. Prereq: Consent of instructor.

Emeritus Professors:

W. L. Greco (Head), Ph.D. Michigan State, P.E.;

G. S. Beard, J. D. American University, P.E.

E. G. Burdette, Ph.D. Illinois, P.E.; J. W. Fortey, Doctorate, d'Universite de Toulouse (France);

J. H. Fiddy, Ph.D. Pennsylvania State;

D. W. Goodpasture, Ph.D., Illinois, P.E.;

K. W. Heathington, Ph.D. Northwestern, P.E.;

J. B. Humphreys, Ph.D. Texas A&M, P.E.;

R. A. Minear, Ph.D. Washington; B. A. Tschantz,


Associate Professors:

W. J. Boyce, Jr., Ph.D. Purdue; W. F. Brandsen,

M. S. Illinois, P.E.;

J. S. Chaff tau tte, Ph.D. North Carolina State, P.E.;

J. D. Church, Ph.D. Johns Hopkins; W. T. Davis, Ph.D.

Tennessee; B. J. Frederick, B.C.E Clarkston College of Technology;

J. M. G. D. Mississippi, P.E.

Assistant Professors:

G. A. Briga, Ph.D. Pennsylvania State;

J. L. Hennen, Ph.D. Pennsylvania State;

J. S. Houghland, Ph.D. Virginia Polytechnic Institute;

R. B. Jackson, Ph.D. Tennessee.

G. J. Hyfantis, Ph.D. Vanderbilt;

F. A. Briggs, Ph.D. Pennsylvania State;

G. A. W. F. J. Wegmann, Ph.D. Illinois.

E. J. Hugl, Ph.D. Pennsylvania State;

J. W. Fortey, Ph.D. Tennessee; T. L. Miller,

F. A. Gifford, Ph.D. Pennsylvania State;

J. W. Fortey, Ph.D. Tennessee.

F. J. Wegmann, Ph.D. Illinois.

Lecturers:

J. M. Corum, Ph.D. Illinois, C. Frances, B.S.

H. L. Hennes, Ph.D. Tennessee;

J. S. Houghland, Ph.D. Virginia Polytechnic Institute;

R. B. Jackson, Ph.D. Illinois.

The Department of Civil Engineering offers degrees leading to the Master of Science, Master of Engineering, and Doctor of Philosophy with a major in Civil Engineering, concentrating in structural engineering, materials and transportation engineering; and to the Master of Science and Master of Engineering in Environmental Engineering with concentrations in water quality, water resources, and air quality.

MASTER OF SCIENCE PROGRAM

The Master of Science programs in Civil Engineering and in 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 Engineering offers two options for the Master of Science degree in Civil Engineering.

Option I: A minimum of 45 quarter hours, including at least 9 hours of thesis, is required.

Option II: A minimum of 48 quarter hours, including at least 9 hours of thesis, is required.
including a 3 quarter-hour special problems project, includes environmental evaluation of a design. Prereq: 4650. 1 hr and 2 lab. Su
4710 Portland Cement Concrete Mix Design (3) Properties and tests of portland cement concrete, methods of concrete mix design, nondestructive concrete quality evaluation, properties of concrete admixtures. Prereq: 3710. 2 hrs and 1 lab. F
4720 Asphalt and Bituminous Concrete (3) Properties and tests of asphalts and asphaltic mixes, mix design of bituminous and flexible pavement mixes, use of asphalt in transportation construction projects. Prereq: 3710. 2 hrs and 1 lab. W
4731-32 Earthquake Resistant Structures I, II (4, 4) (Same as Architecture 4731-32) Su
4800 Introduction to Civil Engineering Systems (3) Methods of modeling civil engineering systems and their specific application to problems of transportation, environment, water resources and materials. Prereq: Senior standing or consent of instructor. Sp, Su
4850 Elementary Structural Matrix Methods (4) (Same as Engineering Science and Mechanics 4850 and Architecture 4850) Su
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter in which a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
5110-20 Statically Indeterminate Structures, (3, 3) Deflection of beams, concentrated and distributed loads; analysis by force methods and by slope-deflection in 5110; analysis by moment distribution and other displacement methods in 5120. W, F
5140 Statically Indeterminate Structures (3) Analysis of complex planar and space frames. Prereq: 5110 and 5120. Sp
5150 Matrix Formulation of Structural Problems (3) Review of matrix algebra and vectors; general concepts in structural systems; approximate design methods for structures. Prereq: 4100 and 4825. F
5160 Analysis and Design of Plate Structures (3) Bending and buckling of plates; analysis and design of bridge and building floors and structural plate components. Prereq: 5110. F
5170 Introduction to Structural Dynamics (3) Analysis of free and forced vibrations, and transient response of structural systems; additional stress components. Prereq: 3710. F
5180 Finite Element Structural Analysis (3) Application of finite element method to structural analysis; plane stress, plane strain, axisymmetric, and three-dimensional elements; use of typical computer programs. Prereq: 5150, and Engineering Science and Mechanics 5560. (Same as Engineering Science and Mechanics 5180) Sp, A
5220 Pavement Design (3) Pavement loads; pavement design; design practices; construction and maintenance. Prereq: 3310. Sp
5240 Advanced Properties of Materials: Cement and Concrete (3) Properties and durability of concretes, effects of chemicals, microstructure, volume changes and creep, elastic and thermal properties of concrete, special types of concrete; causes of failure. Prereq: 4120. F
5350 Advanced Properties of Materials: Bituminous Substances and Mixes (3) Serviceability concepts; pavement failures and remedies; bituminous pavement maintenance techniques; other uses of asphalt products. Prereq: 4720. Sp
5270 Planning and Transportation (3) Preparation of transportation and elements of comprehensive development plans. Plans for transportation systems and other uses of transportation and urban areas. Prereq: 5220. Sp
5310 Engineering Practice (3) Valuation and feasibility studies; depreciation and useful life; engineering economics. F
5320-30 Engineering Practice Applied to Administration of Engineering Projects (3, 3) Engineering administration: planning of governmental and industrial projects; cost estimates and methods of financing. W, F

5410 Construction Contract Law and Administration (3) General principles applicable to construction contracts and construction related sales contracts. Emphasis on role of engineer in preparation, award, and administration of construction contracts. Case study method of instruction. Prereq: 4320 or consent of instructor. F; W; Sp

5420 Structural Model Analysis (3) Experimental methods of shear, moment, and stress analysis.

5430-50 Construction Management I, II, III (3, 3, 3) Management and organization of heavy and building construction projects. Prereq: 4430 or consent of instructor. F; W; Sp

5460-70 Construction Estimating I, II (3, 3) Project costs, estimating techniques; market cost conditions analysis, and slope stability analysis. Prereq: 3310 or consent of instructor. F

5550 Soil Mechanics—Plastic Equilibrium (3) Failure theories; earth pressure analysis, bearing capacity analysis, and slope stability analysis. Prereq: 3310 or consent of instructor. F

5560 Soil Mechanics—Elastic Behavior (3) Stress-deformation characteristics, consolidation, settlement analysis. Prereq: 3310 or consent of instructor. W

5750 Soil Mechanics—Seepage (3) Saturated flow through embankments, filter design criteria, seepage force and velocities, subdrains, and embankment failures. Prereq: 3310 or consent of instructor. Sp

5610 Behavior of Steel Structures (3) Behavior of structural steel members due to static and fatigue loading; relation between research results and current specialization for design. Prereq: 3230. W

5730 Prestressed Concrete (3) Properties of prestressing materials and anchorages systems; methods of stressing materials and posttensioning; analysis and design of members and continuous structures. F

5740 Behavior of Reinforced Concrete Members (3) Ultimate strength and behavior of reinforced concrete members; relation between research results and current specifications for design. Prereq: 4120. W

5800 Urban Systems: Engineering and Management I (3) Management of various urban systems usually under city manager and/or city engineer. Organization, planning, and management of personnel; purchasing and equipment management and dealing with engineering consultants as each deals with multiple city departments. Prereq: Graduate standing in Civil or Environmental Engineering or consent of instructor. W

5805 Urban Systems: Engineering and Management II (3) Continuation of 5800. Management and engineering of urban streets, including lighting, cleaning and snow removal, water supply and wastewater drainage, solid waste, air pollution and regulations. Prereq: 5800. Sp, A

5810 Traffic Engineering—Characteristics (3) Driver-vehicle-roadway system; level-of-service concept of capacity. Coreq. Statistics 3450. 2 hrs and 1-2 hr lab. F

5820 Traffic Engineering—Operations (3) Fixed-time and volume-density controllers; progressive systems; one-way operations; reversible flows; system operation, including computerized networks; legal aspects of operational controls. Prereq: 5610. 2 hrs and 1-2 hr lab. W

5840 Geometric Design (3) Advanced theory and practice in the geometric design of highways. Prereq: 4600. Sp

5850 Functional Design of City Streets and Urban Freeways (3) Functional design of highway systems upon which urban growth and development; classification and function of streets; design features, including cross section, intersections, utility considerations, parking, effect of mass transportation; channelization; mar-


4150 Urban Water Management (3) Introduction to urban water modeling; evaluation of optimum urban water policies; formulation of system constraints and analysis of decision making in the management of storm water for beneficial use. Prereq: 3000 and 3330. Sp

4210 Water Resources Engineering Design (3) Elements of water resources systems, including reservoirs, dam and control works, and open channel design. Dam safety control, environmental impact of reservoir projects. Prereq: 3300 or consent of instructor. F

4220 Water Resources Engineering Development (3) Multiobjective evaluation procedures for comparing and selecting among water resources development alternatives; achieving project optimality, single- and multi-purpose projects; special topics in new developments in water resources engineering. Prereq: 3330 or consent of instructor. W

4330 Hydrologic Design (3) Application of frequency and regression analysis to hydrologic design of reservoirs and urban drainage systems; surface runoff and streamflow modeling; urban peak runof design using kinematic wave theory; evaluation of effects of land use changes on streamflow quantity and quality. Prereq. 3330. W

4510 Elements of Water and Wastewater Transportation Systems (3) Introduction to theory and design of water and wastewater treatment systems and wastewater collection systems. Prereq: 3120 and 3330. F, W

4520 Elements of Water and Wastewater Treatment System Designs (3) Introduction to unit operations and processes employed in physical, chemical, and biological treatment of water and wastewater. Application of unit operations and processes in design of water and wastewater treatment plants. Prereq: 3000 and 3120. Sp, Su

4530 Sanitary Engineering Laboratory (3) Physical, chemical, and bacteriological analysis of water and wastewater. Prereq: 4210 or 3 lab.

4600 Solid Waste Management (3) Fundamentals of solid waste management systems; collection methods and equipment; disposal and recycle technologies; economics; planning and management. Prereq: 3000. Sp

4700 Air Pollution-Air Resources Management (3) Introductory course on concepts of air pollution; analysis of relationship between pollutant emissions and their effects on air quality, meteorology and topographic factors, and adverse effects on receptors; engineering approaches for air pollution control. Prereq: 4220 or 4 lab.

4820 Environmental Engineering Law (3) Legal aspects of air and water pollution, drainage, land use controls and environmental impact statements with emphasis upon federal-state relations, recent legislation and court decisions, and enforcement. Prereq: Senior standing. F

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a 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

5150 Water and Urban Welfare (3) Social, environmental, and economic impact on planning and management of urban water systems. Emphasis upon conflict and choice, reconciliation between environmental and development values, measurement of social equity, degree of life style impacts. Analyzing multiobjective policy alternatives with selected case studies. Prereq: Consent of instructor. F

5160 Planning and Utilities (3) Planning for adequate water supply and sewage waste disposal in the urban environment. Impact of utility patterns on urban development and productivity of utility service policies. Not for civil engineering majors. (Same as Planning 5160.)

5232 Sediment Transportation (3) Sediment properties and measurements; bed loads and suspended load movement; erosion, scour, transportation and deposition of sediments by flowing water; silting of reservoirs and related topics. Prereq: 5230. W

5234 Flood Damage Reduction (3) National, regional, local flood problems; hydrologic design criteria; flood damage prevention; flood controls and adjustments; floodproofing, flood insurance, and other flood damage reduction elements; interdisciplinary approach in floodplain management; case studies. Prereq: Consent of instructor. Sp

5261 Basic Principles of Remote Sensing (3) Applications of remote sensing in agriculture, engineering, forestry, meteorology, land use planning, and resource management; properties of electromagnetic radiation including wave theory, physical and geometric optics, and the interaction of EM radiation and matter; current data handling technology. Prereq: Consent of instructor. W

5282 Remote Sensing Data Acquisition (3) Active and passive sensors, their areas of special application and limitation; description of remote sensing platforms, including airborne, spaceborne, and satellite Communication Systems; mission planning. Prereq: 5261 or consent of instructor.

5283 Remote Sensing Data Analysis and Interpretation (3) Mathematical methods of data analysis and interpretation, formatting and display, pattern recognition techniques; use of automated data processing, equipment for data, retrieval, analysis and classification. Prereq: 5261, Mathematics 3150, Statistics 3450.

5301 Stormwater Modeling I (3) Interpretation of hydrologic data systems and analysis of hydrologic components are analyzed as linear and nonlinear systems integrated into mathematical models of watershed response. Selecting optimal parameters with illustrative examples. Prereq: Consent of instructor. W

5302 Stormwater Modeling II (3) Continuous streamflow records interpreted using methods of stochastic hydrologic, including flow frequency and time series analysis. Hydrologic design of water resources systems using streamflow simulation techniques including autoregressive and fractional gaussian noise models. Prereq: Consent of instructor.


5330 Descriptive Hydrology (3) Occurrence and description of riverine landscape, effects on earth and relations to humans. Not for civil engineering majors.

5400 Introduction to Environmental Systems (3) Moisture, air quality, solid waste disposal, and location of central facilities; exposure to current literature on environmental management problems; optimization of these systems. Prereq: Graduate standing. Civil Engineering 4800 or consent of instructor. Sp

5501 Water and Wastewater Treatment Theory I (3) Theory of physical, chemical, and biological processes employed in sanitary engineering. Prereq: 4520. F

5502 Water and Wastewater Treatment Theory II (3) Theory of physical, chemical, and biological processes employed in sanitary engineering. Prereq: 4520. W


5530 Environmental Engineering and Natural Systems Behavior (3) Seminar in selected issues of environmental engineering research relating to natural system behavior. Eutrophication, trace metals and trace organics. Prereq: Graduate standing or consent of instructor.

5551 Water Quality Management (3) Water quality control objectives, methods, and philosophies; water quality criteria; effect of various uses on water quality; recycling and energy recovery, and waste assimilation capacity; regulatory standards; economic considerations. Prereq: 4520. W

5562 Microbiology for Sanitary Engineers (3) Microorganisms and microbiological processes significant in sanitary engineering, including basic microbiology, detection and identification, enzymes, metabolic reactions, energy transfer, synthesis and growth; aerobic and anaerobic biological treatment processes. Prereq: Graduate standing. Sp

5593 Advanced Environmental Engineering Laboratory (3) Application of modern and typical methods, principally instrumental, to analysis of environmental pollutants. Prereq: 4520. 2 hrs and 1 lab.


5630 Design of Solid and Hazardous Waste Disposal Systems (3) Unit operations and processes for solid and hazardous waste disposal: soil attenuation, incineration and heat recovery, biological processes, fixation and encapsulation, and resource recovery. Prereq: 4600, 5593, 5503. 1 lab.

5700 Planning and Air Pollution Control (3) Relationship between air pollution, area development, and urban growth. Social, economic, and political processes involved in air pollution control. Fall

5710 Air Pollution Control Engineering (3) Emission control systems for industrial and power generating processes, stack sampling methods, air monitoring, dispersion of pollutants. Prereq: Graduate standing. F

5715 Ambient Air Monitoring (3) Physical and chemical techniques for ambient air monitoring. Survey network design. Quality control of air monitoring data. Use of air monitoring data in air quality management programs. Prereq: Consent of instructor.

5720 Air Pollution Particle Collection Theory (3) Mechanics of particles suspended in gaseous medium including particle motion, coagulation, and aerodynamic capture of particles. Prereq: Engineer- ing Science and Mechanics 3110. W

5725 Air Quality Modeling and Impact Assessment (3) Techniques to assess the air quality impact of major transportation projects and industrial air pollution sources. Application of atmospheric dispersion models and evaluation of meteorological and air quality data. Prereq: Graduate standing. Computer Science 3150. Sp

5730 Air Pollution Control Device Design (3) Design and evaluation of systems used to control emission of gaseous and particulate air pollutants. Comprehensive design of specific devices and systems. Prereq: 5720. Sp

5735 Industrial Source Sampling (3) Sampling methods for collection and analysis of air pollutant emissions from industrial processes. Prereq: Graduate standing. 2 hrs and 1 lab. Su

5745 Ambient Air Chemistry (3) Reaction mechanisms for primary and secondary air pollutants from anthropogenic primary pollutants and naturally occurring precursors. Prereq: Consent of instructor.

5760 Diffusion in the Atmosphere (3) Movement and dilution of natural or man-made material released into the atmosphere. Basic theory. Rise of buoyant plumes, relation between Eulerian and Lagrangian spectra, differences between instantaneous and continuous sources, diffusion in a zone of wind shear and diffusion from urban area sources. Prereq: 5725.

5900 Special Problems in Environmental Engineering (1-9) To fulfill the special problem requirement in the non-thesis program. Enrollment limited to environmental engineering students in the non-thesis program. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NCO only. E

5910-20-30 Special Topics (1-6, 1-6, 1-6) Problems and projects on current developments in field of environmental engineering not included in other courses. May be repeated. E

5990 Environmental Engineering Seminar (1) All courses. May be repeated. E

6110-20 Advanced Topics in Fluid Mechanics and Convective Transport (3) Sainti and engineering Science and Mechanics 6110-20.


6510 Industrial Unit Operations and Processes (3) Laboratory-scale and pilot plant development of physical, chemical and biological variables for treatment of industrial wastes and residuals, utilization of vari- able design. Prereq: 5501, 5502, 5503. 1 lab. 1 hr. 4 labs.

6520 Industrial Waste Management (3) Sources and characteristics of industrial wastes, recycling, wet waste isolation, incineration, resource recover- ry, and treatment options, ultimate disposal of residuals including thermal processes, and applica- tion of recovery, and design oriented. Field trips. Prereq: 5501, 5502, 5503.

6820 Advanced Theory and Applications in Water Resource Systems Engineering I (3) Advanced theory on cumulative and conductive heat transfer, turbulent heat diffusion and mass transport mechanisms in open channels, applications in evaporation, thermal transport difficulties, and stratified flow phenomena. Prereq: 5610 or equivalent.

9910-20-30 Special Topics in Environmental Engineering (1, 1, 1) Selected advanced problems of current interest in environmental engineering. Prereq: Consent of instructor. E

NOTE: Prerequisite to all graduate courses: Consent of instructor.

Electrical Engineering

MAJOR

DEGREES

Electrical Engineering: M.S., M.E., Ph.D.


Associate Professors: D. W. Bouldin, Ph.D. Vanderbilt; T. W. Reddoch, Ph.D. Louisiana State;

*Space Institute, Tsukuba.

*Institute of Service Discipline Professor.
A minimum of one-third of the program must be in engineering design, and one-third in one of, or a combination of, advanced math, computer sciences, basic sciences, or engineering sciences.

**DOCTORAL PROGRAM**

The Ph.D. degree with a major in Electrical Engineering may be pursued in the areas of circuit theory, computers, electro-optics, communication theory, electromagnetic theory, plasma engineering, power systems, solid-state electronics, and control systems.

Specific departmental requirements for the Ph.D. degree include the following:

1. A Master of Science or Master of Engineering degree.
2. A minimum of 27 quarter hours of course work beyond the B.S. degree excluding thesis, research, and dissertation credit.
3. A minimum of 36 quarter hours credit in doctoral dissertation.
4. A final oral examination covering the thesis and related course work.

**MASTER OF ENGINEERING PROGRAM**

A graduate program leading to the Master of Engineering degree is available to qualified graduates of A.B.E.T.-accredited undergraduate curricula in electrical engineering or its equivalent.

Specific degree requirements which must be met include:

1. Electrical Engineering 5070-80 and 5710.
2. Nine quarter hours of graduate credit in mathematics consisting of Mathematics 4710, 4550, and 4250, or 4510-20-30. Other 4000-5000 level mathematics courses approved by the student's Master's committee must be substituted for any of the above course material covered in undergraduate work.
3. An additional 18 quarter hours of 5000-level work in electrical engineering or 9 quarter hours of 5000-level work in one area of electrical engineering and 9 quarter hours of 5000-level work in another area approved by the student's Master's committee.
4. A minimum of 30 quarter hours of course work in Electrical Engineering to be divided equally between two different electrical engineering areas.
5. A thesis, totaling 9 quarter hours or more.
6. A final oral examination covering the thesis and related course work.

specific departmental requirements include:

1. Electrical Engineering 5070-80 and 5710.
2. Nine quarter hours of graduate credit in mathematics consisting of Mathematics 4710, 4550, and 4250, or 4510-20-30. Other approved 4000-5000 level mathematics courses must be submitted for any of the above course material covered in undergraduate work.
3. An additional 18 quarter hours of 5000-level work in electrical engineering or 9 quarter hours of 5000-level work in one area of electrical engineering and 9 quarter hours of 5000-level work in another area approved by the student's Master's committee.
4. The 18 quarter hours of 5000-level work in electrical engineering must be divided equally between two different electrical engineering areas.
5. The courses required in electrical engineering undergraduate curriculum cannot be used in either the M.S. or Ph.D. programs. In addition, 4000-level courses in electrical engineering may not be used if 5000-level courses are available in upper-level engineering graduate programs.

Many of the electrical engineering courses are offered in the evening. Engineers working in industry are encouraged to participate in the degree candidate program.

Intermediate circuit programs providing special opportunities for academic and research work in areas pertinent to atmospheric and space flight are also available at the Space Institute, Tullahoma.

3010 Transient Analysis (3) Analysis of transient response of networks and systems; Laplace transforms and method and classical differential equation methods for system analysis; complex frequency concept and pole-zero concepts; applications to engineering problems. 3, 4


3050 Basic Field Theory (3) Forces between charges, electric and magnetic fields, Gauss's law and divergence theorem, magnetic field, static, and wave equations. Prereq: Mathematics 2850. 3 hrs including lab. 4

3060 Propagation I (3) Plane waves, reflection, guided waves, transmission lines, standing waves, impedance, impedance matching, graphical methods, rectangular wave guides. Prereq: 3050. 3 hrs including lab. 4

3080 Energy Conversion (3) Magnetic circuits, transformer theory and operation, principles of electromechanical energy conversion with emphasis on input-output characteristics: steady-state analysis of induction motors and d.c. machinery. Prereq: 3060. 3 hrs including lab. 4

3090 Energy System Operation (3) Synchronous machines, transmission-lines, and transformers as power system elements; power system representations, per unit concepts, material bodies, polarization, magnetic circuits, Maxwell's equations, dynamic potentials. Prereq: Mathematics 2860. 3

3100 Random Signals and Noise in Engineering (3) Theory of random signals and spectral density of noise as applied to engineering problems. Random signal response of linear networks. Transformation of random signals by nonlinear networks. Prereq: 3010 and 3040. 3 hrs including lab. 4

3110 Basic Electrical Engineering—Circuits and Fields (3) For non-electrical engineering majors. Prereq: Mathematics 2850, Physics 2310-30. 3 hrs including lab. 4

3120 Basic Electrical Engineering—Electronics (3) For non-electrical engineering majors. Prereq: 3110. 3 hrs including lab. 4

3130 Basic Electrical Engineering—Machinery (3) For non-electrical engineering majors. Prereq: 3110. 3 hrs including lab. 4

3180 Logic Design of Digital Systems (3) Introduction to boolean algebra and design of combinational circuits. Presents various methods of proofs and construction. Design of clocked sequential circuits and other systems containing memory. Introduction to minicomputer architecture and instruction set manipulation. Course includes basic structure and function of arithmetic storage, input-output, and control systems. Instruction set capabilities and machine language programing. Prereq: 3010, Computer Science 3150. 3 hrs including lab. 4

3190 Plasma I (3) Engineering applications of physical electronics, plasma effects and devices. Topics include electrostatic precipitators and plasma light sources, laser operation and applications (electro-optics), and MHD, controlled thermonuclear and other techniques of advanced power production. Prereq: Physics 2310-20-30. 3 hrs including lab. 4

3270 Linear Systems Analysis (3) Steady-state and transient response: log-frequency, gain-phase, and polar plots; block diagram transformation; signal flow graphs; analog circuits, properties of second-order systems; introduction to feedback theory; stability criteria. Prereq: 3010 and Mathematics 3150. Coreq: 3180. 3 hrs including lab. 4

3810 Basic Electronics I (3) Bond theory fundamentals; theory and applications of p-n junctions; simple power supplies; theory of operation of field-effect transistors and simple circuits. Coreq: 2030. 3 hrs including project laboratory. 4

3820 Basic Electronics II (3) Operation of bipolar transistors and vacuum tubes with applications in basic amplifiers. Integrated circuit funda-
Wave propagation in free space, earth's troposphere and ionosphere. Wave reflections from earth. Prereq: 3060.

4570 Electro-Acoustics (3) Reproduction of monophonous and stereophonic sound, microphone and speakers, disc recording, magnetic recording, film recording, acoustics of studies, auditorium.

4600 Analog Signal Processing Circuits for Electronic Circuits (3) Consideration of practical aspects of pulse-modulation, clock-mode, and level-mode sequential circuits. Theory and characteristics of one- and two-dimensional systems. Theories of large-scale digital systems using MSI and LSI technologies. Introduces principles of reliability and error detection techniques. Prereq: 3180. 3 hrs including biweekly lab.

4630 Digital System Organization and Design (3) Considers system organization of digital systems including computer hardware, architectures and comparisons. Characteristics of ALU and CPU structures, storage systems (RAM, ROM, and on-chip memory blocks), and input-output systems are developed. Control unit organization to include parallel-processing modes of operation, synchronous as well as asynchronous, and microprogramming of control functions. Prereq: 3180. 3 hrs including biweekly lab.

4660 Bioelectric Instrumentation (3) Nature and operation of biomedical transducers, amplifier requirements, recording systems and noise problems.

4700 Digital Integrated Electronics (3) Receiver and transmitter circuits for communications. Prereq: 3040. 3.3 hrs including project laboratory.

4740 Integrated Circuits (3) Processing and fabrication of active and passive components for monolithic and hybrid circuits. Design techniques for linear and digital circuits. Prereq: 3830. 3 hrs including project laboratory.

4780 Synchronous Machines (3) Development of small machine systems. Applications in industrial process control and in power generation systems. Theories of synchronous machines. Prereq: 3830. 3 hrs including biweekly lab.

4800 Bioengineering Systems III Instrumentation (3) Instrumentation and control systems for physiological signals. Systems proper- ties of resistance, impedance, and storage are inves- tigated. Analog and digital simulation of biological systems. Prereq: 4370 or consent of instructor.
maximize yield of meaningful information about original biological system. Prereq: 4660 or consent of instructor.

5210-20 Advanced Electrical Machinery (3, 3) Fundamental principles of electric machines. Information structures and sub-systems. For computer science majors and those without prior experience in logic design. Prereq: Elementary linear algebra and calculus of several variables. 4 labs per quarter.


5240 Control Systems Design I, II, III (3, 3, 3) Analysis and design of control systems using classical and modern techniques. Prereq: 4202 or Mechanical Engineering 4150 or equivalent, or consent of instructor.

5245 Advanced Direct Electrical Energy Conversion I (3) Theory, latest devices, and applications for production of electrical energy by gaseous means of thermionic, magnetohydrodynamic, and electrolytic energy systems. Prereq: 4020 or Mechanical Engineering 4150 or equivalent, or consent of instructor.

5246 Advanced Direct Electrical Energy Conversion II (3) Theory, latest devices, and applications for production of electrical energy by gaseous means of thermionic, magnetohydrodynamic, and electrolytic-energy systems. Prereq: 4020 or Mechanical Engineering 4150 or equivalent, or consent of instructor.

5281 Modern Systems Theory I (3) Introduction to control systems theory. State-space model, linear dynamical system, state transition map, matrix exponential, controllability, observability, realization theory, pole placement, observers, stability theory for linear systems. Prereq: Consent of instructor.


5291 Modern Systems Theory III (3) Optimal control theory. Deterministic optimal control theory, minimum principle, Hamilton-Jacobi-Bellman equations of stochastic dynamic programming, stochastic control theory, stochastic dynamic programming, dual control problem and separation principle, linear quadratic gaussian control problem, relationships between uncertainty and stability, Prereq: 5271 or equivalent.

5310 Basic Requirements for Plasma Fusion (3) Historical study of fusion systems in nature. Lawson break-even criterion. Inertial fusion systems—hydrogen bomb, laser fusion, and electron-beam fusion. Magnetically-confined plasma systems, tokamak, mirror system, and exotic systems. Confinement, stability, and heating. Possibility of fusion-fission hybrids. Prereq: Consent of instructor or plasma engineering or plasma physics background or employment in fusion field.


5330 Engineering of Fusion (3) Materials in a thermonuclear environment. Magnetic field production. Diverter design. Blankets and breeding of tritium. Radiological safety. Cost of controlled fusion power. Prereq: Consent of instructor or plasma engineering or plasma physics background or employment in fusion field.

5340 Introduction to Quantum Electronics (3) Interaction of poly- and monochromatic radiation with atoms and molecules. Comparison of classical and quantized oscillator models for emission and absorption of electromagnetic radiation, oscillator spectral line, shape for amplification by stimulated emission of radiation and schematics of laser design and construction. Coreq: Mathematics 4710 or equivalent.


5370 Advanced Direct Electrical Energy Conversion I (3) Theory, latest devices, and applications for production of electrical energy by gaseous means of thermionic, magnetohydrodynamic, and electrolytic-energy systems. Prereq: 4020 or Mechanical Engineering 4150 or equivalent, or consent of instructor.

5380 Advanced Direct Electrical Energy Conversion II (3) Theory, latest devices, and applications for production of electrical energy by gaseous means of thermionic, magnetohydrodynamic, and electrolytic-energy systems. Prereq: 4020 or Mechanical Engineering 4150 or equivalent, or consent of instructor.

5390 Advanced Direct Electrical Energy Conversion III (3) Prereq: 5370 and 5380, or equivalent.

5410 Power System Networks (3) Sequence impedances for transmission lines, machines, and transformers. Formulation of system network characterization such as Z, Y, and other such matrices. Prereq: Graduate standing or consent of instructor.

5420 Fault and Load Flow Studies (3) Analysis of power systems for steady-state and transient load flow problem is formulated with computer methods. Computer methods for fault studies. Load flow problem is formulated with computer methods. Prereq: Graduate standing or consent of instructor.


5440 Distribution System (3) Electric power distribution with particular reference to utility systems. System growth and planning, interconnected system operation, and control. Prereq: 4410, 4420, 4430 or equivalent.

5460 Selected Topics in Power Systems (3) To meet special needs of students. Possible topics: power system reliability, interconnected system theory, power plant operation, electrical transients in power systems, and power system relaying. Prereq: Consent of instructor. May be repeated with consent of department.

5510-20-30 Advanced Analog Electronics (3, 3, 3) Physical operation of modern electronic devices with emphasis on semiconductor devices and devices. Diode, bipolar transistors, J-FETs, and MOSFETs. Small-signal equivalent circuits and noise models of active devices—monolithic operational amplifiers, discrete and integrated operational amplifiers, and other such devices. Suppression of noise, system stability, noise and distortion. Prereq: 5340 and Mathematics 4710 or equivalent.

5540-60 Electronic Communication Systems (3, 3) Deterministic optimal control theory, minimum principle, Hamilton-Jacobi-Bellman equations of stochastic dynamic programming, stochastic control theory, stochastic dynamic programming, dual control problem and separation principle, linear quadratic gaussian control problem, relationships between uncertainty and stability, Prereq: 5271 or equivalent.

5570 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.

5580 Pattern Recognition (3) (Same as Computer Science 5210)

5680 Artificial Intelligence (3) (Same as Computer Science 5210)

5710 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.


5740 Digital Processing of Signals (3) Analysis of discrete signals; sampling theorem and its implications; frequency domain design of digital filters; time domain design of digital filters; quantization and efficient digital processing of digital signals; discrete Fourier transform. Prereq: 4100 or equivalent.


5770 System Identification (3) Various identification schemes: deterministic, stochastic, and hierarchical methods. Applications in all areas of engineering and science. Prereq: Consent of instructor.

5800 Power Transmission Lines (3) New and unconventional power transmission systems. Transmission line parameters for overhead and underground transmission. Prereq: 4100-20-30 or equivalent.

5810-20 Electromagnetic Fields (3, 3) Vector analysis, Maxwell's equations, special relativity, plane waves, reflections, waves in anisotropic media, guided waves, rectangular and cylindrical wave guides, radiation from current elements. Coreq: Mathematics 4510 or 4710.

5830 Linear Antennas and Antenna Arrays (3) Linear and planar antennas, receiving antennas, receiving antennas, linear arrays. Prereq: 5620.


5850 Microwave Electronics (3) Space charge waves in an electron beam, corrugated and guided waves, Klystrons, magnetrons, traveling

6760 Coding Theory (3) Mathematical structure of algebraic and probabilistic codes. Coding metrics and bounds. Convolutional codes and decoding methods. Prereq: 5710 or consent of instructor.


Engineering Science and Mechanics

MAJOR DEGREES

Engineering Science M.S., Ph.D.

Professors:

Associate Professors:
R. J. Jendrucko, Ph.D. Virginia; P. E.; K. H. Kim, Ph.D. North Carolina State; A. Mathews, Ph.D. Illinois; P. E.; T. F. Moriarty, Ph.D. Illinois; P. E.; W. Scott, Ph.D. Johns Hopkins; J. Wasserman, Ph.D. University of Cincinnati, P. E.

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 options include solid mechanics, fluid mechanics and biomedical engineering. In the biomedical and engineering science option, interdisciplinary programs are arranged to meet individual needs or interests. Each applicant will be 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.

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 options are intended to be of particular interest to prospective students currently employed in research, development, or design activities and whose interests in continuing education (either full-time or part-time) lie at one of the interfaces between science and engineering, or can best be met by interdisciplinary study in engineering. The department's course offerings and research activities are also intended to meet the needs of students who seek preparation for employment in engineering areas requiring specialization in mechanics, or in related interdisciplinary studies such as biomechanics.

THE MASTER’S PROGRAM

Two M.S. plans are offered: Plan I requires a thesis, while Plan II does not. The second plan is offered to meet the needs of engineers employed in industry, or those who plan to teach in community colleges and technical institutes. It will be available, however, to any student who, in the opinion of her or his advisory committee, can benefit from additional course work more than from work on a thesis.

In Plan I a minimum of 45 quarter hours, including the thesis, is required. In Plan II a minimum of 48 hours is required. The requirements include the following:

Plan I Plan II

Mathematics

Engineering courses 18 28

(Major option, may include but is not restricted to courses offered by the Engineering Science and Mechanics Department.)

Related courses (May include additional courses in mathematics, computer science, or the physical and life sciences as well as engineering courses.)

Thesis A final examination is required under both plans, covering graduate course work and the thesis (if the DOCTORAL PROGRAM).

The DOCTORAL PROGRAM

General policies and requirements of the Graduate School relating to admission, residence, languages, research, examinations, faculty advisory committee, and admission to candidacy apply to this program.

Specific departmental requirements for the Ph.D. degree include:

1. A minimum of 108 quarter hours credit beyond the Bachelor's degree, exclusive of credit for the Master's thesis. These shall include a minimum of 36 quarter hours credit in Doctoral Research and Dissertation and a minimum of 72 quarter hours credit in other courses.

2. A minimum of 36 quarter hours in engineering graduate courses, exclusive of thesis and dissertation credit. These courses *Engineering courses under Plan II may include advanced laboratory work or special problem work, for example Engineering Science and Mechanics 5910 or analogous courses in other departments.
will normally be numbered 5000 and above, with at least 12 quarter hours of 6000-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 18 quarter hours in mathematics or computer science in courses numbered 4000 and above, exclusive of a first course in ordinary differential equations.

4. A minimum of 9 quarter hours of courses numbered 5000 and above, offered in departments other than mathematics, computer science, and the student's major department and which are not included in the areas of concentration under item 2.

5. Active participation in graduate seminars and colloquia.

6. Stress and displacement analysis of axially-loaded members; torsion; bending. Not for departmental graduate credit. Prereq: Basic Engineering 1310. Coreq: Mathematics 2640 or consent of instructor.

3410 Introduction to Biomedical Engineering (4) Designed to introduce the facets and opportunities of biomedical engineering, and to provide basic terminology, principles, and knowledge for all courses in the field. Subjects include anatomy, physiology, biometrics, mathematical models of body systems. Coreq: Mathematics 2640 or consent of instructor.

3420 Introduction to Clinical Engineering (3) Designed to train students in life sciences, health professions, and engineering in use and applications of medical instruments. Body systems are introduced, and instruments used in care of those systems are explained and demonstrated. Prereq: 3410 or consent of instructor.

3520 Materials Behavior and Chemical Process Design (3) Same as Metallurgical Engineering 3520.

3700 Dynamics (4) Kinematics of rigid bodies; mass moments of inertia; coulomb friction; kinetics of rigid bodies using force, mass, acceleration; work-energy; impulse-momentum. Not for departmental graduate credit. Prereq: 2705 or Basic Engineering 1320, Mathematics 2840.

3710 Intermediate Dynamics (3) Three-dimensional dynamics of rigid bodies; dynamics of bodies with varying mass; central force motion; LaGrange's equations. Prereq: 3700, Mathematics 2840.

4420 Engineering Aspects of Infection Control (3) Biomedical engineer's role in infection control will be related to hospital and clinical activities. Fluid flow phenomenon, pressure measurement

4430 Orthopedic Biomechanics (3) Introduction to engineering concepts and fundamental concepts in orthopedics and rehabilitation. Topics include statics, Newton's laws of motion, stresses in simple sections, statics of particles, and biomaterials. Prereq: Consent of instructor.

5000 Thesis (1-15) E

5110-20 Fluid Dynamics (3, 3) Kinematics of fluids, vorticity, rate deformation, plane and axially symmetric flow. Stream function; exact solutions, creeping flow and boundary-layer approximations; nonviscous flow, potential theory, complex potentials, conformation mapping. Prereq: 5110 and 5800.

5220 Mechanics of Viscous Flow (3) Viscous forces in flow phenomena; application of Navier-Stokes equations; numerical methods of solutions; stress-optic methods of laminar analysis. Prereq: Mathematics 4610. (Same as Chemical Engineering 5610.)


5410-20 Theory of Elasticity (3, 3) Stress, strain in three dimensions; torsion and bending of prismatical bars; axiymmetric stress distribution; stress concentration; plane stress, plane strain. Prereq: 5800.

5420 Mechanical Stress (3) Heat conduction; thermoelectric equations; thermal stresses in beams, rings, plates, and shells; thermal buckling problems. Prereqs: 5410 or 5310-20-30, and Mechanical Engineering 3440.

5440 Theory of Linear Viscoelasticity (3) Linear viscoelasticity of solids; quasistatic problems; vibration problems; stability problems; foundations of three-dimensional linear viscoelasticity. Prereq: 5800.


5710-20 Advanced Dynamics (3, 3) Physical laws relative to translating and rotating reference frames; rigid body dynamics; conservation of energy; free-free systems; Lagrange's equations; Hamilton's principle. Prereq: 3710 or 4710, Mathematics 4610.

5730 Advanced Vibrations (3) Vibration of multiple degrees of freedom, free-free systems; characteristic roots and frequencies. Prereq: 4710 and 4850.

5740 Vibrations of Continuous Media (3) Equations of motion for strings, beams, plates, and shells: internal and external forcing functions; response of damped and undamped components to
applied dynamic loads; approximate methods of solution. Prereq: 5410 and Mathematics 4550.

5750 Orbital Mechanics (3) Planetary, satellite, and astronomical orbits and trajectories; orbital perturbations; introduction to principles of minimization. Prereq: 3710 and 4710.

5800 Introduction to Continuum Mechanics (3) Fundamentals of mechanics of solids and fluids; Cauchy stress tensor, stress determination, flow in a continuous medium; constitutive equations; applications to solids and fluids. Prereq: 3130 and 3311 or equivalent.


5860 Introductory Finite Element Methods (3) General finite element procedure; convergence requirements; programming concepts. Stress analysis, heat transfer, fluid flow, and solution of differential equations. Prereq: 5800 or 5310, or Mechanical Engineering 4540.

5910 Special Topics in Engineering Mechanics (3) Mechanics problems related to recent developments. Prereq: Consent of instructor. May be repeated with consent of department.

6000 Doctoral Research and Dissertation (3-15) E

6110-20 Advanced Topics in Fluid Mechanics and Convective Transfer (3, 3, 3) Survey of literature on advanced convective momentum, heat, and mass transfer, with emphasis on boundary layer flow and Navier-Stokes equations; boundary layer stability analysis; phenomenological theories of turbulence; turbulence production and the fast mixing speed of turbulence and phenomena in nonreacting and reacting systems. Prereq: 5110-20 or equivalent; Mathematics 4610.


6230-40-50 Theory of Turbulence (3, 3, 3) Mathematical description of turbulence; isotropic turbulence; two-dimensional turbulence; compressible fluids; large and small eddy structure by turbulent flows; turbulent diffusion by continuous movement; applications to turbulent jets, wakes, pipe flow, and boundary layers. Prereq: 5110-20 or equivalent. Coreq: Mathematics 4610-20.

6310 Theory of Plates (3) Classical theory of bending of thin and thick plates; theory of variable thickness; buckling and large deflection problems. Prereq: 5310-20.

6320 Analysis and Design of Thin Shell Structures (3) Geometry of surfaces, derivation of thin shell theory, and applications of theory for structural engineer. Prereq: 6310 or Civil Engineering 5160.


6340 Theory of Plasticity (3) Yield conditions; strain hardening; general constitutive equations; plastic potential; uniqueness theorems; extremum and variational principles; problems in perfectly plastic solids; finite plastic deformations; piecewise linear plasticity. Prereq: 5410 and Mathematics 4550.

6610 Photoelasticity (3) Stress-optic law in three dimensions and index ellipsoid, rotational effects in three-dimensional photoelasticity, techniques and applications of three-dimensional photoelasticity, scattered light method, dynamic photoelasticity, photothermoelasticity, photoplasticity and photo- ristochromic measurements in photoelasticity. Prereq: 5460, 5420 and consent of instructor. 2 hrs and 3 labs.

6710 Impact and Stress Waves in Solids (3) Mechanical response to shock propagation in elastic solids; impact and wave energy dissipation in solids, and plate contact problems in impact of elastic bodies; dynamic loading in viscoelastic and plastic materials; dynamic properties of materials. Prereq: 5410, Coreq: Mathematics 5630.

6800 Nonlinear Viscoelasticity (3) Same as Polymer Engineering 6810.

6810 Energy Methods (3) Virtual work, minimum potential energy, and complementary energy; Casigliano's theorem, Hamilton's principle, and Lagrange's equations of motion; variational methods; examples from theory of structures, plates and shells, buckling, vibrations, and advanced dynamics. Prereq: 5710-20 and Mathematics 5610-20.

6910 Special Topics in Engineering Mechanics (3) Advancement of problems of interest in mechanics, worked either as group or individually. Prereq: Consent of instructor. May be repeated with consent of department.

NOTE: Not all of the above courses will be offered in any one year.

**Industrial Engineering**

**DEGREES**

**MAJOR**

**Industrial Engineering**


Associate Professors: E. K. Boyce, M.S. Tennessee, W. W. Claycombe, Ph.D. Virginia Polytechnic Institute, P.E.; E. L. DePorter, Ph.D. Virginia Polytechnic Institute, D. H. Hutchinson, Ph.D., Georgia Institute of Technology, W. A. Lyday, M.S. Tennessee.


**THE MASTER'S PROGRAM**

A graduate program leading to the degree of Master of Science is open to graduates of recognized undergraduate curricula in industrial engineering or to graduates of other engineering curricula who take up to 15 quarter hours of prerequisite course work. A non-thesis option with 45 hours of course work plus 6 hours of thesis work is available. Graduate work in Industrial Engineering provides for concentrations in operations research, industrial administration, manufacturing and production systems, human factors engineering, and systems engineering. Either one or two minors can be elected in Engineering, Mathematics, Psychology, Business, Computer Science, Statistics or Economics.

**MASTER OF ENGINEERING PROGRAM**

This professional degree program is intended as a culminating year in a five-year baccalaureate-master program which emphasizes engineering design and professional practice. Admission requirements include those presented above plus the requirement of a Bachelor's degree from an A.B.T.-accredited engineering program. This 45-quarter hour program requires 18 hours of course work in an industrial engineering core, 9 hours of technical methods electives, 9 hours of industrial engineering design electives and 9-hour thesis or design project. Any 4000-level course required in the Bachelor of Science degree. An Engineering program at The University of Tennessee may not be used for graduate credit in the M.S. or M.E. graduate program in Industrial Engineering.

**4040 Manufacturing Materials and Processes (3)** Course not to be repeated with 5440 or 5460 because of similar content and techniques common to industrial manufacturing processes. Prereq: Engineering Science and Mechanics 3310, Metallurgical Engineering 2110.

**4060 Material Requirements System Design (3)** Theory and application of forecasting, production planning, inventory analysis, planning and control, and systems design and implementation. Design of the material requirements process as an integrated system. Prereq: 3510-20. Not available for graduate credit for industrial engineering students.

**4070 Production Systems Design (3)** Production planning, scheduling, and control, design and implementation of production systems; design of production facilities as integrated system. Prereq: 4060.

**4080 Forecasting Methods in Industrial Engineering (3)** Application of technological forecasting techniques to industrial engineering problems, includes moving averages and exponential smoothing, system optimization, regression models, autoregressive time-series analysis, Delphi methods and other selected industrial forecasting methods. Prereq: 4060.

**4150 Project Control with CPM and PERT (3)** Study of project planning and control based primarily on critical path techniques, including resource allocation, cost-time trade-offs, network planning, multi-project control, and computer programs. Prereq: 3430.

**4160 Materials Handling (3)** Analysis and planning for the overall problem of moving, packaging, and storing of materials; equipment comparison and selection; cost analysis. Prereq: 4520 and Engineering Science and Mechanics 3310. Not available for graduate credit for industrial engineering students.

**4170 Automatic Process Control (3)** Characteristics of automatic processes and controllers; elementary control and computer programs. Prereq: 4520. Not available for graduate credit for industrial engineering students.

**4200 Production Facilities Design (4)** Materials handling, plant layout, service areas, inventory control applications, and operating procedures design. Prereq: 3630, 3510-20, 4060, 4520.

**4230 Scheduling Systems (3)** Performance measures for job shop and flow shop scheduling, including both static and dynamic conditions, as well as techniques for generating production schedules. Deterministic and probabilistic dispatching conditions. Prereq: 3520.

**4250 Work Measurement Applications (3)** Application of learning curves, queuing theory, standard data methods and incentive systems to the design of industrial work situations.

**4260 Engineering Economy (3)** Methods and problems related to determination of economic decisions among engineering alternatives, including capital recovery, economic life of equipment, and rate of return on investment. Not available for graduate credit for industrial engineering students.

**4350 Cost Analysis (3)** Application of technological forecasting techniques to industrial engineering problems, includes moving averages and exponential smoothing, system optimization, regression models, autoregressive time-series analysis, Delphi methods and other selected industrial forecasting methods. Prereq: 3430, and Computer Science 3150.
4600 Predetermined Time Systems (3) Work design and measurement using predetermined time systems: methods, time measurement, basic motion time-study, or work factor. Theory and application. Prereq: 3670.

4610 Human Factors in Work Design II (3) Human capabilities and limitations affecting work place layouts, working environments, design of tools and equipment, and planning of work for human-systems. Prereq: 3600, 3630, or consent of instructor.

4830 Health Systems Engineering (3) Hospital management systems and means by which they may be improved through application of modern industrial engineering principles and techniques.


4870 Mini-Computer Applications in Industrial Engineering (3) Introduction to computer hardware and human-computer interfaces; emphasis on small computers as element of larger system; applications and limitations of small computers in solving industrial engineering problems. Prereq: Senior standing.

4910-290 Special Industrial Engineering Topics (1-5) Prereq: Consent of instructor. May be repeated. 3/NC only. E 5110 Work Design (3) Advanced methods analysis of design and input of work systems. Human factors, workers' response and management participation. Prereq: Motion and time study or work methods and design.


5240 Facilities Planning and Design (3) Modern material handling techniques, computer-aided layout techniques, applications of operations research methods and their application to design manufacturing faciltiy. Prereq: Production facilities planning or consent of instructor.


5260 Information Systems Design (3) Systems engineering approach to information systems design. System model, analysis, and evaluation of information systems, information objective and design criteria. Optimization and simulation in system design.

5280 Production and Inventory Systems (3) Applications of operations research to production and inventory systems. Closed form solutions, search techniques, and use of available computer codes. Prereq: 5700, Core 5710.


5420 Reliability Engineering (3) Reliability concepts, failure distribution, equipment reliabilities, time dependent systems, and operations research problems. Maintenance data analysis and replacement problems. Prereq: Statistics 3450.


5600 Human Factors Engineering (3) Human characteristics which influence design of tools, equipment, environments, and products. Modeling of human as process or system controller. Prereq: Consent of instructor.

5610 Human Factors Engineering III (3) Human operator, performance characteristics, and environmental requirements. Formal description of human capable processes through quasilinear models and models describing operator as information processor. Prereq: 5600.


5701 Operations Research Applications (3) Survey of operations research techniques with emphasis on application to industrial engineering problems. Prereq: Mathematics 2860 (or equivalent), Statistics 3450, computer programming. Available for credit only to students without a B.S. degree in industrial engineering.

5710 Linear, Quadratic and Separable Programming (3) Mathematical programming, linear programming, quadratic programming, and separable programming. Computer solutions to programming problems. Prereq: Computer Science 3150 and matrix algebra.

5720 Queuing Models and Simulation (3) Theory of and application of queuing models and simulation methods employed to evaluate complex queueing systems. Data analysis and hypothesis testing related to pertinent queuing probability density functions. Prereq: 5700, 5730.

5730 Game Theory and Random Processes (3) Operations research including game theory with applications and random processes. Modes analysis with root locus and Bode plots. Simulation and random processes to applications to queuing, inventory models and decision making. Prereq: 5700.


5830 Health Systems Engineering II (3) Health systems for analysis, control, and improvement of function and total health system. Prereq: 4830.


5900 Design Project (1-9) Industrial engineering topic to fulfill senior requirement in non-thesis program. Enrollment limited to industrial engineering seniors in non-thesis program. May be repeated. Maximum 9 hrs.

5910-20 Special Topics in Industrial Engineering (3, 3, 3) Special problems for students qualified to do individual or group research projects. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.


6700 Nonlinear Programming (3) Optimization techniques for static and dynamic nonlinear systems subject to various constraints. Applying optimization theory to solve nonlinear optimization problems. Variable metric methods, search methods, constrained nonlinear programming and penalty function methods. Prereq: 5700.


8910 Advanced Topics in Industrial Engineering (3) Will cover topics not covered in other graduate courses. A forum for advanced graduate students to study multidisciplinary group as appropriate. Prereq: Graduate standing and consent of instructor. May be repeated with consent of department.


Assistant Professors: R. C. Gifford, Ph.D., Penn Polytechnic Institute; J. Missimer, Ph.D., Pennsylvania, M. Parang, Ph.D., Oklahoma, R. G. Peters, Ph.D., California State, P. E.

Alumni Distinguished Service Professor. Space Institute, Tuscaloosa.
GRADUATE STUDY PROGRAMS

Graduate programs in Mechanical Engineering or Aerospace Engineering are available which lead to the degrees of Master of Engineering, Master of Science in Engineering, and Doctor of Philosophy with concentrations in solar energy, energy conversion and utilization, power generation, machine design and dynamics, aerodynamics, and heat transfer. Programs are also available which lead to the degrees of Master of Engineering or Master of Science, and either a Certificate of Proficiency or an M.S. degree program in Mechanical Engineering. Specific program requirements are given below.

MASTER OF ENGINEERING PROGRAMS

Entrance into the Master of Engineering program is restricted to qualified graduates of A.B.E.T.-accredited undergraduate curricula in mechanical or aerospace engineering. At least one-third of the program of study must be classified as engineering design. The student's advisor will assist in planning the program of study to ensure that it includes the necessary design content. Three required programs (thesis, course, and problem) are described below. Note that some students may not be eligible for the course option.

MASTER OF SCIENCE PROGRAMS

Entrance into the Master of Science programs is available to qualified graduates of recognized undergraduate curricula in mechanical or aerospace engineering and to qualified graduates of other curricula who satisfy the necessary prerequisites. Three program options (thesis, course, and problem) are described below. Note that some students may not be eligible for the course option.

MASTER'S PROGRAM OPTIONS

Three program options are available:

A. The Thesis Option. The requirements of this option are that the student must satisfactorily complete a program of study that includes:
1. A minimum of 36 quarter hours of courses which includes at least 18 quarter hours of graduate (5000-level or above) courses in mechanical and/or aerospace engineering and normally 9 quarter hours of course work (4000-level or above) in mathematics.
2. A minimum of 9 quarter hours of credit in Selected Engineering Problems (5900). A written report must be presented for each problem investigated.
3. Participation in the departmental seminar program.

B. The Problems Option. The requirements of this option are that the student must satisfactorily complete a program of study that includes:
1. A minimum of 36 quarter hours of course work which includes at least 18 quarter hours of graduate (5000-level or above) courses in mechanical and/or aerospace engineering and normally 9 quarter hours of course work (4000-level or above) in mathematics. Students must satisfy the necessary prerequisites.
2. A minimum of 12 quarter hours in mathematics in courses numbered 4000 or above.
3. A minimum of 18 quarter hours in mathematics courses numbered 4000 or above.
4. A minimum of 36 quarter hours in mechanical and/or aerospace engineering courses numbered 5000 and above, with at least 12 quarter hours of 6000-level courses.
5. Participation in the departmental seminar program.

C. The Problems Option. The requirements of this option are that the student must satisfactorily complete a program of study that includes:
1. A minimum of 36 quarter hours of course work which includes at least 18 quarter hours of graduate (5000-level or above) courses in mechanical and/or aerospace engineering and normally 9 quarter hours of course work (4000-level or above) in mathematics.
2. A minimum of 9 quarter hours of selected engineering problems.
3. Participation in the departmental seminar program.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

Junior (3000-level) and senior (4000-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 normally use more than one 4000-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

3600 Energy—An Overview (4) Introduction to available energy resources and conversion and utilization, power generation techniques including conservation schemes; emphasis on the resources-environment-human interaction associated with energy; primarily for non-engineering students.

3110 Applied Engineering Thermodynamics (3) Energy and laws governing energy transformations; thermodynamic properties; applications to engineering problems.

3311 Engineering Thermodynamics (3) Energy and laws governing energy transformations; thermodynamic properties.

3330 Engineering Thermodynamics (3) Properties of gasses and mixtures; chemical reactions; equilibrium; applications to mechanical engineering problems.

3410 Fluid Flow (3) Development of continuity, momentum and energy principles for fluid systems; applications of mechanical and aerospace engineering principles.

3440 Heat Transfer (3) Heat transfer processes, heat conduction, thermal radiation.

3520-30-40 Thermal Sciences (3, 3, 3) Fundamental principles of thermodynamics and transport phenomena as applied to engineering design. To be taken in sequence.

3610 Mechanics of Machinery—Kinematics (3) Machine motions, graphical and analytical methods; instantaneous centers, velocities, accelerations.

3620 Mechanics of Machinery—Dynamics (3) Applications of Newton's laws, work, energy, and impact to machinery. Force analysis of mechanisms, balancing, gyroscopic effects, flywheels. Prereq: 3610.


3650 Introduction to Machine Design (3) Ductility-brittleness behavior of materials under static and cyclic loading. Stress concentration, design factors and theories of failure. Changes in material behavior in processing and fabrication. 2 hrs and 1 2-hr lab.

3910 Engineering Analysis (3) Advanced analysis techniques for problems of aerospace and mechanical engineering. Emphasis on approximate methods.

4140 Energy Conversion Systems (3) Laws governing energy transformations and their application to power plants.

4150 Energy Conversion Systems (3) Operating and design characteristics of new technology energy conversion systems, selected direct conversion techniques.

4160 Energy Conversion Systems (3) Economic and technical design parameters as applied to power plants for public utilities or industrial applications; selected design and layout problems.

4170 Turbo-Machinery (3) Basic principles of turbo-machinery; systematic methods or analysis, design, performance evaluation.

4180 Energy Production and Utilization (3) Thermodynamics constraints on energy production; comparison of power generation methods; evaluation of new energy sources and concepts; energy conservation schemes.

4220 Environmental Noise (3) Basic principles of acoustics—measurement and control of noise in industrial and community environments.

4420 Heat Transfer (3) Heat transfer by free and forced convection, heat transfer in phase change, heat transfer in high speed flow, heat exchanger applications.

4560 Lubrication (3) Hydrodynamic theory of lubrication of sliding bearings; application of Navier-Stokes equations to infinite and finite bearings; analytical and numerical solutions; applications to design.

4471-91 Experimental Mechanical Engineering (3,
theory; kinematics and dynamics of perfect fluids; analysis and design of aerodynamic bodies.

4230 Viscous Flow (3) Boundary layer theory; laminar and turbulent flow; compressibility effects; numerical solution methods.

4240 Astronautics (3) Propulsion, trajectories, guidance, control, and atmospheric reentry of space vehicles.

4250 Propulsion (3) Principles of propulsion device: turbojet, ramjet, and rocket engines.

4260 System Design (3) Synthesis of aerospace system. Design report on the system.

4471-91 Experimental Aerospace Engineering (3, 3, 3) Experimental techniques and measurements of force, length, time, temperature, pressure, transport rates and physical properties. Planning, conducting, analyzing, and reporting experimental tests run according to test standards and other specifications.

4510 Airplane Performance (3) Introduction to airflow, lift, drag, propellers; static and performance and maneuver; theory and design of control surfaces; stability.

4910 Selected Topics in Aerospace Science (3) Dynamics and stability of flight vehicles; applications of aerodynamics to specific problems. May be repeated. S/NC only.

5000 Thesis (1-5) E

5102 Non-Thesis Graduation Completion (3-15) Research and preparation for graduation. May be repeated for credit.

5110 Fundamentals of Aeronautics (3) Kinematics and dynamics of perfect fluids; potential flow about simple bodies; conformal mapping; hodographs. Prereq: 4220 or Mechanical Engineering 5310, Mathematics 4250.

5120 Experimental Methods in Fluid Mechanics (3) Experimental techniques with laboratory experiments; hot wire anemometry and turbulence measurements, flow visualization, wind tunnel tests (supersonic and subsonic), water table experiments, supersonic flow measurements, boundary-layer measurements. Prereq: 4210-20-30 or Mechanical Engineering 5210.


5210-20 Dynamic Systems and Compressible Fluids (3, 3) One-dimensional flow; waves, surface perturbation of a body under body; similarity rules, method of characteristics. Prereq: 4210 for 5210, and 5210 for 5220.

5240 Dynamics of Viscous Fluids (3) Equations of viscous fluid flow; laminar and turbulent flow, transition, separation, boundary layer theories; exact and approximate solutions. Prereq: Mechanical Engineering 5310 or equivalent.

5280 Introduction to Hypersonic Flow (3) Transonic and hypersonic flow, blunt body and hypersonic flow; viscous interactions; free molecule and rarefied gas flow. Prereq: 5240.

5280 Selected Topics in Aerodynamics (3) Transonic, supersonic, and hypersonic flow theories. May be repeated. Maximum 9 hrs.

5270-90 Aerodynamics Ground Test Facilities (3, 3, 3) Atmospheric models and similarity considerations. Aerodynamic testing facilities including wind tunnels, shock tubes, hotshot and ballistic range; propulsion test facilities for air breathing and rocket engines. Theoretical and practical considerations of space environment test facilities. Prereq: 5240, Mechanical Engineering 5310 or equivalent.

5310 Magneto-hydrodynamics (3) Electromagnetic field theory; chemical kinetics, thermodynamic and thermophysical properties of gas plasmas; governing equations and applications. Prereq: 4220 and Mathematics 4710.

5340-50 Atmospheric Entry (3, 3) Motion and heating along ballistic and lifting trajectories; dynamic stability, heat shield models. Prereq: 5220. Recommended: 5240.

5440-50 Transonic Flow (3, 3) Theoretical and experimental aspects. 5440—Nature of flow at transonic speeds and development of shock waves. Solution of nonlinear nature of flow, strong viscous interaction, development of small disturbance equations and similarity solution, incompressible flow, and assumption of irrotational motion, solution techniques. 5450—Shock-wave boundary layer interaction, boundary layer and shock wave measurements, design of shock-free flows, wind tunnel testing at transonic speeds. Interference problems. Prereq: 5220 or equivalent.


5560 Vertical or Short Take-Off and Landing Aircraft (3) Analysis of performance and inherent stability and control characteristics. Prereq: Consent of instructor. May be repeated. S/NC only.

5570 Aircraft Vehicle Flutter and Vibration (3) Aeroelastic phenomena, structural and aeroelastic operators. Stability criteria for airfoils operating in oscillating stream. Two- and three-dimensional flutter of wings, control surfaces, and empennages over wide flight speed range. Prereq: 4230 and 5530.


5620 Aeroacoustics I (3) Special topics and recent research results in field of aeroacoustics. Turbomachinery noise, jet noise, and general theoretical developments, empirical equations. Prereq: 5610.

5640 Aviation Systems: An Overview (3) Aviation systems, present and future, emphasis on systems approach. 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. Prereq: 5610 or non-aerodynamic and non-mechanical engineering majors only.

5620 Air Vehicles (3) Current capabilities and future requirements for air transport vehicles. Parameters significant for air vehicle type selection. Integration of air vehicle into aviation system. Prereq: 5640 or non-aerodynamic and non-mechanical engineering majors only.

5800 Special Topics in Gasdynamics (3) Electromagnetic field equations, magnetohydrodynamics, statistical description of plasma, Boltzmann equation, conduction and diffusion in ionized gases. Prereq: 4220 or 5240. Prereq: Mathematics 5610, Physics 4220.

5910 Advanced Boundary Layer Theory (3) Derivation and critical review of governing equations. Asymptotic solutions; similarity methods; boundary layer transformations. Approximate integral methods to include compressibility and heat transfer, Attached and separated flows, shock-wave boundary layer interaction. Prereq: 5220, Mechanical Engineering 5120, and Physics 5630.

5910 Advanced Topics in Gasdynamics (3) Selection of topics based upon mutual interest of students: nonequilibrium transport phenomena, radiative gasdynamics, nonequilibrium gasdynamic flow, nonequilibrium kinetic and perturbation techniques. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

5990 Special Topics in Aerospace Engineering Credit to be arranged. 3 hrs maximum each quarter.

6000 Doctoral Research and Dissertation (3-15) E


6230 Magneto-hydrodynamics II (3) Continuum magnetohydrodynamic equations. Alfven and shock waves, exact solutions for magnetohydrodynamic channel flows, one-dimensional model of channel flow, magnetohydrodynamic boundary layer. Prereq: 6310, Mathematics 5620.

6330 Gasdynamics II (3) Engineering applications of magnetohydrodynamics, propulsion and power generation. Prereq: 6320, Mathematics 5630.

6410 Physical Gasdynamics (3) High-speed, high temperature flow of gas from molecular point of view; molecular concepts and simple kinetic theory; mechanical properties of gases and gas mixtures from steady-state kinetic theory chemical thermodynamics, and statistical mechanics. Prereq: 5610, Mathematics 5630.

6420 Physical Gasdynamics (3) Continuation of 6410; flows of gas mixtures in local thermodynamic and chemical equilibrium; physical and chemical behavior of the equation of state with vibrational and chemical nonequilibrium. Prereq: 6410.

6510 Advanced Fluid Dynamics (3, 3, 3) Supersonic, transonic, supersonic, and hypersonic flows treated in a generalized and unified manner with combined viscous/inviscid effects. Relationships among various regimes of fluid flows. Fundamental assumptions, limitations of approximations and consequences. Foundations of gas dynamics with emphasis on applications to aircraft, rocket, ground testing, and jet propulsion. Discusion of special topics according to students' interest. Prereq: 5110, 5220, and 5240 or equivalent.

6510 Advanced Fluid Dynamics (3, 3, 3) Supersonic, transonic, supersonic, and hypersonic flows treated in a generalized and unified manner with combined viscous/inviscid effects. Relationships among various regimes of fluid flows. Fundamental assumptions, limitations of approximations and consequences. Foundations of gas dynamics with emphasis on applications to aircraft, rocket, ground testing, and jet propulsion. Discusion of special topics according to students' interest. Prereq: 5110, 5220, and 5240 or equivalent.

6810 Advanced Boundary Layer Theory (3) Derivation and critical review of governing equations. Asymptotic solutions; similarity methods; boundary layer transformations. Approximate integral methods to include compressibility and heat transfer, Attached and separated flows, shock-wave boundary layer interaction. Prereq: 5220, Mechanical Engineering 5120, and Physics 5630.

6810 Advanced Boundary Layer Theory (3) Derivation and critical review of governing equations. Asymptotic solutions; similarity methods; boundary layer transformations. Approximate integral methods to include compressibility and heat transfer, Attached and separated flows, shock-wave boundary layer interaction. Prereq: 5220, Mechanical Engineering 5120, and Physics 5630.

6810 Advanced Boundary Layer Theory (3) Derivation and critical review of governing equations. Asymptotic solutions; similarity methods; boundary layer transformations. Approximate integral methods to include compressibility and heat transfer, Attached and separated flows, shock-wave boundary layer interaction. Prereq: 5220, Mechanical Engineering 5120, and Physics 5630.
MASTER OF SCIENCE PROGRAM

A graduate program leading to a degree of 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 a program of study of 45 quarter hours which has been approved by the student's advisory committee and which includes the following:

1. A major consisting of a minimum of 18 quarter hours of graduate courses in nuclear engineering.
2. A minor of 9 quarter hours in mathematics, statistics, or computer science.
4. Final examination covering the thesis and graduate course work.

An alternate program is available for the Master of Science degree which involves engineering practice rather than a thesis. The student must complete a program of study which includes the following:

1. Thirty-six quarter hours of course work similar to the requirements for the regular Master of Science Program (see above).
2. Twenty-four quarter hours of Nuclear Engineering 5980. A student usually registers for 6 hours of Nuclear Engineering 5980 each quarter and is responsible for problems assigned by a member of the faculty. At the end of each quarter the student submits a written report and makes an oral presentation of the work.
3. Final examination covering graduate course work and practice school problems.

Masters of Engineering Program

A graduate program in Nuclear Engineering leading to the degree of Master of Engineering is available to those graduates with an accredited engineering degree or one which satisfies A.B.E.T. basic level criteria. In addition to Graduate School requirements the following degree requirements must be met:

1. A minimum of 9 hours of design project, thesis, or 24 hours of Nuclear Engineering Practice (5980). Documented proof of significant engineering experience may be submitted in lieu of the design project, thesis or Nuclear Engineering Practice, but in this case 45 hours of course work are required.
2. Nine hours of course work submitted must be from out of department.
3. A minimum of one-third of the program must be in engineering design, and one-third in one of, or a combination of, advanced math, computer sciences, basic sciences, or engineering sciences.
4. An additional pass a final oral examination on all work presented for the degree.

THE DOCTORAL PROGRAM

Students in the field of nuclear engineering desiring to study for the degree of Doctor of Philosophy must have a Bachelor of Science or a Masters of Science degree from a recognized university, with a major in engineering or physics, and present at least a B average. All candidates will be required to demonstrate special competence in a comprehensive examination in the areas of engineering science, mathematics, and physics. At the same time, all candidates will be required to demonstrate special competence in nuclear design.

Specifc course requirements for the Ph.D. degree in Nuclear Engineering include:

1. A minimum of 72 quarter hours credit beyond the Bachelor's degree, exclusive of credit for the M.S. thesis or Nuclear Engineering Practice.
2. A minimum of 36 quarter hours of credit in doctoral level courses.
3. A minimum of 45 quarter hours in nuclear engineering courses numbered 5000 and above (or the equivalent), with at least 12 quarter hours of 6000-level courses. These are exclusive of thesis or dissertation credit.
4. A minimum of 18 quarter hours in mathematics, computer science, or statistics in courses beyond nuclear engineering undergraduate requirements. Must be numbered 4000 or above.
5. A minimum of 9 quarter hours in courses numbered 5000 and above or from a department other than nuclear engineering. The choice depends on the student's overall program and should expand his/her knowledge in a given field.
6. A reading knowledge of one foreign language will be determined by the student's Doctoral Committee.

4110-20-30 Introduction to Nuclear Reactor Theory (3, 3, 3) Nuclear structure; radioactive decay laws; neutron interaction; fission process, chain-reacting systems, diffusion equation including multigroup diffusion theory, neutron moderation; reactivity coefficients, perturbation theory. Prereq: Physics 3450, 3790 or consent of instructor.
4140 Thermohydraulic Systems (3) Fusion reactions; properties of plasma; plasma confinement; plasma diagnostics; thermonuclear devices. Prereq: Mathematics 3730, Mathematics 4550, F.
4210-20-30 Nuclear Engineering Laboratory (3, 3, 3) Radiation detection and counting instrumentation, counting statistics, half-life and decay schemes, gamma spectrum, cross-section measurements, analog computation, diffusion properties of neutrons, critical loading experiments, control rod calibration, statistical weight, shielding, xenon poisoning, prompt critical reactor behavior, fission density and adjoint flux. Prereq or coreq: 4110 or equivalent. F, W, Sp.
4710 Energy Transport (4) Development of differential and integral energy conservation equations; conduction, convection, and radiation heat transfer; applications to nuclear reactor fuel elements and heat exchangers. Prereq: 3730, F.
4720 Reactor Thermal Design (4) Hydrodynamics and heat transfer in boiling systems; boiling crises; fuel element thermal design, steam generator design. Prereq: 4710, F.
4730 Nuclear Reactor Design (3) First order reactor design, integration of non-thermal heat transfer and power conversion system, economic evaluation; optimization, Monte Carlo, design description, description of typical systems. Coreq: 4130, Sp.
4820 Reactor Kinetics and Controls (3) Derivation of kinetic equations; basic kinetic parameters; transient response with feedback, control and protective systems. Prereq: 4110, W.
4840 Nuclear Reactor Safety (3) Presentation of reactor safety concepts; credible accidents; fission product release and transport; containment systems; accident analysis; engineered safety bars. Prereq: 4110.
5210 System Dynamics (3) Transient analysis, Laplace transforms, frequent response, stability (linear and non-linear), and sensitivity analysis by state variable methods. Dynamic analysis of distributed systems. Prereq: Consent of instructor. F.
5220 Reactor System Dynamics (3) Application of methods of general system dynamics to reactor systems. Modeling and simulation of neutronic processes. Dynamics, stability, and control of zero power reactors and reactor systems. Prereq: 5210, 4130 or equivalent. W.
5240 Reactor Instrumentation (3) Instrument components and systems for reactor control and safety of nuclear reactors; role of instrumentation in public health and safety; engineered safeguards for nuclear power plants. Prereq: 4820, or consent of instructor. Sp.
5510-20-30 Nuclear Systems (3, 3, 3) Various reactor types; flow diagrams, thermodynamic analysis, control methods, and safety of nuclear power systems using various reactor types and nuclear power economics. 4610-20-30 or equivalent or consent of instructor.
5740 Reactor Shielding (3) Application of analytic solutions of Boltzmann transport equation to shield design problems. Spherical harmonics, moments methods, numerical solutions, adjoint calculations, and invariant imbedding cases studied. Prereq: 4610. F.
5790 Monte Carlo Shielding Design (3) Analysis of radiation transport problems in shielding by Monte Carlo Analysis methods and random sampling, evaluation of integrals, analogous particle transport techniques of variance reduction. Prereq: 4810. W.
5840-50 Fast Breeder Reactors (3, 3) Special characteristics of fast breeder reactors; emphasis on LMFRB. Need for breeders; neutron physics and thermal characteristics of reactor core; development status of experimental and full scale breeder reactors. Prereq: 4810. W.
5970 Special Topics in Nuclear Engineering (3) Lectures and recitation on recent advances in nu-
clear engineering. Prereq: Consent of instructor. May be repeated with consent of department.

5980 Nuclear Engineering Practice (3-12) Experiences in solving and reporting on engineering problems. Prereq: Approval of Nuclear Engineering Department. May be repeated. Only Alternate Plan students may take this course. S/NC only. E

6000 Doctoral Research and Dissertation (3-19) E

6110-20-30 Selected Topics in Reactor Theory (3, 3, 3) Transport theory, control rod theory, and perturbation theory. Selected topics from literature. Prereq: Consent of instructor. F, W, Sp

6140 Radiation Shielding (3) Advanced topics in radiation shielding. Monte Carlo techniques and space radiation problems. Natural space radiators, energy-source radiators, dose conversion, probability, Selected neutron, gamma, and space-radiation shielding problems. Prereq: Consent of instructor. Sp

6150 Reactor Dynamics (3) Special topics in reactor dynamics and control. Prereq: Mathematics 5630. Su

6410 Selected Topics in Nuclear Systems Reliability Engineering (3) Advanced state-of-the-art topics in nuclear systems reliability engineering and risk assessment. Prereq: 5330 or consent of instructor.

6510 Nuclear Reactor Noise Analysis (3) Modern system theoretical methods for evaluating reactor performance descriptors from operating data. Prereq: 4610 and Electrical Engineering 5740 or equivalent.

6710 Two-Phase Flow and Heat Transfer (3) Pool boiling and flow boiling; hydrodynamics of two-phase flow, boiling crisis, two-phase instabilities. Prereq: 5130 or equivalent. Su
Graduate work in Home Economics prepares the student for teaching, research and public service in colleges and universities and for managerial positions in government and industry. Graduate study leads to the degrees of Master of Science in: Child and Family Studies; Consumer Studies and Housing; Public Policy; Interior Design and Housing; Food Science; Food Systems Administration; Vocational-Technical Education (concentration in home economics education); Nutrition; and Textiles and Clothing; and the degree of Doctor of Philosophy in Home Economics with three options: interdisciplinary, food science, and nutrition.

GENERAL REQUIREMENTS FOR GRADUATE STUDENTS

General requirements for graduate study are prescribed by the Graduate School and by the student's department. Each student's application is reviewed by faculty, and students lacking adequate preparation may be required to take additional courses at the undergraduate level as prerequisites to graduate study. A student deficient in English may be required to take courses as necessary to remove the deficiency.

APPLICATION FOR ADMISSION AND FINANCIAL AID

Requirements for admission to the Graduate School are on page 12 of this catalog. A College of Home Economics application and three letters of recommendation are required. These may be obtained at the Dean's Office, Jessie Harris Building, or write or call: Nancy Belck, Dean; Jay Stauss, Assistant Dean; Graduates Studies Fran Andrews, Assistant Dean, Undergraduate Studies Helen Grove, Assistant to the Dean.

Graduate Record Examination scores for the aptitude test including the quantitative, verbal, and analytical sections are required for application to the Ph.D. interdisciplinary program, to the Master's program in Child and Family Studies, and Consumer Studies and Housing: Public Policy.

ACADEMIC COMMON MARKET

The doctoral program in Home Economics is listed in the Academic Common Market of the Southern Regional Education Board. Residents of Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, South Carolina, or West Virginia are eligible to enroll at UTK on an in-state tuition basis. The Master's program in Food Systems Administration is also listed for residents of Arkansas, Kentucky, or West Virginia; as is the Master of Science program in Nutrition for residents of Alabama and Virginia.

PROGRAMS LEADING TO THE DEGREE OF MASTER OF SCIENCE

Thesis Option:

Majors and minors are offered in the following areas:

- Child and Family Studies
- Consumer Studies and Housing
- Public Policy

Interior Design and Housing

- Requirements include Interior Design and Housing 5615 or Child and Family Studies 5170; Child and Family Studies 5700 or Planning 5100 or Economics 5340 or Agricultural Economics 4320; and Home Economics 5660. Three-hour course in research methods or statistics. Twenty-four hours in consumer studies or housing to include 9 hours of Consumer and Family Studies 6000 or Interior Design and Housing 5000.
- Consumer studies courses to be selected from Child and Family Studies 5140, 5170, 5180, 5700, 5800, 5900; Interior Design and Housing 5120; Food Science 4040; Textiles and Clothing 5180; Agricultural Economics 4710; Economics 5050-60; Political Science 5641, 5670-80, 5710; Library and Information Science 5250; Housing courses to be selected from Agricultural Mechanization 5110, 5610; Interior Design and Housing 4330, 5615, 5616-20, 30; Planning 5380-83, 5455; Geography 5620.
- Twelve hours in an area of home economics other than the area (consumer studies or housing) chosen above. Minimum 27 hours in and 9 hours outside College of Home Economics. Minimum of 27 hours 5000-6000 level courses and total minimum of 45 hours. Courses may be used to meet more than one requirement but all minimum requirements will need to be met.

Non-Thesis Option:

Requirements include those listed under the thesis option for the major in Consumer Studies and Housing: Public Policy. An oral examination is required. Note: Nine hours is the maximum credit allowed for special problems work and seminar work in any one area of home economics.

Food Science

- Food Systems Administration
- Nutrition
- Textiles and Clothing

Major (includes minimum of 9 hours of 5000 courses) .......... 18 hrs
- Thesis ........................................ 9 hrs
- Collateral area(s) of study (includes minimum of 6 hours of 5000 courses) .............. 18 hrs
- (Minimum of 18 hours of 5000-level exclusive of thesis.)

Total 45 hrs

In some instances two related collateral areas may be selected with 9 hours in each area and a minimum of 3 hours of a 5000 course in each.

Collateral area(s) of study may be chosen in an area other than in home economics with the approval of the appropriate professors.

An oral examination is required.

Non-Thesis Option:

The non-thesis option is available for all majors listed under the thesis option and in the only option available for public health nutrition.

In addition to the regulations of the Graduate School, the non-thesis program of study for all majors except Consumer Studies and Housing: Public Policy* will consist of 45 credit hours with a minimum of 24 hours in the major field and 18 hours at the 5000 and 6000-level. A minimum of 27 hours of 5000 and 6000 level courses is required in the program. Some majors may require 9 hours in one collateral area.

Request for the non-thesis option must be made in writing by the student to the department head not later than the end of the first term in residence.

*Requirements include those listed under the thesis option for the major in Consumer Studies and Housing: Public Policy except that 21 hours are needed in consumer studies or housing to include Home Economics 5060 (6 hours), or Childs and Family Studies 5060 or Interior Design and Housing 5060.
DOCTORAL PROGRAMS

The doctoral program in Home Economics provides three options for study: interdisciplinary, food science, and nutrition. The interdisciplinary option is available in all departments in the College.

The interdisciplinary option requires:
1. A minimum of 96 quarter hours in courses beyond the Bachelor's degree exclusive of credit hours for the Master's thesis to include a minimum of 12 quarter hours from Food Science 5510-60-650; Food Systems Administration 6110-20-30-40; 6110, Food Systems Administration 6110; and Zoology 5350 or equivalent.
2. Selection of an option and fulfillment of the requirements as supervised by the faculty committee.
3. The faculty committee for each doctoral student shall determine whether a reading knowledge of a foreign language is required.
4. Written comprehensive examination.
5. Doctoral research and dissertation (minimum 36 hours; maximum 48 hours) may be included in the 96 hours presented for the degree.
6. A final examination.

Other Requirements:

Interdisciplinary option:
1. Home Economics 6110-20, 6210.
2. Twenty-four to 36 hours from at least two departments in the College of Home Economics representing one of the following concentrations:
   - Individual and Family Behavior related to development and change throughout the human life cycle. Emphasis may be on: normal developmental processes in individuals and families; socialization through childhood, adolescence, and adulthood; behavior in diverse environmental and cultural settings; interaction processes within families; community services and planning in the development and change of individuals and families.
   - Environmental Factors in design, space planning, housing, food service systems, clothing, and textiles as they relate to human needs. Emphasis may be on: the impact of: cultural, sociological, psychological, and economic change; technological developments; aesthetics in improving the quality of the environment.
   - Consumers' Economic and Social Well-being throughout the life cycle. Emphasis may be on: the relationship between family structure and decision-making processes in the use of human resources; the effects of social, macro- and microeconomics and political development on consumption patterns and other behavior; community programs to meet the socioeconomic needs of consumers.
3. Fifteen to 24 hours in cognitive or behavior courses (mainly from departments in other colleges in the University) including courses to give sufficient competence in statistics and research methods needed for dissertation research.
4. Doctoral research and dissertation will be based on a problem within the interdisciplinary concentration.

Food science option and food science with concentration in food systems administration:
1. Three hours in research methods from Food Science 5510 or 5520 or Food Systems Administration 5210 and 6 hours from Food Science 5510-20-30-40; 6110, Food Systems Administration 6110; and Zoology 5350 or equivalent.
2. Twenty-four hours in 5000- and 6000-level courses in food science or in food systems administration.
3. Nine hours in a collateral area. Upon approval of student's faculty committee, 4000, 5000, and 6000 courses in collateral area may be substituted for 5000 and 6000 courses in food science or in food systems administration.
4. Minimum of 4 hours of credit in doctoral seminar.

Nutrition option:
1. Thirty hours of 5000 or 6000 courses in nutrition exclusive of research and Zoology 5350 or equivalent.
2. Nine hours in a collateral area. Upon approval of student's faculty committee, 4000, 5000, and 6000 courses in collateral area beyond the 9 hours may be substituted for 5000 and 6000 courses in nutrition.
3. Minimum of 4 hours of credit in doctoral seminar.

GRADUATE PROGRAMS FOR HOME ECONOMICS EXTENSION

Graduate programs at both the doctoral and Master's levels are available for students interested in home economics extension. At the doctoral degree level, programs of study may be planned in the interdisciplinary or in the food science or the nutrition options. A Master's degree major in Consumer Studies and Housing: Public Policy is particularly suitable for students interested in home economics extension, although Master's programs may be planned in any subject matter area of home economics with agricultural extension education as a collateral area. Additionally, four-week courses are offered in February each year for students particularly interested in home economics extension.

Departments of Instruction

Child and Family Studies

MAJORS

Child and Family Studies
Consumer Studies and Housing: Public Policy
Home Economics

Professors

R. L. Highberger, Ph.D. Iowa,
N. Beek (Dean), Ph.D. Michigan State;
Associate Professors

R. L. Cromwell, Ph.D. Minnesota;
J. L. Cunningham, Ph.D. Michigan State;
D. B. Eastwood, Ph.D. V. M. Nordquist;
Ph.D. Tennessee, J. Stuss (Assistant Dean),
Ph.D. Washington State; R. M. Swagler,
Ph.D. Ohio State, S. T. Perez, Ph.D.
Kansas; P. White (Head), Ed.D. Tennessee.
Assistant Professors

P. Howick, M.S.M. Florida International;
G. Peterson, Ph.D. Washington State;

4110 Student Teaching in Preschool Settings (6)
Increasing responsibility for planning and guiding groups of young children under supervision of head teacher includes: Prereq: (1500, 3210, 3300, 3350, 3360) recommended. E
4210 Family Finance (3) Analysis of alternative ways of meeting financial problems encountered during life cycle of family.
4230 Conserving Time and Energy in the Home (3)
Application of management principles to homemaking activities; evaluation of equipment, work centers and work procedures in terms of time and energy demands. Adaptations for the handicapped.
4260 Adult Development and Aging (3) Adult life in our society: Adjustment to internal and environmental changes during middle and aged years. Prereq: 2110 or Home Economics 1510 or equivalent background in adult development or consent of instructor.
4350 Advanced Child Development (3) Survey of selected theories relevant to child development with emphasis on research literature and research methodology. Prereq: 4 hrs psychology and 6 hrs child development or equivalent. W
4420 Learning Experiences with Parents (3)
Dynamics of parent-teacher interaction. Emphasis on a variety of techniques for developing communication and working relationships between parents and teachers through experiences in a variety of settings. Prereq: 3210 or Home Economics 1510 or equivalent. W
4430 Family Relationships (3) Interpersonal relationships among family members and societal roles. Prereq: 3510 or 3515. Sp
4610 Child in the Community (3) Needs of children; community agencies meeting these needs; visits to agencies contributing to the welfare of children. Prereq: 2110 or Home Economics 1510 or equivalent. W
4620 Administration of Programs for Young Children (3) Planning for day care, feeding, scheduling, and financing of day care services for young children, nursery school programs, and specialized programs for handicapped preschool children. Prereq: 3210 or 3510.
4630 Field Work in Child, Family and Consumer Studies (3-15) Opportunity for students to work in nursery schools or community agencies; focus on children, families, and/or consumer concerns. Instructor arranged. Prereq: Consent of instructor. May be repeated. Maximum 15 hrs. S/N only. E
4710 Contemporary Developments (1-3) Student or staff-initiated course for study of special topic(s) pertinent to the field; topics selected to be determined by students and approved with departmental approval. Elective credit only. Prereq: Consent of instructor. May be repeated with departmental approval. Maximum 9 hrs.
4610 Afro-American Families (3) Historical background, contemporary family structure and relationships; emerging needs and programs. Prereq: 4 hrs in social sciences.
4830 Consumers and the Market (3) Analysis of elements in marketplace which create problems for consumers. Special attention is given to consumer decision making, need for information and constraints and opportunities associated with government protection of consumers. Prereq: Economics 2110. W, Sp
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a 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
5060 Practicum (1-12) Field experience in selected agencies and organizations that focus on solutions to problems in consumer studies. Prereq: Consent of instructor. S/N only. E
5110 Field Work in Family Life (3) School and community programs concerned with education for family living. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/N only. E
Nutrition and Food Science

MAJORS

DEGREES
Food Science
M.S.
Nutrition
M.S.
Food Systems Administration
M.S.
Home Economics
Ph.D.

Professors:
B. L. Beach, Ph.D., Wisconsin;
R. E. Beauchene, Ph.D., Kansas State;
G. E. Goertz, Ph.D., Kansas State;
M. L. Moeller, Ph.D., Wisconsin;
L. M. Olandt, Ph.D., Wisconsin;
J. R. Savage, Ph.D., Wisconsin;
J. T. Smith, Ph.D., Missouri;
A. J. Smith (Memphis), Ph.D., Tennessee.
Associate Professors:
D. W. Hubbard, Dr. H. P. Tulane;
D. E. Lyon, M.S. Cornell;
M. P. Penfield, Ph.D., Tennessee;
D. S. Sachan, Ph.D., Illinois;
M. H. Traylor, M.P.H. California (Berkeley).
Assistant Professors:
F. E. Andrews (Assistant Dean), Ph.D., Ohio State;
J. B. Bittis (Memphis), Ph.D., Tennessee;
M. D. Brooks (Memphis), M. S. Alabama;
G. W. Disney, Ph.D., Tennessee;
J. S. Skinner, Ph.D., Oregon State.

Food Science

5000 Origin of Food and Foodways (3) Food origin and development of individual and group foodways. Prereq.: 8 hrs social science or humanities. F, W

5100 Introductory Experimental Food Science (3) Physical and sensory evaluation of foods with fats, high protein foods, and batter and dough systems. Prereq.: 3510, 2 hrs and 1 lab. W, Sp

5200 Experimental Food Science (3) Individual experimentation and report to the research laboratory. Prereq.: 4010, Nutrition 3320 recommended. 1 hr and 2 labs. Su, A

4040 Food in Contemporary Society (3) Consumer's options, responsibility and potential influence with respect to food supply. F, W

5190 Food Preservation (3) Application of basic principles and research findings to food preservation in home. Prereq.: 1010, 4 hrs microbiology, and Nutrition 3310 or equivalent. 2 hrs and 1 lab. F

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a 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

5140 Foods and Nutrition: Physicochemical Principles (3) Theories and applications of food chemistry. Prereq.: 6 hrs social science or humanities. F, W

5250 Food Sensory Testing Methods (3) Principles and methodologies of food quality and evaluation of food; application of methods; analysis of sensory data. Prereq.: 4010, Plant and Soil Science 3610 or equivalent; or consent of instructor. W

5330 Advanced Experimental Food Science (3) Application of research methods to individual problems. Prereq.: 5150-20 or consent of instructor. Su, A

5550 Food Behavior of the Individual (3) Development and change in food and food habits of individual. Prereq.: 4000, 3 hrs nutrition, or consent of instructor. Sp, or Su

5660 Foodways in the United States (3) Current focusing of selection, preparation, and consumption of food and food habits of the United States and historical basis for their development. Prereq.: 4000, 3 hrs nutrition, or consent of instructor. W, Sp.
5610-20 Advanced Food Science (3, 3) Biochemical and biophysical interactions in food. Prereq: 4010; Nutrition 3320 or equivalent, or consent of instructor. W; Sp.
5630 Carbohydrates and Fats in Relation to Food Science (3) Physical and chemical characteristics of sugars, starches, and fats with emphasis on their behavior in food. Prereq: 4010; Nutrition 3320-30 or equivalent.
5640 Proteins in Relation to Food Science (3) Physical and chemical characteristics of the proteins of milk, eggs, flour, and meat with emphasis on their behavior in food. Prereq: 4010; Nutrition 3320-30 or equivalent.
5700 Current Programs and Trends in Food Science (1-3) Recent advances in food science, impact on curricular considerations, and implications for teachers, extension workers, and dietitians. Prereq: Consent of instructor. May be repeated.
5800 Problems in Food Science (1-3) Advanced study from field of food science. Prereq: Consent of department head and professor in charge of investigation. May be repeated.
5850 Field Experience (3-9) Experience in food-related industry or agency under supervision of faculty member. Prereq: Consent of instructor.
5900 Seminar (1-3) Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. S/NC only.
6000 Doctoral Research and Dissertation (3-15) E 6110 Advanced Topics in Food Science (3) Comprehensive individual study and group discussion of topics related to current problems in food science. Prereq: Consent of instructor. May be repeated.
6210 Food Diapers (3) Physical characteristics of solutions, colloidal dispersions, and suspensions in relation to treatment as applied. Prereq: 5520.
6310-20 Structure of Food Plants and Animal Tissues (3, 3) Histological structure of food plants and animal tissues related to physical characteristics and chemical properties of components. Prereq: 5360-40.
6510-20 Food and Sociocultural Change (3, 3) Critical evaluation of factors and interrelationships affecting food intake and consumption patterns. Must be taken in sequence. Prereq: 5550 or 5560; or consent of instructor. F; W
6900 Seminar (1-3) May be repeated. S/NC only. E Nutrition
3310 Organic Chemistry (4) Emphasis on subjects leading to 3320-30. Textiles and Clothing 4220. Prereq: General Chemistry, 3 hrs and 1 lab. Not for graduate credit. May be repeated. Maximum 12 hrs. F, W
3320 Food Analysis (4) Elementary quantitative analysis; typical food analyses. Prereq: 3310 or equivalent. 3 hrs and 1 lab. Not for graduate credit to departments of biological science. S
3330 Physiological Chemistry (3) Metabolism of carbohydrates, lipids, and proteins. Role of vitamins and minerals in metabolism. Not for graduate credit to departments of biological science. S
3339 Physiological Chemistry Laboratory (1) Prereq: 3320; Coreq: 3330. Lab. Not for graduate credit to departments of biological science. Sp, Su
4010 Reproductive and Developmental Nutrition (3) Nutritional requirements for infant and adult male, female, mothers, infants, and preschool children. Prereq: 3020, 3050, or 3410. 2 hrs and 1 lab. F
4020 Nutrition for Children, Adolescents and Adult: Application of basic principles and research findings to good nutrition for children, adolescents and adults. Prereq: 3020, 3050, or 3410. 2 hrs and 1 lab. F
4030 Community Nutrition (3) Nutrition problems and services in the community; supervised field experiences are integral part of the course. Prereq: 3020, 3050, or 3410. 2 hrs and 1 lab. F
4110 Introduction to Nutrition Research (3) Discussion of principles and laboratory experiences. Prereq: 3410 or equivalent. 2 hrs and 1 lab. Sp
4230 Nutrition in Disease (4) Nutrition problems in diseases influenced by diet. Prereq: 3410. W; Su
4240 Nutrition in Disease (4) Internship lactic studies and discussions on the metabolic processes of normal and diseased organs and/or tissues and the dietary or behavior modifications required. Prereq: 4250. Designed for senior students in the coordinated undergraduate program in dietetics.
4430 Diet and Drug Therapy (3) Effect of drug therapy on absorption and utilization of nutrients, and effect of the body's disease on drug metabolism and toxicity of drugs. Prereq: 3410 or consent of instructor. W
5000 Thesis (1-15) E 5002 Non-Thesis Graduation Completion (3-15) May be repeated. Prereq: the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
5110 Advanced Physiological Chemistry (4) Bioenergetics and related metabolism of nutrients. Prereq: 5410-20. A
5120 Advanced Physiological Chemistry (3) Nutritional factors in relation to body fluids, gas transport, and endocrine function. Prereq: 3330. W
5140 Foods and Nutrition: Physicochemical Principles (3) Thermal and chemical properties of proteins, carbohydrates and lipids; chemistry of colloid state; chemical kinetics; specialized kinetics of enzymatic processes. Prereq: Nutrition 3330 and Mathematics 1540 or equivalent. Sp, A
5210 Advanced Nutrition (3) Critical reviews of fundamentals. Prereq: 3330, 3410. F
5230 Experimental Methods in Nutrition (3) Use of small animals in experimental nutrition. Prereq: 3320-30, 3410. 2 hrs and 1 lab. F
5310 Community Nutrition (3) Nutrition problems and practices in community; supervised field work. Prereq: 3410 and consent of instructor. 3 labs. F
5320 Community Nutrition (3) Observations and participation in nutrition programs of local and state agencies. Prereq: 5310 and consent of instructor. 3 labs. W
5330 Community Nutrition (3) Nutrition programs of state and federal agencies; preparation of material for nutrition education; supervised field work. Prereq: Consent of instructor. 3 labs. Su
5340 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: 5320 and consent of instructor. S/NC only. Sp
5350 Mental Retardation or Other Developmental Disorders of Childhood (3) Multidisciplinary core course required of all full-time students in training at Child Development Center, UT Center for the Health Sciences, Memphis. Prereq: Consent of department head. F, W
5410-20 Human Nutrition (3, 3) Functions of carbohydrates, proteins, fats, minerals and vitamins. Nutritional requirements of humans throughout life span and practical problems in meeting requirements. Prereq: 3410 and 5110. W; Su
5430 Physiological Bases for Diets in Disease (3) Developments in dietary treatment of disease in which nutrition plays a major role. Prereq: 5210 or equivalent. W
5450 Survey Methods in Human Nutrition (3) Food consumption, food practices and nutritional status of population groups. Prereq: 5210 or 5410-20. 2 hrs and 1 lab.
5460 World Food Supply and Human Nutrition (3) Food supplies and food practices as related to human nutrition. Traces of proteins in relation to world. Regional, national and international agencies concerned with food and nutrition problems. Prereq: 5210 or 5410-20. Sp
5470 Nutrition and Aging (3) Nutritional problems of aging individual, nutritional requirements, dietary intakes, and effect of nutrition on rate of biological aging. Prereq: 5210 or consent of instructor. W
5610 Nutrition in Mental Retardation and Developmental Disabilities (1-12) Interdisciplinary diagnosis and treatment of developmentally-handicapped child. Role of nutritionist; clinical experiences and lectures at Child Development Center. Center for the Health Sciences, Memphis. Prereq: Consent of department head. E
5700 Current Programs and Trends in Nutrition (3) Recent advances. May be repeated. Prereq: Completion of a major field of nutrition and implications for teachers, extension workers, dietitians, public health nutritionists, and others in related fields. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.
5800 Problems in Nutrition (1-3) Advanced study selected from field of nutrition. Prereq: Consent of department head and professor in charge of investigative work. May be repeated. Maximum 9 hrs. F
5900 Seminar (1-3) Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. S/NC only.
6000 Doctoral Research and Dissertation (3-15) E
6110 Advanced Topics in Food Science (3) Comprehensive individual study and group discussion of topics related to current problems in food science. Prereq: Consent of instructor. May be repeated.
6210 Advanced Topics in Nutrition (1-3) Prereq: General Chemistry. 3 hrs and 1 lab. Not for graduate credit to departments of biological science. A
6260 Food and Lodging Physical Plant, Planning and Ventilation Systems (3) Qualitative and quantitative analysis of ventilation and illumination systems. Types of building materials and construction. Prereq: 4130, 4250, Computer Science 1410. Sp
6270 Food and Lodging Managerial Cost Control (3) Cost analysis for control. Use of financial statements for decision making for food and lodging systems. Prereq: 4130, Accounting 2130. W, Sp
6280 Food and Lodging Managerial Cost Control (3) Cost analysis for control. Use of financial statements for decision making for food and lodging systems. Prereq: 4130, Accounting 2130. W, Sp
6510 Design and Layout of Food Service Systems (3) Design of physical facilities and selection and purchasing of equipment for food service systems. Prereq: 3110 or consent of instructor. Sp
4260 Food and Lodging Managerial Cost Control (3) Cost analysis for control. Use of financial statements for decision making for food and lodging systems. Prereq: 4130, Accounting 2130. W, Sp
4270 Tourism, Food and Lodging Information Systems (3) Qualitative and quantitative analysis of information systems for decision making in food and lodging operations or other operations related to tourist industry. Prereq: 4130, 4250, Computer Science 1410. Sp
registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree and may be repeated. S/NC only.

5110-20 Experimental Quantity Food Study (3, 3) Analysis of food production, holding environment, and service problems related to quality of food prepared in selected food service systems. Prereq: 4130, 3110, or consent of instructor. Su, A

5210 Methods of Food Systems Research (3) Research methods applicable to food systems administration. Prereq: 4130, Statistics 5211 or equivalent. W, A

5220 Experimental Design of Food System Facilities (3) Environment in which food is prepared, held, and served in volume. Prereq: 4150. Su

5230 Food Systems Evaluation (3) Management responsibilities in food systems. Standards for control. Prereq: 4130, or consent of instructor. F


5310 Administration of Food Service Delivery Systems (3) Role and responsibilities of administrator in maintaining desired qualitative and quantitative standards in food service delivery system. Prereq: 3110 or consent of instructor. W, A

5500 Clinical Training in Health Care Agencies (3) Instructional and supervisory techniques in clinical settings by nurses and dietitians for training of entry-level health care providers. Prereq: Nursing 4760 or consent of instructor.

5700 Current Programs and Trends in Food Systems Administration (1-3) Recent advances in food systems administration and implications for dietitians, school food service directors, and others in related fields. Prereq: Consent of instructor. May be repeated.

5800 Problems in Food Systems Administration (1-3) May be repeated.

5850 Field Experience (3-9) Planned administrative experience in food service system. Prereq: Consent of instructor.

5900 Seminar (1-3) Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. S/NC only.

6110 Advanced Topics in Food Systems Administration (3) Comprehensive individual study and group discussion of current problems in food systems administration. Prereq: Consent of instructor.

6210 Manpower Planning and Training for the Food Service Industry (3) Identification of manpower needs by skill levels; programs for personnel in food service industry. Prereq: 4140, 5210 or consent of instructor.

6310-20 Quantitative Methods to Control Resources in Food Service Systems (3, 3) Interrelationships of resources and evaluation of efficiency and effectiveness in food service systems. Prereq: 5230 or consent of instructor. Taken in sequence. Credit for 6310 contingent upon completion of 6320. Su, A

6900 Seminar (1-3) May be repeated. S/NC only. E

Home Economics

DEGREE
Home Economics Ph.D.

5060 Practicum (1-12) Field experience in selected organizations that focus on interdisciplinary solutions to multilevel problems of society. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

5100 International Studies (1-15) Student- or staff-initiated course for study in foreign country of topics pertinent to field. Topic to be determined by student and instructor with department and college approval. May be repeated. Maximum 15 hrs.

5210 History and Philosophy of Home Economics (3) Historical development of home economics; survey of concepts and philosophy of component discipline and analysis of current programs; emphasis on projection of future developments.

5220 Development of Community Service Programs (3)

5230 Evaluation of Community Services Programs (3) Purposes of evaluation, clarification of objectives and procedures for determining progress.

5600 Home Economics in the Community (3) Role of home economists in community and how interactions among professionals of all community resources facilitate finding solutions for and/or solving problems of individuals, families, and communities related to quality of life. Prereq: Agricultural Economics 4320 or Economics 5340. Admission to Planning 4100 or Child and Family Studies 5700 or consent of instructor.


5900 Seminar in Human Resource Development (1-3) May be repeated. S/NC only.

6000 Doctoral Research and Dissertation (3-15) May be repeated.

6110-20 Theoretical Issues in Human Resource Development (3,3) Interdisciplinary approach to development and use of human resources in solution of family and consumer problems. Prereq: 12 hrs of 5000-level courses representing 2 areas of home economics. F, W

6210 Professional Issues in Human Resource Development (3) Role and philosophy, and administrative procedures for human resource development. Prereq: 12 hrs of 5000-level courses representing 2 areas of home economics. Sp

6310 Advanced Topics (3) Comprehensive individual study and group discussion of individual and family behavior, physiological development and well-being, environmental factors, and economic and social well-being. Prereq: 6110. May be repeated.

6500 Methodological Issues in Home Economics (3) Advanced methodology in home economics, including design of research, presentation of research and critical evaluation of research methods. Prereq: 1 graduate-level course in research methodology or consent of instructor.

6900 Seminar (1-3) May be repeated. S/NC only.

Home Economics Education

Graduate study in home economics education provides an M.S. in Vocational-Technical Education (concentration in home economics education) and opportunity for participation in the Ed.D. program in Vocational-Technical Education in the College of Education. (See page 64 for staff and course offerings.)

Textiles, Merchandising, and Design

DEGREE
Textiles and Clothing M.S.
Interior Design and Housing M.S.
Consumer Studies and Housing: Public Policy M.S.
Home Economics Ph.D.

MAJORS
Textiles and Clothing

Professors:
R. G. Blakemore Ph.D. (Florida State)
B.C. Goswami Ph.D. (Manchester (England))
J. Y. Oriana (Head) Ph.D. (Iowa State)

College of Home Economics

Ph.D.
M.S.
M.S.
Ph.D.

Associate Professor: M. F. Drake, Ph.D. Pennsylvania State
J. M. Ford, Ph.D. Pennsylvania State
J. A. Thompson, Ph.D. Missouri

Faculty Associate: T. L. Vigo, Ph.D. Tulane.

Assistant Professors:
C. E. Cox Jr., Ph.D. Tennessee
L. A. Kocher, Ph.D. California (Davis)
G. K. McCurry, M.S. California State.

Interior Design and Housing

A student's course of study includes intensive training in interior design as well as courses dealing with the broader aspects of design. All student programs include: Seminar in Design (5040), Advanced Design Studio (5050), and research methods.

The interdisciplinary program in Consumer Studies and Housing: Public Policy is available to students with interest in the social science approach to housing. Courses dealing with interior design or the design aspects of housing are also offered in the department. This may include slides or original work.

4130 Contemporary Design (3) Furnishings and interiors; economic and sociological influences on the home and studio; considerations of living conditions; architecture and furnishings. Significant designers and their work. W

4155 Interior Space Planning I (6) Analysis, planning and design of office environments; includes contract specifications. Prereq: 3256 or equivalent. F

4156 Interior Space Planning II (6) Studio problems involving large scale nonresidential interior spaces such as restaurants, transportation facilities, stores, institutions. Prereq: 4155 or consent of instructor. W

4320 Family Housing Problems (3) Housing requirements of families. Reading and judging house plans; effective use of space; maintenance problems; housing regulations and restrictions; site selection and operational considerations. Prereq: 12 hrs from Economics 2110-20. Sp

4330 Care and Repair of Household Equipment (3) Care of equipment to gain maximum service in relation to operation and service cost; understanding of common repair problems. Prereq: 2430. 1 hr and 2 abs.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student who did not otherwise register during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5040 Seminar in Design (3) Intensive reading, discussion and critical evaluation of twentieth-century design concepts; use of slides or original work. Prereq: 12 hrs from Economics 2110-20. Sp

5065 Advanced Design Studio (4) Strength, structural variability, and form potentials of design materials; search for aesthetic potential in depth. Prereq: 12 hrs from Economics 2110-20. Sp

5068 Practicum (1-12) Field experience in selected agencies and organizations that focus on solutions to problems in housing.

5120 Historic Interior Design (3) Research studies of historic design developments. Variable course content, emphasis on interior design, furniture and/or accessories for England, Scandinavia, Mediterranien.
5210 Furniture Appreciation (3) Aesthetic qualities of past and present styles. Significant structural and formal characteristics.

5310 Interior Design (3) Advanced problems in planning and design of interior spaces; utilization of research information in making design decisions. Prereq: Consent of instructor.

5410 Advanced Problems (3) Individual development of techniques of furniture appreciation. Prereq: 9 hrs related art or equivalent.

5510 Environmental Factors in Interior Design (3) Human factors and associated research techniques related to interior design methodology—derivation of design implications from anatomy, physiology, anthropology, and behavioral sciences. Prereq: 6 hrs behavioral science, and 6 hrs natural science or consent of instructor.

5520 Environmental Factors in Interior Design (3) Systematic design methodology as applied to design of microenvironments using human factors information. Prereq: 6 hrs behavioral science, and 6 hrs natural science or consent of instructor.

5530 Environmental Factors in Interior Design (3) Human factors and systematic design methodology applied to analysis, synthesis, and evaluation of research-oriented interior design projects. Prereq: 3-member teams. Prereq: 6 hrs behavioral science, and 6 hrs natural science or consent of instructor.

5610 Furniture Design (3) Analysis of human factors data in design of body support, task support, and storage of furniture and systems; production of construction drawings and scale models. Prereq: Consent of instructor. Sp

5613 Housing Management (3) Role and functions of housing management specialists in problems of private and assisted housing management. Prereq: 4320 or consent of instructor.

5614 Housing Regulations and Controls (3) Function of regulations and other control practices and mechanisms as determinants of nature, availability of housing in local communities by various user groups. Prereq: 4320 or consent of instructor.

5615 Housing Programs and Policies (3) Analysis of private and public programs and policies to promote realization of suitable homes and living environments for families. Economic and social problems related to national housing objectives. Prereq: 4320 or consent of instructor.

5620 Experimental Methods in Household Equipment Research (3) Introduction to research procedures and techniques in determination of performance of household equipment. Prereq: 2430 or consent of instructor. 1 hr and 2 labs.

5630 Environmental Requirements for Family Work Centers (3) Trend in planning work center areas such as kitchens and laundry; adequacy, convenience, surface treatment, facilities and costs; problems of installation and remodeling.

5815 Environmental Design Research (1-3) Evaluation and application of research methodologies to interior design problems. Hours and credit arranged. Prereq: 5510-20-30 or equivalent and consent of department head and instructor in charge of investigation. May be repeated. Maximum 9 hrs.

5820 Interior Design (1-3) Advanced study in interior design. Hours and credit arranged. Prereq: Consent of department head and professor in charge of investigation. May be repeated. Maximum 9 hrs. E

5830 Problems in Housing (1-3) Advanced study in housing. Hours and credit arranged. Prereq: Consent of department head and professor in charge of investigation. May be repeated. Maximum 9 hrs. E

5910-25-50 Seminar (1-4, 1-4, 1-4) Hours and credit arranged. Prereq: Consent of instructor.

6110 Contemporary Housing Issues and Problems (3) Individual study and group discussion of various issues and problems related to housing. Prereq: Consent of instructor.

6120 Advanced Topics in Housing Research (3) Various concepts, theories and methodologies of social sciences in housing research. Prereq: Consent of instructor.

6210 Environmental Design Analysis (3) Advanced methodology in psychology of environmental design, multidisciplinary research data and methods in interior design. Prereq: 5510-5520 or consent of instructor. May be repeated. Maximum 9 hrs.

6240 Perspectives in Interior Design (3) Historical influences related to contemporary concepts in interior design. Prereq: 5940, 6 hrs of graduate level art history, or consent of instructor.

Textiles and Clothing

4210 Elementary Textile Microscopy (3) Microscopic techniques as applied to the study of textile fibers and fabrics. Prereq: 4010, 1 hr and 2 labs. W, A

4240 Design Analysis II (3) Interpretation of dress design terminating in finished garments developed through the media of draping.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (2-15) E

5110 Textiles Testing and Methods of Research in Textiles (3) Physical and chemical testing. Research methods. 3 labs. Sp

5120 Advanced Problems in Textiles and Clothing (3) Refresher course; new developments in textiles. Selecting fabrics, agencies aiding consumer, and individual problems in textile field. 2 hrs and 1 lab. F

5130 Advanced Tailoring (3) Comparison of hand tailoring and trade methods used in making suits, coats, or costumes. 3 labs.

5150 Principles of Design Analysis (3) Application of flat pattern theory to garment design incorporating relationships of fabric geometry, texture, hand, and surface ornamentation to design. Prereq: Consent of instructor. 1 hr and 2 labs. W

5160 Review of Literature (3) Intensive survey and evaluation of recent literature; implications for further research. F

5170 Social, Psychological and Economic Aspects of Clothing (3) Clothing as it relates to human behavior. Prereq: 6 hrs economics or consent of instructor. W

5180 Advanced Textile Economics (3) Economic problems or problem areas of current importance in textile and apparel industries—production, consumption, and governmental policy. Prereq: 3420, 6 hrs economics or consent of instructor. W

5210 Evaluation of Instructional Materials in the Field of Textiles and Clothing (3) Evaluating instructional materials in communicating information in various areas of textiles and clothing. Prereq: 1 hr and 2 labs.

5220 Historic Textiles (3) Development of textile industry in world; fibers used, design, and color. F

5240 Practicum (1-6) Off-campus experience with business, industry, governmental agencies and civic groups; preplanned; supervised. Prereq: Consent of major advisor and department head. May be repeated. Maximum 9 hrs. S/NC only.

5250-56-60 Problems in Textile Chemistry (4, 4, 4) Theoretical and experimental study of chemistry of textile fibers including polymerization, reactions, dyeing, and finishing. 5250 and 5260 must be taken first, 5250 and 5270 need not be taken in sequence. 5250—Emphasis on structure; property relationships and reactions of fibers, 5260—Emphasis on fabric finishes. 5270—Emphasis on dyes and dyeing. Prereq: 3420 or equivalent; 1 qtr organic chemistry. 2 hrs and 2 labs.

5310 Fashion Analysis (3) Fashion as social and economic force; evolutionary theories of fashion operation. Prereq: 6 hrs each of sociology and economics.

5320 Problems in Historic Costume (3) Variable flow of styles in relation to cultural determinants. Prereq: 3480 or consent of instructor. May be repeated. F, W, E

5700 Current Programs and Trends in Textiles and Clothing (1-3) Pertinent developments and trends in textiles and/or clothing and implications for new types of programs, techniques and/or curricula approaches. Content and emphasis vary according to changes in field and needs of groups serviced. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

5800 Problems in Textiles and Clothing (1-3) Advanced study selected from field of textiles and clothing. Prereq: Consent of department head and professor in charge of investigation. May be repeated. Maximum 9 hrs.

5900 Seminar in Textiles and Clothing (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.


6110 Selected Issues in Textiles and Clothing (3) Advanced topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

6140 Selected Behavioral Theories in Clothing (3) Role of clothing in functioning of people, utilizing behavioral theories. Prereq: 5170, 6 hrs of graduate level sociology or psychology, or consent of instructor.

6150 Social-Psychological Theories of Clothing Consumption (3) Economic problems or problem areas of current importance in textile and apparel industries—production, consumption, and governmental policy. Prereq: 3420, 6 hrs economics or consent of instructor. W

6170 Physical Performance Behavior of Textile Structures I (3) Fundamentals of yarn and fabric structures, relationship of structure to physical characteristics of textile materials. Prereq: 5120, or consent of instructor.

6910 Seminar in Textiles and Clothing (1-3) May be repeated. Maximum 6 hrs.
Intercollegiate Programs

Aviation Systems

MAJOR: Aviation Systems
DEGREE: M.S.

Lead Professor: M. A. Wright, Ph.D. Wales.

Professors: W. Frost, Ph.D. Washington; W. F. Jacobs, Ph.D. Goettingen (Germany); A. A. Mason, Ph.D. Tennessee; J. M. Wu, Ph.D. California Institute of Technology; R. L. Young, Ph.D. Northwestern.

Associate Professors: F. G. Collins, Ph.D. California (Berkeley); R. D. Kimbertin, M.S. Tennessee; J. R. Maus, Ph.D. North Carolina State.

Assistant Professors: W. B. Baker, Jr., Ph.D. Tennessee; V. K. Smith, Ill, Ph.D. Georgia Institute of Technology.

The University of Tennessee Space Institute offers a program leading to the Master of Science 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 who wish to study under a "systems philosophy" toward careers in research and development or administration in various phases pertinent to aviation. The program features 18 quarter hours major field credit in various aspects of aviation systems, 6 or more quarter hours credit in each of the areas of research, development and administration, and electives which permit further specialization to either area.

To qualify for admission to this program, the applicant must possess a Bachelor's degree in engineering or science from a recognized 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. Subject matter prerequisite to the program includes basic knowledge of computer utilization as represented by Computer Science 3150 or equivalent, a background in statistics as represented by Statistics 3450 or equivalent, a basic understanding of aerodynamic fundamentals, aircraft propulsion and performance as represented by Aerospace Engineering 4110 and 4120 or equivalent, a background in accounting as represented by Accounting 5010 or equivalent basic accounting courses, a basic knowledge of economics as represented by introductory economics or equivalent.

Both thesis and non-thesis programs are available. The thesis program involves satisfactory completion of the following minimum requirements:

1. 18 hours in the major field of aviation systems.
2. For the research and development area, 6 quarter hours in Industrial Engineering 5700 and 5710; for the administration area, 6 quarter hours in Economics 5030 and Accounting 5810, for a total of 12 quarter hours.
3. 6 hours of electives selected from the major field, engineering and/or the areas in item 2.
4. 9 hours in Aviation Systems 5000, Thesis, hence demonstrating the ability to conduct and report on an independent investigation.

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

1. 18 hours in the major field of aviation systems.
2. For the research and development area, 9 quarter hours in Industrial Engineering 5700, 5710, and 5720; for the administration area, 9 quarter hours in Economics 5030, Accounting 5810 and Finance 5010-20, for a total of 18 quarter hours.
3. 6 hours of electives in one of the areas in item 2.
4. 6 hours of electives in the major field, engineering and/or the areas of item 2.
5. Satisfactory completion of 3 quarter hours in Aviation Systems 5100, Project in Aviation Systems.
6. Satisfactory completion of a comprehensive final written examination on all course work submitted for the degree and defense of the project course paper.

The thesis program involves 45 quarter-hour credits minimum while the non-thesis program involves 51 quarter-hour credits minimum.

Courses suitable for credit in the major field include: Aerospace Engineering 5810 and 5820, Industrial Engineering 5840; Aviation Systems 5070, 5080, 5090, 5210, 5220, and 5970.

Electives typical of those suitable for credit in the area of aviation systems, research and development include: Aerospace Engineering 5150-60-70: Computer Science 3510-20, 4550 and 5555-65-75; Industrial Engineering 4060, 4150, 4230, 5720, 5730, 6700, 6730; Mathematics 4225-35-45, 4510-20-30; Metallurgical Engineering 5810-20-30; and Statistics 3450.

Electives typical of those suitable for credit in the area of aviation systems, administration include: Accounting 5020; Business Law 5010; Economics 5020; Management 5130; Marketing 5010-20; Transportation 5050, 5130, 5210-20, and 5910.

5000 Thesis (1-15)
5070 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 the community, collection and distribution, demand requirement analyses, types of developments and their projections. Prereq: Aerospace Engineering 5610.
5080 Collection and Distribution (3) Capabilities, technology, plans, programs and developments for collecting and distributing passengers and freight to and from various types of airports. Ground, water, air and mixed transportation modes, present and future; requirements analysis, and model analysis of the system. Prereq: Aerospace Engineering 5810.
5090 Governmental Policies for Aviation (3) Theoretical and legal basis for economic and governmental regulation of aviation. Historical and legislative development of aviation regulatory agencies, organizational structure and administrative and enforcement procedures. Prereq: Aerospace Engineering 5810.
5100 Project in Aviation Systems (3) In-depth study and formal report on aviation systems topic, normally performed during last quarter of work toward degree in non-thesis program. For aviation systems degree candidates only.
5210-20 Experimental Flight Mechanics (3, 3) Flight mechanics, experimental techniques. Speciality
equipped airborne laboratory allows active student participation in a variety of experiments demonstrating acquisition of flight test data. Tests conducted covering broad range of aircraft performance, stability and control. Development of theory necessary to support class experiments, test techniques, instrumentation and data reduction methods. 520 emphasizes stability and control. Prereq: Aerospace Engineering 4120.

5970 Special Topics in Aviation Systems (3) Current topics in aviation systems. Prereq: Consent of instructor. May be repeated with consent. See also course descriptions for Aerospace Engineering 5810, 5820, and Industrial Engineering 5840.

Comparative and Experimental Medicine

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

Joint Coordinating Committee

H. Kitchen (Chairperson); C. C. Congdon; J. E. Fuhr; J. M. Holland; R. L. Michel; J. M. Woodward

The Comparative and Experimental Medicine degree program (M.S. and Ph.D.) is a jointly administered program designed to provide students with in-depth knowledge of the biomedical sciences. This program emphasizes the comparative approach to study of pathology, immunopathology, aberrant metabolism, oncology, and genetic disorders. The program is open to approved graduate students seeking training in this area and is especially useful for individuals with professional degrees. The program is intended to prepare students for teaching, research, and professional positions in industry or government.

ADMISSION REQUIREMENTS

General Requirements

Admission requirements of The Graduate School have been met. Applicants who are admitted to the Master of Science degree program are: (1) admission to the Graduate Record Examination; (2) at least 12 quarter hours of college mathematics, and 4 quarter hours of college science; (3) at least 18 hours of college mathematics and 4 quarter hours of college science; (4) the Graduate Record Examination (optional). Application forms for admission should be obtained from the Graduate School. Inquiries concerning the admission requirements should be addressed to the Director, Graduate Program in Ecology, University of Tennessee, Knoxville, Tennessee 37916.

ADVISORS

Advisors are selected from ecologists in several departments of the University who have competence in the area in which the student expects to work. Entering students are expected to choose their advisor early in the program. The advisor will be the student's faculty committee.

THE MASTER'S PROGRAM

The minimum 45 quarter hours of graduate credit shall include 18 hours of ecology courses (exclusive of thesis), of which 6 hours shall be in Ecology 5210-20-30 and at least 8 additional hours in ecology courses numbered above 5100; 9 hours of thesis in Ecology 5500, and 18 additional hours in ecology or supporting courses. To insure an interdepartmental program, the required minimum 45 hours shall include no more than 18 hours of non-thesis courses from any one department of instruction.

The general requirements for this Master's degree are listed on page 19. A minor in ecology is available.

THE DOCTORAL PROGRAM

The requirements for this degree are in general the same as those of The Graduate School. In addition, the doctoral program must include Ecology 5210-20-30 and a minimum of 9 quarter hours of courses numbered above 6000. A student cannot enroll for dissertation until the research proposal has been discussed and approved by the doctoral committee.

Shared Faculty

Industrial and Organizational Psychology

MAJOR

Industrial and Organizational Psychology

DEGREES

M.S., Ph.D.

Committee:

J. M. Larsen, Jr. (Chairperson); W. H. Calhoun; F. A. Chambliss; H. D. Dewhirst; M. E. Gordon; R. T. Ladd; J. W. Lounsbury; M. C. Rush; E. D. Sundstrom; D. J. Wheeler; G. H. Whitlock.

(For complete Faculty Listing, see Departments of Management and Psychology)

The Master's and doctoral programs are offered jointly by the Department of Psychology and the Department of Management. They are designed to prepare students for personnel, managerial and organizational research. They include university teaching and research opportunities with industry. The emphasis is upon applied research utilizing a thorough theoretical background, including classical and modern organization theory, organizational behavior, psychology, and management. The programs are administered by a joint committee of the two departments, appointed by the Vice Chancellor for Graduate Studies and Research on recommendations from the two department heads.

It is intended that students entering the 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 which will assist the student to attain a reasonable level of sophistication in areas of deficiency.

ADMISSION PROCEDURE

Applicants for admission should request forms and make application to the Graduate Office and the Chairperson, Industrial and Organizational Psychology Program, 413 Stokely Center for Management Studies.

Two separate applications must be completed: one application for admission to the Graduate School and one application for admission to the Industrial and Organizational Psychology program.

Deadline: For fall entrance, all materials should be received by the Vice Chancellor for Graduate Studies and Research no later than March 1 if you wish financial assistantship consideration. Standards: At least 9 quarter hours of college mathematics and one course in statistics are required. Ordinarily, an undergraduate grade-point average of 2.5 or above is required, with no evidence of special weakness in mathematics and physical sciences.

Test scores on each section of the aptitude portion and the Advanced Psychology portion of the GRE are required. Customarily, those students admitted to the program have performed above the 63rd to 65th percentile on the aptitude tests. (This corresponds to a raw score of approximately 500 on each of the tests.) The GRE Advanced Psychology score will be used in making admission decisions, although special consideration will be given in the case of non-psycho-logists majoring in psychology.

THE MASTER'S PROGRAM

I. Course Requirements

A. Management or Psychology 5170, 5180, 5190.

B. Statistics 5050-60-70 and 3 hours of applied psychometrics.

C. Eighteen hours of additional course work to be selected primarily from among the 5000-level course offerings in management and psychology (e.g., Management 5110, 5120, 5220, 5260, 5270).

D. Nine hours of Psychology or Management 5000 (Master's Thesis).

II. Program Requirements

A. A minimum of a comprehensive examination in general psychology within no more than two years of entry by attaining a score of 630 or the 85th percentile on the GRE Advanced Test in Psychology.

B. The Ph.D. program requirements described below in sections II A, and II G comprise the major requirements for a Master's degree. An oral examination covering the thesis and related topics must also be completed.

THE DOCTORAL PROGRAM

I. Course Requirements

A. Minimum course requirements:

1. Management or Psychology 5170, 5180, 5190.


3. Minimum of three 6000-level seminars to be selected from Psychology or Management 5250, 5260, 5270, Management or Psychology 6380.*

4. 36 hours of Psychology or Management 6000.

B. Recommended electives:

1. For students for advanced section (81) GRE: Psychology courses as appropriate.

2. For students who require preparation in psychometrics: Applied psychometrics.

3. For students who require preparation in management: Management 5110, 5120, 5220, 5250, 5230.

4. For students who wish to pursue special research interests aside from their dissertation: Management 5250, 5260, 5270, Management or Psychology 6900.

5. Courses available in areas related to industrial and organizational psychology:

a. Through College of Business Administration.

b. Through College of Liberal Arts.

c. Others as approved by advisor.

II. Program Requirements*

A. A minimum of a B average*** in Management or Psychology 5170, 5180, 5190.

B. Completion of a comprehensive examination in general psychology within no more than two years of entry by attaining a score of 650 or the 90th percentile on the GRE Advanced Test in Psychology.

C. Completion of a comprehensive examination in scientific methodology before beginning the third year of study. This examination covers the following specific areas: statistics, psychometrics, experimental design.

D. Completion of a special comprehensive examination in the area of the student's major research and professional interest. A student is expected to take this examination by the end of twelve quarters. This examination may be repeated once, normally no later than six months after the first attempt, at the discretion of the student's doctoral committee.

E. By the end of nine quarters a student is expected to choose a major advisor (Chairperson of Doctoral Committee).

F. Completion of oral examination following the preparation of a doctoral dissertation. This examination covers the

*May be repeated for additional credit.

**Any student in the doctoral program may be required to prepare a Master's thesis and/or dissertation in 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 or the qualifications for pursuing a Ph.D. are required.

***See program handbook for definition of a B average.
Management Science

MAJOR
Management Science

DEGREE
M.S.

Committee:
R. S. Garfinkel (Chairperson), Management Science; R. W. Boling, Management; J. S. Bradley, Mathematics; R. L. Church, Civil Engineering; E. Glustoff, Economics; W. J. Morse, Accounting; R. E. Rosenthal, Management Science; R. E. Shrieves, Finance; C. C. Thigpen, Statistics; M. G. Thomason, Computer Science.

THE MASTER'S PROGRAM

The M.S. program in Management Science is designed as preparation for a career in the application of quantitative techniques for the solution of management problems in large organizations. The program's flexibility also makes it appropriate as preparation for doctoral study in Management Science. Management Science course work will expose students to both the theoretical development of quantitative techniques and their application to managerial decision making. In addition to the development of sufficient mathematical maturity for creative use of quantitative skills, the program requires concentrated study in a supporting area. Supporting areas are available in other departments of the College of Business Administration (excluding statistics) as well as in computer science, public administration, ecology and other areas, subject to approval by the Management Science Committee.

Applications are encouraged from all majors, but mathematics background equivalent to the completion of at least two years of college calculus and proficiency in a computer language (e.g., Computer Science 3150) is required. The program is designed to be completed in one calendar year by full-time students entering in the fall quarter. However, students may start the program in any quarter and may pursue an M.S. degree in Management Science on a part-time basis.

Course Requirements

<table>
<thead>
<tr>
<th>Course Requirements</th>
<th>Quarter Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Science 5310-20-30-35-40</td>
<td>14</td>
</tr>
<tr>
<td>Applied concentration area (approved by advisor)</td>
<td>12</td>
</tr>
<tr>
<td>Statistics 5110</td>
<td>3</td>
</tr>
<tr>
<td>Statistics elective (5000 level or above)</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics (4000 level or above)</td>
<td>6</td>
</tr>
<tr>
<td>Electives selected from mathematics, statistics, computer science, and/or management science</td>
<td>6</td>
</tr>
<tr>
<td>Electives in any area approved by advisor</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

A thesis option is available which substitutes 9 hours of thesis credit for the following 14 hours of course work: Management Science 5335-40, and one 3-hour course in the applied concentration area and 6 hours of electives in any area. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The committee must approve a tentative overall program during the student's first quarter and must approve all courses on a quarter-by-quarter basis.

Recognizing the diverse backgrounds and needs of Management Science M.S. students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. For example, an undergraduate mathematics major with a strong background may be allowed to take 6 additional hours of electives in place of the mathematics requirements. On the other hand, a student lacking experience in rigorous senior-level mathematics courses will be asked to take such courses to fulfill the 6-hour mathematics requirement. The total course load will remain 50 hours for all non-thesis students and 45 hours for all thesis students; however, the number of hours of electives can be reasonably expected to vary between 6 and 18 as a function of prior background.

For course listings and description of the Ph.D. program in Management Science, refer to the Department of Management Science, College of Business Administration.
The College of Liberal Arts offers programs leading to eight advanced degrees.* See page 9 for degrees and majors.

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 1-12 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.

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, working in political campaigns, etc. Credit per quarter will vary from 1-12 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.

INDEPENDENT STUDY

Certain educational goals may best be met through independent study done 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 quarter will vary from 1-12 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.

Departments of Instruction

Anthropology

MAJOR

Anthropology

DEGREES

M.A., Ph.D.

Professors:

W. M. Bass (Head), Ph.D. Pennsylvania; C. H. Faullner, Ph.D. Indiana; A. K. Guth, Ph.D. Michigan; R. L. Jantz, Ph.D. Kansas; P. W. Parmalee, Ph.D. Texas A & M.

Associate Professors: I. E. Harrison, Ph.D. Syracuse; M. H. Logan, Ph.D. Pennsylvania State; F. H. Smith, Ph.D. Michigan.

Assistant Professors: B. J. Howell, Ph.D. Kentucky; W. E. Klippel, Ph.D. Missouri; G. F. Schroedl, Ph.D. Washington State.

The Department of Anthropology offers the Master's Program and the Doctor of Philosophy degrees with concentrations in physical anthropology, cultural anthropology, archaeology, zooarchaeology, and folk culture.

THE MASTER'S PROGRAM

The formal requirements for the Master's degree include:

1. A minimum of three quarters of residence at The University of Tennessee, Knoxville.
2. A minimum of 45 quarter hours for graduate credit, including preparation of thesis. Thirty-six of these 45 hours must be in anthropology, 9 hours may be taken in closely related disciplines (at least one-half of the courses must be at the 5000 level).
4. A thesis. In addition to the two (2) copies required by the Graduate School, one bound copy of the thesis is to be presented to the department and one bound copy to the student's thesis advisor.

THE DOCTORAL PROGRAM

Although there is no minimum credit hour requirement for the Ph.D. degree, students in this program should plan to devote to its attainment no less than 3 years beyond the B.A. level and to complete the following requirements:

1. Admission to Ph.D. program through passing Graduate Evaluation Examination at completion of first year of study, or through departmental acceptance of a previously earned M.A. degree in Anthropology.
2. Formation of an advisory committee and establishment in consultation with that committee of a program of study. Delineation of field(s) of competence by the student and committee and subsequent presentation to graduate advisor.
3. Demonstration of competence in a foreign language as determined by the student's committee.
4. Successful completion of oral and written comprehensive examinations and admission to candidacy.
5. Successful completion of the dissertation and final oral examination.

3070 Genetics and Society (3) (Same as Botany 3070)

3419 Principles of Cultural Anthropology (3) Basic concept and objectives in study of culture. Range of cultural phenomena and approaches to its study. Recommended prerequisite: 2530. F or W

3440 Religion of Primitive Peoples (3) Religions of nonliterate peoples. Place of religion in their social and cultural systems. Recommended prerequisite: 2530. (Same as Religious Studies 3440) F or Sp

3450 Community Studies in Complex Culture (3) Review of cross-cultural comparative urban and village communities and methodologies used in community studies. Recommended prerequisite: 2530. A

3510 Peoples and Cultures of Mainland Asia (3) Ethnographic survey of the indigenous cultures of mainland Asia. Cultural diversity and human ecol-
ogy in area perspective. Recommended prereq: 2530.
3530 Peoples and Cultures of Africa (3) Ethnographic survey of the aboriginal cultures of sub-Saharan Africa. Current and historical anthropology as a discipline. Emphasis on cultural differences of peoples occupying these areas during precolonial period. Prereq: 2530. F or Sp.
3555 Cherokee Ethnology (3) Survey of sociopolitical aspects of internal affairs and external relationships from first European contact to present. Emphasis on eighteenth and nineteenth centuries.
3580 Peoples and Cultures of Mesoamerica (3) Ethnographic survey of aboriginal peoples and post-conquest changes in Indian cultures. Emphasis upon analysis of small rural communities using modern village studies as source material. Recommended prereq: 2530. A
3610 Archaeology of United States and Canada (3) Survey of prehistoric peoples north of Mexico from initial occupation to European contact. Recommended prereq: 2530.
3620 European Prehistory I (3) Cultural developments during Paleolithic, Mesolithic, and Neolithic. Recommended prereq: 2520. W, A
3630 European Prehistory II (3) Cultural developments during Metal Ages. From the close of Neolithic through Iron Age. Recommended prereq: 2520. 3620 and 3630 should be taken in sequence. W, A
3640 Ancient Civilization of Mesoamerica (3) Introduction to archaeology of areas of advanced Indian culture in Mexico and Central America beginning with earliest cremation and preceramic to contact with Europeans. Recommended prereq: 2520.
3660 Prehistory of Tennessee (3) History of archaeological research in Tennessee and survey of prehistoric American Indian cultures identified through research. Sp
3670 Principles of Archaeology (3) Research strategies in archaeological excavation, interpretation, and explanation. Prereq: 2520 or consent of instructor. A
3700 Forms of Folklore (4) Introduction to the anthropological study of folklore.
3710 Survey of European Folk Cultures (3) Material anthropological study of folklore.
3700 Forms of Folklore (3) An ethnographic survey of cultures of Arctic, Southwest, Plains and Eastern Areas. Emphasis on cultural differences of peoples occupying these areas during precolonial period. Prereq: 2530. F or Sp.
4111 Non-Western Education: Anthropological Approaches (3) Analysis of traditional educational practices among non-Western peoples and problems encountered from application of Western models of education among those peoples. Particular attention is paid to African, American Indian, and Asian tribal groups and Asian cultures. (Same as Curriculum and Instruction 4111.) W
4200 Contemporary North American Indian (3) Survey of Indian cultures from initial Euro-American contact to present. Emphasis on change culture, U.S. Government Indian policy, reservation life. Prereq: 2530 or consent of instructor. A
4210 Ethnographic Research Techniques (3) Methods of collecting data and utilizing data. Prereq: Consent of instructor. A
4240 Applied Cultural Anthropology (3) Application of anthropological theory, methods and findings in programs of community and national development, public health, international aid, and military assistance. Examination of the roles of anthropologists, questions of values and ethics in intervention schemes, and of organization of planned changes in applied programs. Intensive analysis of selected case studies. Prereq: 2530. A
4250 Medical Anthropology: Lecture (3) A survey of medical anthropology. Emphasis on Western and non-Western cultural aspects of health, disease, treatment, and health-illness concepts. Focus on analyses and descriptions of anthropological fieldwork. Sp
4259 Medical Anthropology: Laboratory (3) Fieldwork in medical anthropology. Emphasis on cultural aspects of health, disease, and death in industrial societies and folk medicine systems which coexist with technology, medicine. Coreq or prereq: 4250. A
4300 Readings in Anthropology (1-9) Intensive reading, problem oriented. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E
4340 Field Work in Archaeology (3-9) Practice in surveying, excavating, processing, and analyzing of data; intensive reading. Prereq: 2510-20-30 and consent of instructor. May be repeated. Maximum 9 hrs. F
4360 Field Work in Physical Anthropology (3-9) Practicum in collection and analysis of human biological remains in both living or living populations. Prereq: 2510-20-30 and consent of instructor. May be repeated. Maximum 9 hrs. F
4400 Cultural Ecology (3) Survey of concepts and methods in studying dynamic interaction between cultures and their environments. Topics include ecological theory, methods of analysis, and application from specific case studies. Prereq: 2520, 2530, 2540 or consent of instructor. A
4420 Dynamics of Culture (3) Culture change: innovation, diffusion and acculturation; cultural continuity and stability. Prereq: 2530 or consent of instructor. A
4430 Personology and Culture (3) Analysis of relations among individual, society and culture. Application of psychological techniques in cross-cultural studies. Cultural differences and their influence on group behavior. Prereq: 2530 or consent of instructor.
4440 Urban Anthropology (3) Survey of theoretical and methodological issues anthropologists encounter researching cross-cultural urban settlements. Focus on anthropological perspective and urban problems and planning. Prereq: 3430 or consent of instructor. A
4480 Current Trends in Anthropology (3) Analytical integrative review in symposium of the current debates, research directions, theories, fieldwork methods, and general assumptions of the four subfields of anthropology: archaeology, physical anthropology, linguistics, and cultural anthropology. Sp
4490 Cross-Cultural Survey of Sex Roles and Behavior (3) Examination of sex roles and sex behavior from a cultural and diachronic viewpoint. Draws disparate and scattered studies together and attempts to arrive at conclusions on questions as to how sex roles and sex behavior have changed or changed. Prereq: 2510 or consent of instructor. A
4510 Peoples of China II: Chinese Society After 1839 (3) Anthropological survey of Chinese society and culture in the last 150 years: rejection of the West, and development of modern, communist Chinese society and culture. Prereq: 2510 or consent of instructor. Recommended prereq: East Asian course.
4520 Peoples of the Southeastern United States (3) Survey of Southeastern Indian cultures; emphasis on post-contact adjustment to environment. Westward expansion of Southeastern Amerind groups prior to Euro-American contact. Prereq: 2530, 3450 or consent of instructor.
4580 Cherokee Ethnology (3) Intensive survey of ideology and material aspects of Cherokee culture existing at time of first European contact.
4570 Peoples of Southeast Asia (3) Survey of representative ethnic groups and indigenous cultures of mainland and island Southeast Asia. Problems of contemporary culture changes. Prereq: 2530, consent of instructor or an East Asian course.
4580 Asians in the Americas Since 1600: Anthropological Perspectives (3) Character, factors, and motivations in Asian immigration to North, Central and South America. Assimilation pattern and enclave communities are major topics. Major courses are on United States.
4590 Peoples of Japan (3) Analysis of the culture diversity and unity of peoples of Japan. Prereq: 2530 or consent of instructor. Recommended: 4510 or an East Asian course.
4600 Method and Theory in American Archaeology (3) Historical development of New World archaeology. Emphasis on theory and field techniques. Prereq: 2520 or consent of instructor. F
4610 African Prehistory (3) Survey of cultural history in Africa, south of the Sahara, from earliest evidence of human activity to time of European contact. Prereq: 2520 or consent of instructor. A
4640 Zooarchaeology (3) Basic osteological studies of vertebrate classes; emphasis on aboriginal human utilization of native animals in subsistence and culture. Identification, analysis, and interpretation of archaeologically derived molluscan and vertebrate remains. Sp.
4650 Archaeology of Southeastern United States (3) Intensive study of prehistoric American Indian. Special emphasis on Tennessee prehistory. Prereq: 3630 or consent of instructor. W, A
4660 Prehistory of Northwest North America (3) Survey of archaeological research and prehistoric cultures in Northern Great Basin, Columbia Plateau, Northwest Plains, and Northwest Coast. Recommended prereq: 2530. A
4720 American Folklore (3) Anthropological perspectives of folklore of geographical regions and ethnic groups of the United States. Prereq: 3700 or consent of instructor. A
4740 Southern Appalachian Folk Culture (4) Research-oriented course dealing with wide range of traditional culture in Southern Appalachia: settlement patterns, folk housing, economy, clothing, belief, speech, art, song, dance, and oral traditions and customs. Prereq: Consent of instructor. May be repeated.
4750 Mexican Folklore (3) Anthropological perspectives on folklore of Mexico and Spanish speaking southwestern United States. Prereq: 3700 or consent of instructor and a reading knowledge of Spanish.
4760 Italian Folklore (3) (Same as Romance Languages 4760.)
4780 Cherokee Language (3) Linguistic survey of the language of the Cherokee nation. Prereq: 2520 or consent of instructor. A
4930 Physical Growth and Constitution (3) Comparative growth patterns throughout the human life cycle, skeletal and dental maturation; sex differences in growth and development; nutritional types. Prereq: 2510 or consent of instructor. A
4940 Biology of Native Americans (3) Indian origins and evolution from standpoint of skeletal remains and morphology and genetics of Indian populations. Recommended prereq: 2520.
The Art Department offers two graduate degrees: Master of Arts and Master of Fine Arts. In order 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.
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. Application forms and further information are available by writing to the Department of Art.

MASTER OF ARTS

Areas of concentration consist of ceramics, communication design, drawing, fiber-fabrics, painting, printmaking, sculpture, and watercolor. One year of residence is required.

Curriculum:

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<tr>
<th>Quarter Hours</th>
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<tr>
<td>Thesis</td>
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<tr>
<td>Area of concentration</td>
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<tr>
<td>Drawing and composition</td>
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<tr>
<td>Art history</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Total</td>
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The thesis is a critical essay relevant to the area of concentration. The M.A. thesis may not be used to fulfill the project in lieu of thesis requirements for the M.F.A. A graduate exhibition is required. Final examination is oral.

MASTER OF FINE ARTS

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

Six quarters beyond the baccalaureate degree are required in residence. Residence is defined by the Department of Art as (1) a minimum enrollment of 6 hours per quarter, and (2) use of Department of Art facilities so that students are available for discussion and criticism. Final examinations are oral, concurrent with project exhibition.

Curriculum:

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<tr>
<th>Quarter Hours</th>
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<tbody>
<tr>
<td>Project in Lieu of Thesis</td>
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<tr>
<td>Major area</td>
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<tr>
<td>Art history</td>
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<td>Electives</td>
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<tr>
<td>Seminar in Art History</td>
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<tr>
<td>Seminar in Art Criticism</td>
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<tr>
<td>Total</td>
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DEGREE REQUIREMENTS FOR M.F.A.

1. Successful completion of 30 hours of studio in concentration area. Inter-area studies must normally be approved by the faculty no later than the third quarter in residence. Fifteen hours of the major must be in second year courses.
2. Twelve hours of art history for graduate credit.
3. Seminar in Art History (4 hours) and Seminar in Art Criticism (4 hours).
4. Ten hours of electives which may consist of any committee-approved combination of graduate credit courses outside the student’s departmental concentration.
5. First year evaluation: At the end of the three quarters in residence the student must present work for evaluation by the faculty and receive permission to continue in the program.
6. Second year evaluation: With completion of all course work the student must present work for evaluation by the faculty and receive permission to register for Projects in Lieu of Thesis (Art 5999).
7. Art 5999, Projects in Lieu of Thesis (30 hours) is a third year of semi-independent study.
8. 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 the work, must satisfactorily complete an oral examination.

GRADUATE MINOR IN THE HISTORY OF ART

A graduate minor in Art History may be arranged with the 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.

3516 Typography (4) Theories and techniques of typesetting and printing as fine art medium. Creative problems using type and printing presses. May be repeated. Maximum 12 hrs.
3517 Airbrush (4) Technique of airbrush. Emphasis on skill and creative applications. For art majors only. F, Sp.
3704 Medieval Art (4) Byzantine and western art of Middle Ages: manuscript illumination, mosaic, Romanesque pilgrimage church, Gothic cathedral. F.
3705 Northern European Painting: 1350-1600 (4) From courtly art of late Middle Ages to Northern Renaissance. Jan van Eyck, Roger van der Weyden, Bosch, and Durer; early printmakers. A.
3716 The Art of Italy, 1475-1575 (4) Leonardo da Vinci, Michelangelo, Titian, Raphael, Pontormo and Giorgione, F.
3726 The Art of Northern Europe, 1500-1675 (4) Concentrated study of Bruegel, Rubens, Rembrandt, Georges de La Tour, Vermeer, Poussin and Hals, W.
3735 History of Nineteenth-century Painting in Europe and America (4) Emphasis on French; Neo-classicism, Romanticism, Friedrich, Constable, Turner, Courbet and Barbizon landscape artists, Hudson River Group, pre-Raphaelite Brotherhood, Manet, Courbet, Impressionism, Eakins, Homer, Seurat through Cezanne, W.
3736 History of Twentieth-century Painting in Europe and America (4) Fauvism, Die Brucke, Cubism, Blaue Reiter, Futurism, Dada and Surrealism, geometric abstraction, social commentary painting, Abstract Expressionism in the U.S. and paralleling in Europe; Pop, Op, Minimal, and Concept Art, F.
3746 History of Modern Sculpture in Europe and America (4) From 1800 to 1900. Neoclassicism to Rodin; Picasso 1900 to present: emphasis on Cubism, Constructivism, Expressionism, Assemblage, Pop, Primary Forms, Environments, and Earthworks, Sp.
3763 Crafts in America (4) Craft movement; growth and development. Educational, social, economic, and aesthetic values. Role of designer in society as producer and teacher.
3765 History of North American Art (4) Survey of landmarks in painting, architecture, sculpture, and design from prehistory to 1900. F.
3766 History of Twentieth-century American Art (4) Analysis of developments in architecture, painting, sculpture, and design from 1900, W.
3775 Art of Indian Asia (4) History of Indian art with consideration of art of Central Asia and Southeast Asia. Sp.
3776 Chinese Art (4) F.
3777 Japanese Art (4) F.
3811 Introduction to Museology (3) Concepts, practices and historical development of museums of art, archaeology, anthropology and science. (Same as Anthropology 3811)
4006 Special Topics (2-4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.
4015 Individual Projects (4) Prereq: Consent of instructor. May be repeated. Maximum 16 hrs.
4106 Special Topics in Drawing (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.
4115 Drawing IV (4) Individualized pursuit of personal drawing techniques and concepts; individual and group critiques; weekly life drawing sessions. Prereq: 12 hrs 3155. May be repeated. Maximum 16 hrs.
4119 Advanced Design Studio (4) To explore strengths, structural variability and form potentials of design materials, aesthetic potential. Prereq: Senior or graduate standing or consent of instructor.
4206 Special Topics in Painting (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.
4215 Painting IV (4) Individual concepts of personal expression with varied media on canvas. Prereq: 12 hrs 3215 for art majors; consent of instructor for non-majors. May be repeated. Maximum 12 hrs.
4256 Special Topics in Fiber and Fabrics (4) Student- or instructor-initiated course to be offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.
4315 Watercolor IV (4) Individual concepts of personal expression with varied water-based media in paper. Prereq: 12 hrs 3315 for art majors; consent of instructor for non-majors. May be repeated. Maximum 12 hrs.
4406 Special Topics in Sculpture (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.
4415 Sculpture IV (4) Individual development of sculptural problems and techniques. May be repeated. Maximum 16 hrs.
4470 Wood Design: Advanced Practical Construction (4) Application of laminations, carving and joining techniques in designing and construction of
contemporary furniture. Prereq: 2450 or consent of instructor. May be repeated. Maximum 12 hrs.

4506 Special Topics in Communication Design (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.


4516 Portfolio and Exhibition Techniques (4) Application of design principles to promotion, construction, display and evaluation for two- and three-dimensional artists. Prereq: Senior or graduate standing or consent of instructor. Sp

4545 Visual Communications Seminar (2) Political, social, economic and ethical problems of contemporary designer. Sessions with outside guest speakers and field trips. Prereq: 4515. W

4606 Special Topics in Printmaking (4) Student or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.

4615 Intaglio IV (4) Photographic, collage techniques, combine printing with other print media. May be repeated. Maximum 12 hrs. F, W, Sp


4617 Screen Printing (4) Traditional hand cut and photographic stencils, combine printing on paper and other surfaces. May be repeated. Maximum 12 hrs. F, W, Sp

4656 Special Topics in Metal Design (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.


4685 Studies in Art History (2) Concentration in selected areas. Prereq: 16 hrs of art history and consent of instructor. May be repeated. Maximum 6 hrs.

4686 Special Topics in Ceramics (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.


4970 Glaze Calculation (4) Prereq: Senior or graduate standing and consent of instructor. W

4971 Kiln Construction (4) Prereq: Senior or graduate standing and consent of instructor. Sp

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May be used toward degree requirements. May not be repeated. S/N only. E

5011-2131 Exhibition in Lieu of Thesis (3, 3, 3)

5101 Foreign Study (1-12) See page 99.

5102 Off-campus Study (1-12) See page 99.

5103 Independent Study (1-12) See page 99.

5115 Graduate Drawing I (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5125 Graduate Drawing II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5215 Graduate Painting I (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5225 Graduate Painting II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

525 Graduate Fiber and Fabrics I (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5275 Graduate Fiber and Fabrics II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5315 Graduate Watercolor I (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5325 Graduate Watercolor II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5415 Graduate Sculpture I (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5425 Graduate Sculpture II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5515 Graduate Communication Design I (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5525 Graduate Communication Design II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5561 Graduate Painting/Lithography II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5562 Graduate Painting/Intaglio II (2-6) Individual problems with etching and engraving. May be repeated. Maximum 18 hrs. F, W, Sp

5627 Graduate Screen Printing-Screen Printing II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5755 Reading and Research in Art History (2) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

5770 Seminar in Art History (4-A)

5900 Seminar in Art Criticism (4) Theory and practice. Intended for majors in studio art.

5955 Graduate Ceramics I (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5975 Graduate Ceramics II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp

5999 Projects in Lieu of Thesis (10) Prereq: All graduate course work and successful second year evaluation by the graduate faculty. May be repeated. Maximum 30 hrs. E

Graduate II courses must be preceded by successful first year evaluation by the faculty.

Courses offered periodically only at the Pi Beta Phi Arrowmont School of Crafts, Gatlinburg, Tennessee. Courses may be repeated.

4104 Drawing (1-4) Intermediate to advanced.

4204 Painting (1-4) Intermediate to advanced.

4254 Fiber Processes (1-4) Intermediate to advanced.

4264 Fiber Construction (1-4) Intermediate to advanced.

4274 Fabric Surface Design (1-4) Intermediate to advanced.

4284 Fabric Constructions (1-4) Intermediate to advanced.

4304 Watercolor (1-4) Intermediate to advanced.

4404 Sculpture (1-4) Intermediate to advanced.

4504 Communication Design (1-4) Intermediate to advanced.

4604 Printmaking (1-4) Intermediate to advanced.

4654 Metal Design (1-4) Intermediate to advanced.

4664 Enameling (1-4) Intermediate to advanced.

4904 Photography (1-4) Intermediate to advanced.

4954 Ceramics (1-4) Intermediate to advanced.

**Audiology and Speech Pathology**

**MAJORS**

Audiology Speech and Hearing Science

**DEGREES**

M.A. M.A.

* Ph.D.

**Speech Pathology**

M.A.

Professors:

H. L. Luper (Head), Ph.D. Ohio State; S. Adler, Ph.D. Ohio State; C. W. Asp, Ph.D. Ohio State; P. J. Carney, Ph.D. Iowa; D. M. Lipscomb, Ph.D. Washington; I. Nabelek, Sc.D. Prague; H. A. Peterson, Ph.D. Illinois; B. Silverstein, Ph.D. Purdue.

Associate Professors:

S. B. Burchfield, Ph.D. Michigan State; C. G. Maier, M.D., Texas;

Assistant Professors:

A. O. Diefendorf, Ph.D. Washington; E. Ireland, Ph.D. Iowa; C. J. Ferrell, M.A. Tennessee.

**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. Within this broad coverage of speech pathology or audiology, it is possible for a student to specialize to some extent. For example, in the M.A. in Audiology program, a student may specialize in aural habilitation-rehabilitation, medical or pediatric, or industrial audiology. Within the M.A. in the Speech Pathology program, a student may specialize in language disorders, cultural language differences, or speech disorders such as aphasia or stuttering.

Students interested in specializing beyond the typical broad M.A. program should consult the department chairperson or their advisor for lists of suggested courses, practica and independent studies.

Students majoring in the two areas are expected to complete the academic requirements for their major as well as certification from the American Speech and Hearing Association, including the required number of clock hours of clinical practicum. An exception to this rule must be approved by the Department Curriculum Committee.

Enrollment in clinical practicum courses is required for all clinical practice experiences. If the undergraduate preparation does not include sufficient course work in speech pathology, audiology, psychology, and related fields, the student may be required to make up such deficiencies.

Students may elect either the thesis program or the non-thesis option. Students in both programs are normally required to take 5110 and 5119. The Master's program with the thesis will include a minimum of 45 quarter hours of approved graduate credit, including 9 quarter hours of 5000 credit in the preparation of an acceptable thesis representing original independent work, and a final oral examination. At least one-half of these total courses must be at the 5000 or 6000 level, no more than 9 hours of which may be thesis courses. Students in the non-thesis option program must present a total of 48 quarter hours of approved graduate credit and pass a final written examination. A minimum of 24 quarter hours must be at the 5000 or 6000 level. The decision as to choice of the thesis or non-thesis program is normally made following completion of 5110 and a conference with the student's advisor.

**THE DOCTORAL PROGRAM**

The Ph.D. program in Speech and Hearing Science seeks to develop individuals for research or college teaching careers in the
field of speech and language pathology, audiology, or speech and hearing science. This degree program is research oriented, with primary emphasis upon developing the scientific and cognitive skills which allow individuals to identify and independently study important questions concerning the human act of oral and aural communication. Students will be expected to master the accumulated knowledge in the area 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 experiential design which enable the student to investigate problems pertaining to speech and hearing processes.

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

Specific programs of study will be determined by the student in consultation with his/her faculty committee. In addition to the general Graduate School requirements, specific requirements for the degree of Doctor of Philosophy in Speech and Hearing Science will include:

1. Successful completion of course work in the study of one or more research tools, or other specific scientific methodological vehicles pertinent to the research interests of the candidate. The choice of research tool(s) is subject to departmental approval.
2. A minimum of 9 quarter hours of graduate credit obtained in course work in a cognate field outside the Department of Audiology and Speech Pathology. These hours are in addition to those required in item 1 above.
3. Sufficient course work within the department that fulfills the area of specialization to give a broad foundation and understanding.
4. A comprehensive examination to demonstrate a general knowledge of the basic areas of audiologic and language pathology, and speech and hearing science; advanced knowledge of the specifics of the area of specialization.
5. Research and dissertation to give at least 36 hours of graduate credit (6000 level).
6. A final oral examination.

4100 Appraisal of Speech and Language Disorders (4) Diagnostic procedures for children and adults with speech and language problems including observation and practice with diagnostic tests. Prereq: 3040, 3050, or consent of instructor. (Same as Special Education 4040.) F, Sp
4070 Free Association (4) Oral and written free association as process for diagnosing and treating communication disorders. Includes didactic self-analysis. W
4180 Speech Development of the Hearing Impaired (3) (Same as Special Education 4180.)
4200 Practicum in Speech Development of the Hearing Impaired (3) (Same as Special Education 4200.)
4210-20 Language Development of the Hearing Impaired Part I, II (3, 3) (Same as Special Education 4210-20.)
4250 Introduction to the Psychology and Education of the Hearing Impaired (3) (Same as Special Education 4250.)
4310 Stuttering (3) Nature and treatment. Review and integration of various theories. Prereq: 3040 or consent of instructor. (Same as Special Education 4310.) F, Su
4320 Introduction to Clinical Practice in Speech Pathology (3) Prereq: 3040, 3050, 3310, 4040, and consent of instructor. (Same as Special Education 4320.) E
4330 Clinical Practice in Speech Pathology (1-6) Prereq: 4330 and consent of instructor. (Same as Special Education 4330.) S/NC only. E
4340 Clinical Practice in Speech Pathology (1-6) Prereq: 4330 and consent of instructor. (Same as Special Education 4340.) May be repeated. S/NC only. E
4400 Voice Disorders (4) Etiology, diagnosis, and treatment of organic and functional voice disorders. Prereq: 3040, 3065, or consent of instructor. (Same as Special Education 4400.)
4450 Clinical Practice in Audiology (1-6) Prereq: 4720 and 4930. E
4460 Clinical Practice in Audiology (1-6) Prereq: 4600, 4720, 4730, and 4930. May be repeated. Maximum 9 hrs. E
4520 Speech Pathology (3) Independent study of special problems in speech pathology. Prereq: Consent of instructor. E
4550 Problems in Speech Pathology (1-6) Prereq: Consent of instructor. E
4560 Problems in Audiology (1-6) Prereq: Consent of instructor. May be repeated: Maximum 6 hrs. E
4610 Introduction to Language Pathology in Children (4) Nature, etiology and treatment of language retardation. Observation in language clinic is available. Prereq: 3040, 3065, or consent of instructor, F, Sp
4620 Birth Defect Syndromes and Language Retardation (3) Examination of research literature relevant to birth defects and language retardation including clinical, educational and socioemotional implications of such disorders. Prereq: 4610 or consent of instructor, F
4630 Practical Applications of Language Habilitation Techniques (3) Discussion and demonstration of various methods and procedures used in treating children with language disorders. Prereq: 4610 or consent of instructor, F
4640 Parent Participation in Language Habilitation Programs (3) Nature of counseling and educational relationships with parents of exceptional children including emotional, social, behavior management strategies, home training methods. Prereq: 4610 or consent of instructor, F
4650 Speech and Language of the Culturally Different Child (3) Discussion of speech and language differences of children of various minority groups, of different ethnic and class membership and from different geographic regions, their causes, and their effects upon educational programs. F, W, Su
4660 Topics in Language Retardation and Its Habilitation (3) Lectures on selected topics by representatives of such fields as special education, early childhood education, educational psychology, genetics, and psychology. Prereq: 4610 or consent of instructor, F
4720 Audiology II (4) Basic principles of clinical audiology; pure-tone, speech, masking and overview of special audiological tests. Prereq: 3710. (Same as Special Education 4720.) W, Su
4930 Aural Rehabilitation: Speechreading and Auditory Training (3) Rehabilitation of acoustically-impaired by maximizing use of residual hearing and utilizing speechreading as receptive communicative process. Prereq: 4720. (Same as Special Education 4930.) F, W, Su
4940 Introduction to the Verbo-Tonal System (4) Prereq: 3710 or 4700. Recommended: Prereq: 4320 and 3050. (Same as Special Education 4940.) F, W, Su
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Maximum 9 hrs. E
5040 Advanced Clinical Practice in Audiology Study and Practice (1-6) Prereq: 4720 and 4930. May be repeated. Maximum 12 hrs. (Same as Special Education 5040.) E
5045 Practicum in Hearing Aid Orientation and Communication Counseling (1-6) Practical exposure to counseling hard of hearing and family members, microprocessor diagnostics, and expectations of hearing aids, suggestions for better use of communication skills. Prereq: 4720, 4930, and consent of instructor. May be repeated. Maximum 9 hrs. E
5050 Practicum in Verbo-Tonal Habilitation (1-6) Prereq: 4940, 5950, or consent of instructor. May be repeated. Maximum 9 hrs. E
5051 Practicum in Aural Rehabilitation (1-6) Prereq: 4720, 4930, or consent of instructor. May be repeated. Maximum 9 hrs. E
5060 Anatomy and Physiology of Speech (3) Structure and function of neuromuscular system involved in breathing, phonation, respiration, and articulation. Prereq: 3065. E
5070 Anatomy and Physiology of Hearing (3) Structure of human ear, pathology of hearing impairment, and psychosociocausals of audition. Prereq: 3710. F
5071 Physiological Acoustics and Electrophysiology (3) Techniques for electrophysiological measurement of auditory sensitivity, sound transmission by ear, distortion in ear, and ear as analytic mechanism. Prereq: 4720, 5070 or consent of instructor, Sp, Su
5100 Comparative Anatomy of the Peripheral Auditory Structures (3) Tutorial laboratory course in comparative anatomy of temporal bone employing microsensoric dissection techniques. Prereq: 5070 or consent of instructor, E
5110 Introduction to Research in Speech and Hearing (3) Analysis of research techniques, application of statistics, and pilot research project. Prereq: Elementary statistics. F, W, Su
5117 Instrumentation in Audiology and Speech Pathology (2) Principles of instrumentation used in audiology and speech pathology. Prereq: 3010. W, Sp
5119 Laboratory in Instrumentation in Audiology and Speech Pathology (1) Laboratory assignments designed to familiarize student with instruments for measuring speech and hearing processes. Prereq: 5117, E
5200 Seminar on Stuttering (3) Current significant research in problem of stuttering. Prereq: 4310 or consent of instructor. W, Su
5201 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: 5060 or equivalent consent of instructor, W, Su
5303-30-40 Advanced Clinical Practice in Speech Disorders (1-6, 1-6, 1-6) Prereq: Consent of instructor. Maximum 9 hrs. S/NC only. E
5350-50-70 Advanced Clinical Practice in Speech Diagnosis (1-6, 1-6, 1-6) Prereq: 4040, 4340 or equivalent. May be repeated. Maximum 9 hrs. S/NC only. E
5380 Cerebral Palsy (3) Neurological foundations and language training. Prereq: 5060. (Same as Special Education 5380.) F
5400 Introduction to the Verbo-Tonal System (4) Prereq: 3710 or 4700. Recommended: Prereq: 4320 and 3050. (Same as Special Education 4940.) F, W, Su
5381 Adult Dysarthria (3) Neuromotor organization for speech production, types of adult dysarthria and associated neuromuscular symptomatology; diagnostic examination of adult dysarthric speakers. Prereq: 5060. Su

5390 Cleft Palate (3) Etiology, diagnosis and clinical management of cleft palate speakers, emphasis on speech pathology. Prereq: 5010 or 5310. (Same as Special Education 5390.) W, Su


5450 Sound Measurement and Audiometer Calibration (3) Noise measuring systems and techniques; factors in military and industrial audiology, role of audiologist in industry. Prereq: Basic Acoustics or consent of instructor. W

5460 Advanced Audiology (3) Theory and practice of advanced pure tone and speech audiometry; instruments and utilization of testing tools and analyses of auditory findings with differential diagnosis. Prereq: 4720. F

5470 Impedance Measurement in Audiology (3) Theoretical considerations behind emergence of impedance measurement in clinical measurement of hearing. Practical experience in using several impedance measuring devices. Prereq: 4720 and 5070. W

5490 Practicum in Hearing Conservation (1-6) Supervised on-site experience in hearing conservation programs at industrial settings. Prereq: 5040. May be repeated. Max 9 hrs. E, F, Sp

5500 Seminar in Audiology (3) Significant research in various areas of audiology. Prereq: Consent of instructor. May be repeated. Maximum 18 hrs. F, Sp

5503 Special Auditory Tests (3) Theoretical and practical aspects of auditory procedures used for differentiating between cochlear vs. retrocochlear auditory lesions, identifying central auditory malformations and nonorganic hearing loss. Prereq: 5460. S

5505 Special Problems in Audiology (1-6) Prereq: 4720 or equivalent and consent of instructor. May be repeated. Maximum 6 hrs. E

5530 Seminar in Speech Pathology (3) Current significant research in speech pathology. Topics vary from quarter to quarter. Prereq: 12 hrs in speech pathology. May be repeated with consent of department. Maximum 12 hrs. E

5540 Seminar in Language Pathology (3) Nature, etiology and treatment of retarded language development in children. Prereq: 4610. (Same as Special Education 5540.) W

5550 Special Problems in Speech Pathology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E, F

5560 Independent Study in Speech Pathology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

5570 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. Prereq: 5010 or equivalent. Maximum 6 hrs. E

5590 Independent Study in Audiology (1-6) Special reading, consultation, and research activities in field of audiology. May be repeated. Maximum 6 hrs. E

5610 Practicum: Language Pathology in Children (3) Seminar and/or practicum involving discussion and utilization of testing tools and analyses of habilitative philosophies, specialties and techniques. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

5651 Seminar in Language Differences (3) Significant research relevant to language differences of culturally different children. Prereq: 4550. Summer.

5730 Hearing Disorders (3) Advanced study of auditory disorders commonly encountered in medical environment. Etiology, pathology and evaluative procedures to differentiate lesions of auditory mechanism. Field trips may be required. Prereq: 4720 or equivalent and 5070. Su

5740 Pediatric Audiology (3) Advanced study of theoretical and practical considerations of procedures to evaluate hearing of infants and small children. Prereq: 4720 or equivalent. Sp

5750 Educational Audiology (3) Advanced case management of hearing impaired child: audiology follow-up, educational alternatives, teacher and parent counseling, social adjustment, classroom acoustics and state and federal guidelines. Prereq: 5040 and 5440.

5790 Seminar in Psycholinguistic Concepts in Speech Pathology (3) Psycholinguistic concepts and implications in studying the normal acquisition of language and certain disorders of language. Prereq: Consent of Instructor. (Same as Psychology 5780.) F.

5950 The Verbo-Tonal System (3) Theory, procedures and instrumentation of Verbo-Tonal System in habilitation, rehabilitation, diagnosis, speech therapy, and foreign languages. Prereq: 3710. Recommended prereq: 3050, 4720, and 4350. F, W, Su

6000 Doctoral Research and Dissertation (3-15) E

6010 Experimental Phonetics (3) Acoustical and physiological analyses of speech production and perception. Prereq: 5119 or consent of instructor. F

6019 Experimental Phonetics Laboratory (2) Must be taken concurrently with 6010.

6020 Psychoacoustics (3) Auditory reception and perception of non-speech stimuli. Prereq: 6010. W

6029 Psychosomatics Laboratory (2) Must be taken concurrently with 6020. W

6050 Applied Anatomy and Physiology of Speech Mechanism (3) Dissection, lab exercises and related readings. Prereq: 5060 or equivalent. Sp

6069 Laboratory in Applied Anatomy & Physiology of Speech Mechanism (2) Must be taken concurrently with 6060. Sp

6070 Experimental Techniques in Cochlear Physiology and Neurophysiology (3) Prereq: 5070 or equivalent. A

6080 Seminar in Speech Science (3) Advanced study of experimental areas such as speech physiology, acoustic analysis, recognition, perception and intelligibility of speech, communication theory, and psycholinguistic measurement of speech and language. Topics vary from quarter to quarter. Prereq: 6010 or consent of instructor. May be repeated. Maximum 9 hrs. Sp

6090 Seminar in Hearing Science (3) Advanced study of perception of non-speech acoustic signal; detectability, pitch, loudness, differential threshold, adaptation, 5450 or consent of instructor. May be repeated. Maximum 9 hrs. W, A

6110 Experimental Design in Speech and Hearing (3) Analysis of experimental design in theses and related journal articles. Prereq: 6010 or consent of instructor. May be repeated. Maximum 9 hrs. W, A

6117 Theories of Hearing (3) Physiological process related to classical theories of hearing related to sensitivity, loudness, pitch and discrimination of acoustic stimuli. Prereq: 5070 or consent of instructor. W

6119 Advanced Instrumentation in Speech and Hearing Science (3) Selection, use and calibration of instrumentation used in speech and hearing research. Prereq: 5117, 5119 or equivalent. W, A

6500 Advanced Seminar in Audiology (3) Prereq: Consent of instructor. May be repeated. Sp

6520 Advanced Seminar in Speech and Language (3) Topical or non-topical quarter to quarter may include advanced study of aberrations of voice, articulation, speech, language impairment, case management, or use and development of language models. Prereq: Consent of instructor. May be repeated. F, Sp

6560 Directed Research (1-6) Participation in on-going or non-dissertational research. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. E

6570 Directed Study in Speech Pathology (1-3) May be repeated. Maximum 9 hrs. E

6580 Directed Study in Audiology (1-3) May be repeated. Maximum 9 hrs. E

6590 Directed Study in Speech Science (1-3) May be repeated. Maximum 9 hrs. E

6600 Directed Study in Hearing Science (1-3) May be repeated. Maximum 9 hrs. E

Biochemistry

DEGREES

M.S., Ph.D.

Professors: W. D. Wicks (Head), Ph.D. Harvard; J. E. Churchich, Ph.D. Sheffield (England); J. G. Joshi, Ph.D. Poona (India); K. J. Monty, Ph.D. Rochester; T. P. Saito (Associate Head), Ph.D. Michigan.

Associate Professors: S. W. Hawthorne, Ph.D. Chicago; L. Huang, Ph.D. Michigan State.

Assistant Professors: L. B. Brattsten, Ph.D. Illinois; R. Bryant, Ph.D. Illinois; R. H. Feinberg, Ph.D. California (Berkeley).

The graduate program consists of an orientation examination to determine the most suitable course work for the incoming graduate student, successful completion of a series of graduate courses and seminars, and a qualifying examination at the end of the first year. In addition, the M.S. degree requires research leading to the writing and oral defense of a thesis, while the Ph.D. degree requires successful completion of a comprehensive examination and dissertation leading to the Ph.D. dissertation and its oral defense.

The orientation examination: Given fall quarter at 9:00 a.m. on the Thursday prior to the week in which classes begin, is taken by all incoming students without exception. The purpose of the examination is to aid in placing students in the proper courses to help ensure their success in the graduate programs. The examination will cover analytical, organic and physical chemistry and biochemistry. If the student's undergraduate program does not show appropriate courses in one of the subjects, the student will not take that part of the examination but will be enrolled in a suitable course. The results of the examination will help determine appropriate course work.

The qualifying examination: At the conclusion of the first year's work in 5510-20-30, 5310-20-30 and 4230, a comprehensive qualifying examination covering all of the material will be taken by all first year graduate students, without exception, in the first week of the summer quarter. On the basis of results of the examination, the student will be counseled concerning his/her future in the biochemistry program.

THE MASTER'S PROGRAM

This program requires about two years of full-time study and provides both breadth and depth of training by mixing classroom instruction with research laboratory experience. Students completing this program will have a sound foundation in modern biology and chemistry and will be equipped to follow and absorb future advances in these fields. Recent graduates of this program are now involved in such occupations as industrial pharmaceutical...
research, junior college and high school teaching, hospital laboratory work, consumer research, scientific journalism, and pursuit of Ph.D. degrees.

Candidates usually should offer course work covered by an undergraduate major in either biology or chemistry. Departmental requirements consist of the satisfactory completion of 45 credit hours of graduate work and the mastery of the subject matter of the following courses:

1. Introductory Organic Chemistry with laboratory (at least one year)*, at least one quarter of analytical chemistry, and a minimum of three quarters of approved physical chemistry.

2. A minimum of 12 quarter hours of approved biology courses beyond the introductory level, including at least 3 hours of genetics and 3 hours of physiology.

3. An orientation examination as described above.

4. Biochemistry 5510-20-30, 5310-20-30, 4230; and at least one special topics course (5450), or 5610 or 5110 or 5120 or 5210.

5. A qualifying examination as described above.

6. At least 9 hours of advanced lecture-seminar courses from the following: Biochemistry 6410, 5010.

7. At least 9 hours of Master’s research and a thesis.

8. A final comprehensive examination which will cover both the thesis endeavor and the subcommittee of the course requirements.

 THE DOCTORAL PROGRAM

An incoming student must present course work covered by an undergraduate major in either biology or chemistry. Departmental requirements for the awarding of the Ph.D. include mastery of the subject matter indicated in the following list of courses. Course contents listed in items 1 and 3 are prerequisites to taking the comprehensive examination; applicants usually should expect to complete these requirements by the third year of graduate school.

1. Introductory Organic Chemistry with laboratory (at least one year)*; at least one quarter of analytical chemistry, Chemistry 4510.

2. Integral Calculus*; at least three quarters of approved advanced calculus.

3. Biochemistry 4210-20-30, or Chemistry 4910-20-30, 4230; and at least 18 hours of biology beyond the introductory level including at least 3 hours of genetics and 3 hours of physiology. At least 3 hours must be graduate credit in an approved area of specialization which should be identified early so that necessary prerequisites can be taken.

2. Orientation examination.


4. In addition to the courses listed in item 3 above, four courses selected from those numbered 5110 or higher, excluding 5300 or 5610.

5. Qualifying examination.

6. Participation in Biochemistry 6410 and in the advanced biochemistry seminars 6010 during the entire period of residence.

7. Comprehensive examination: Students who pass the comprehensive examination with sufficiently high marks and who complete a mandatory M.S. degree (required prior to the comprehensive examination) will take the examination, at a time and of a format compatible with Graduate School requirements as determined by the student’s committee.

8. A dissertation reporting the results of original and significant research carried out during the term of candidacy.

9. A final examination which will be concerned primarily with the student’s dissertation.

Petitioning for Master’s degree: Students who have passed the preliminary examination in the Ph.D. program may petition the department for award of a Master’s degree. The additional requirements for such a degree are as follows:

a. The completion of at least 45 hours of approved course work for graduate credit, at least half of which must be at or above the 5000 level.

b. The preparation of a research manuscript suitable for submission for publication in a major scientific journal; and

c. The oral defense of that manuscript before an examining committee of three faculty members appointed by the head of the department, at least two of whom shall be members of the department.

4110-20 Cellular and Comparative Biochemistry (4, 4) Electrolyte behavior; chemistry and structure of proteins; enzyme behavior and biological function; catabolism and energy capture; synthetic metabolism; nucleic acid function; protein synthesis and biochemical genetics; regulation of biological processes. Must be taken in sequence. Prereg: Chem-

4210-20 Introduction to Physical Biochemistry (3, 3) 4210—Introduction to thermodynamics; phase sta-

4230 Introduction to Physical Chemistry (3) Physical characterization of macromolecules; polarized light, absorption and fluorescence, sedimentation and transduction of importance in biochemical and molecular biology. Prereg: 4110 or equivalent. Sp

5000 Thesis (1-15) E

5010 Biochemical Techniques (2) Theory and labora-

5110 The Metabolism of Nitrogen Containing Com-
pounds (3) Nitrogen fixation. Synthesis and degra-
dation of amino acids, purines, pyrimidines and nu-

5120 Biochemistry of Mitochondria and Selected Organelles (3) Organization of compartmented metabolic systems and their associated membranes and organelles. Supramolecular organization, bioenergetics, transport systems, drug metabolism, oxygen toxicity and defense mechanisms; membrane function and fixation and photosynthesis. Emphasis on exper-

5130 Protein Structure and Enzyme Function (3) Physiochemical properties of proteins; primary, secondary, tertiary and quaternary structure; de-

5230 Protein Synthesis and Its Role in Metabolic Regulation (3) Detailed enzymology of messenger RNA, ribosome structure and function; deciphering and genetic code; regulation of transcription and translational processes (induction, repression, etc.). Prereg: 4110-20 or equivalent.

5300 Graduate Research Participation (3-9) May be repeated. Maximum 12 hrs.

5310-20 Experimental Techniques (2, 2, 3) Tutor-

5510 Graduate Research Participation (3-9) May be repeated. Maximum 12 hrs.


5520 Molecular Basis of Metabolism and its Regu-

5530 Biosynthesis and Regulatory Functions of In-

5610 Environmental Toxicology (3) Basic concepts in toxicology, interactions at subcellular, cellular, organ, organismal, population, and environmental levels, legal aspects. Major emphasis on biochemi-

5640 Techniques in Environmental Toxicology (2) Survey of experimental techniques for assessment of presence, toxicity, and impacts of pollutants in global ecosystem. Laboratory exercises focus on analytical, biochemical, and bioassay methods employed in toxicological studies. Prereg: 4110-20. Chemistry 3211-21-31. Chemistry 4910-20, or consent of instructor. (Same as Ecology 5610.) W

5650 Analytical, Quantitative, and Computational Meth-

5780 Environmental Toxicology (2) Survey of experimental techniques for assessment of presence, toxicity, and impacts of pollutants in global ecosystem. Laboratory exercises focus on analytical, biochemical, and bioassay methods employed in toxicological studies. Prereg: Chemistry 2140-20. (Same as Ecology 5780.) W

5800 Analytical, Quantitative, and Computational Meth-

5811 Marine Ecological Processes (2, 2) The study of the unique properties of marine ecosystems, including the influence of oceanographic and physical conditions on the distribution and abundance of marine animals and plants. Prereg: 5510 or consent of instructor.

5820 Analytical, Quantitative, and Computational Meth-

5950 Analytical, Quantitative, and Computational Meth-

5960 Analytical, Quantitative, and Computational Meth-

5970 Analytical, Quantitative, and Computational Meth-

5980 Analytical, Quantitative, and Computational Meth-

5990 Analytical, Quantitative, and Computational Meth-

6010 Environmental Toxicology Seminar (1) Topics to be covered posted in spring quarter for following year. Invited speakers of note will participate. May be repeated. Maximum 9 hrs. S/N C only. F, W, Sp

*Though completion of these courses or the equivalent is required, they may not be taken for graduate credit.
Current Topics in Biochemistry (1) Seminars and lectures dealing with current advances in field of chemical biology. May be repeated with consent of department. S/NC only. F, W, Sp

Current Topics in Biological Membrane Research (1) Conferences and literature on biological membrane research. Prereq: 4110-20 or equivalent. May be repeated. Maximum 9 hrs. S/NC only. (Same as Microbiology 6420). F, W, Sp

Current Topics in Environmental Toxicology (1) Critical reviews of research problems and methods in environmental toxicology, behavioral toxicology, biochemical and ecological effects, biostatistics and epidemiology. Presentations by students, faculty and guest lecturers from academia and industry. May be repeated with consent of department. Maximum 6 hrs. (Same as Ecology 6431). S/NC only. F, W, Sp

Advanced Special Topics (1-3) Registration only by prior arrangement with department. For students who have passed Ph.D. preliminary examination or are in advanced state of graduate studies. Topic title posted in advance. May be repeated. Maximum 9 hrs.

Biology

MAJOR: DEGREE

MACT Biology

K. J. Monty, Coordinator.

The Master of Arts in College Teaching program is administered by an interdepartmental committee composed of one representative from each of the following departments: Biochemistry, Botany, Microbiology and Zoology. Inquiries regarding the program should be addressed to the chairperson of the committee.

The admission requirements are:
1. Bachelor's degree with satisfactory record.
2. Nine quarter hours of college mathematics.
3. Twelve quarter hours of general biology, general botany, or general zoology.
4. Eighteen quarter hours of advanced biology courses.

Requirements for the degree:

All candidates for the MACT degree in Biology will meet a minimum distribution of graduate and undergraduate courses as follows:
1. Eight quarter hours in each of the following:
   a. Taxonomy and/or Ecology.
   b. Morphology, Developmental Biology and/or Anatomy.
   c. Physiology and/or Biochemistry.
   d. Genetics, Cytology and/or Cytogenetics.
2. Eighteen quarter hours of graduate credit in each of two of the following four fields: biochemistry, botany, microbiology, zoology or 36 quarter hours of graduate credit among the four fields as specified by the interdepartmental committee administering the MACT program in Biology.
3. At least 21 quarter hours of coursework in requirement 2 (not including special projects and thesis) numbered at the 5000 or 6000 level.
4. At least 9 quarter hours of Master's research and an acceptable thesis.
5. Total graduate credit in the biological sciences (or appropriate supporting fields) of 57 quarter hours (including that in items 1, 2, 3, and 4).
6. A three-quarter, 1-hour seminar (or seminar series) on the problems and techniques of college teaching.
7. Six quarters of part-time, supervised college teacher-internship training.
8. A final comprehensive oral examination covering the thesis endeavor and the subject matter of the course requirements.

Botany

MAJOR: DEGREES

Botany

Professors:

Associate Professors:
C. C. Amundsen, Ph.D. Colorado; J. D. Caponetti, Ph.D. Harvard; A. S. Haliman, Ph.D. Ohio State; R. R. Heady, Ph.D. Miami (Ohio); K. W. Hughes, Ph.D. Utah; O. J. Sharp, Ph.D. North Carolina State, H. H. Shugart, Ph.D. Georgia.

Assistant Professors:

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

Requirements for admission: In addition to the general Graduate School requirements (see page 11) the botany department also strongly recommends submitting aptitude and advanced scores from the Graduate Record Examination, at least three letters of recommendation from academic or professional persons, a short statement describing probable areas of interest in botany, and the following specific courses: (1) general botany or biology, 12 quarter hours; (2) advanced botany or closely allied biological sciences, 18 quarter hours; (3) physical sciences; general inorganic chemistry, 12 quarter hours; organic chemistry and physics highly recommended; (4) college mathematics, 9 quarter hours.

General degree requirements are given on pages 19-20 Special departmental requirements include successful completion of the following.

The Master's Program

A. Thesis Program
1. Satisfactory preparation of a written formulation and as oral defense to the student's committee of a research proposal suitable for a thesis project. Must be completed before enrollment in Botany 6000.
2. Satisfactory performance on an examination in one modern foreign language or an A or B in French 3030 or German 3030 (can also be applied to the doctoral program).
3. Satisfactory completion of 2 credit hours at the 6000 level.

**Note:** Graduate School requirements are specified by the department. These requirements should be interpreted as minimal requirements and specific stipulations or requirements such as additional foreign languages, additional oral preliminary examinations may be required by the individual student's faculty committee.

**2010-20 Plants in Evolution (4, 4) Monera to angiosperms; emphasis on evolutionary relationships, morphology and development. Prereq: 8 hrs. in biological sciences.**

**3030 Field Botany (4) Study of plants in natural environments including plant identification, collection, preservation and basic ecological concepts. Prereq: 8 hrs in biology or Botany.**

**3031-32 Field Botany (4, 4)** Emphasis on fall and winter flora respectively. Prereq: 3030. Need not be taken in sequence. W

**3050 Socioeconomic Impact of Plants (3)** Significance of plants in origin and development of human cultures, evolution of cultivated plants, and role of plants in present civilizations. Occasional field trips. Sp, Su

**Not for graduate credit for botany majors.
Chemistry

**MAJOR DEGREES**

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

Professors:
- G. Mamantov (Head), Ph.D. Louisiana State
- H. S. Bowman, Ph.D. Pennsylvania State  
  *A. Buehler* (Emeritus), Ph.D. Ohio State; E. B. Bull, Ph.D. Illinois; J. Q. Chambers, Ph.D. Kansas
- J. A. Dean, Ph.D. Virginia; J. F. Eastham, Ph.D. California (Berkeley); W. H. Fischer, Ph.D. Minnesota; C. W. Keenan, Ph.D. Texas
- D. C. Kiesewetter, Ph.D. J. W. Larson, Ph.D. Purdue; M. H. Litzke, Ph.D. Wisconsin
- G. D. O'Keeley, Ph.D. California (Berkeley); J. R. Peterson, Ph.D. California (Berkeley); K. H. Schweitzer, Ph.D. Illinois; D. A. Shirley (Emeritus), Ph.D. Iowa State; H. A. Smith (Emeritus), Ph.D. Harvard; W. T. Smith, (Emeritus), Ph.D. Ohio State; W. A. Van Hook, Ph.D. Johns Hopkins; E. L. Wehry, Ph.D. Purdue; T. F. Williams, Ph.D. London; J. H. Wood (Emeritus), Ph.D. North Carolina.

Associate Professors:
- J. E. Blower, Ph.D. Manchester; F. A. Grimm, Ph.D. Cornell; G. W. Kabaka, Ph.D. Purdue; J. F. Kinstle, Ph.D. Akron; A. L. Cane, Ph.D. California (Berkeley); R. M. Magid, Ph.D. Yale; R. M. Pagni, Ph.D. Wisconsin; M. Schell, Ph.D. Indiana.

Assistant Professors:

Students majoring in Chemistry for the Master's or doctoral degree are required to present 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 with appropriate deficiencies which must be removed without graduate credit.

For students minoring in Chemistry, the prerequisite is two years of chemistry including quantitative analysis.

**THE MASTER'S PROGRAM**

The department offers specialization in seven areas for the M.S. degree: analytical chemistry, environmental chemistry, energy, inorganic chemistry, organic chemistry, polymer science, and physical chemistry.

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

1. Research and a thesis to give 9 to 18 hours of graduate credit (5000).
2. Chemistry 4160-70 and two of the following: 5511, 5521, 5531.
3. Sufficient additional graduate course work in chemistry and/or related field to make an overall total of 45 hours. These additional hours must include one of the following sequences: 5110-20-29-30, 5250-59-69-70-79, 5340-50, 5410-20-30, 5710-20-30.
4. Participation in seminar (5911-21-31) during the entire period of graduate study.
5. A final oral examination.

**THE DOCTORAL PROGRAM**

The department offers specialization in nine areas for the Ph.D. degree: analytical chemistry, chemical physics, environmental chemistry, energy, inorganic chemistry, organic chemistry, physical chemistry, polymer science, and theoretical chemistry.

For the Ph.D. degree in Chemistry with specialization in analytical, inorganic, organic, physical, or theoretical chemistry, the satisfactory completion of the following is required:

1. Research and a dissertation to give at least 36 hours of graduate credit (6000).
2. Chemistry 4160-70 and two of the following: 5511, 5521, 5531.
3. Participation in seminar (5911-21-31).
during the entire period of graduate study. 4. Thirty-nine hours of additional graduate course work including at least 6 hours at the 6000 level and at least 12 hours from the Department of Chemistry offerings. 5. A comprehensive advanced examination in the field of specialization. 6. Demonstration of a reading knowledge of one of the following languages: French, German, Russian, or an approved alternate. 7. A final oral examination. The requirements for the Ph.D. degree in Chemistry with specialization in environment or energy consist of the satisfactory completion of: 1. Research and a dissertation on an environment or energy-related problem to give at least 36 hours of graduate credit. 2. Chemistry 4160-70 and two of the following courses: 5511, 5521, 5531. 3. Participation in seminar (5911-21-31) during the entire period of graduate study and a six-month internship in a governmental or industrial laboratory. 4. Thirty-nine hours of additional graduate course work including 6 hours at the 6000 level. For emphasis in environment, these additional courses must include Chemistry 5020, 5250, 5500-20-30-70, 5110, Environmental Engineering 4030, plus selected courses from other areas of chemistry, environmental engineering, meteorology, microbiology, health physics, ecology, computer science, statistics, and industrial health. For emphasis in energy, these additional courses must include Chemistry 5410,5610-20-30,a chemistry sequence (Chemistry 510-20-30-35 or 5250, 5500-20-30-70, 5810), Mechanical Engineering 4180, plus other course selections from areas such as catalysis, heterogeneous equilibria, kinetics, thermal science, combustion and propulsion engineering, nuclear science, environmental engineering, and electrical engineering. All course selections must be approved by the appropriate departmental committee. 5. A comprehensive advanced examination. 6. Demonstration of a reading knowledge of one of the following languages: French, German, Russian, or an approved alternate. 7. A final oral examination. For the Ph.D. degree in Chemistry with specialization in chemical physics, the satisfactory completion of the following is required: 1. Research and a dissertation to give at least 36 hours of graduate credit (6000). 2. Chemistry 4160-70, 5351, 5140-50, 5160 or 5170, Polymer Engineering 4910. 3. Participation in Chemistry Seminar (5911-21-31) and the Polymer Seminar Program during the entire period of graduate study. 4. Forty hours of additional graduate course work, including at least 6 hours at the 6000 level and at least 12 hours from the Department of Chemistry offerings. 5. A comprehensive advanced examination in polymer science. 6. Demonstration of a reading knowledge of one of the following languages: French, German, Russian, or an approved alternate. 7. A final oral examination. *3211-21-31 Organic Chemistry (3, 3, 3) Compounds of carbon, hydrogen, nitrogen, oxygen; organic and inorganic, spectroscopic and other physical properties. Must be taken in sequence. Prereq: 1110-20-30. Corresponding lecture (3211-21-31) is a course for students not having credit for the laboratory. E *3219-29-39 Organic Chemistry Laboratory I, II, III Experiments on topics discussed in 3211-21-31. Coreq: Analytical chemistry. F, W, Sp. *3420-29-39 Physical Chemistry Laboratory I, II, III Gases, liquids, chemical equilibria, solutions, phases, equilibria, and nuclear chemistry. Prereq: 3410-29-39 and 3220. Lab. F, W, Sp. *3511-21-31 Principles of Organic Chemistry (3, 3, 3) Structure and reactivity of aliphatic and aromatic compounds; reaction mechanisms; organic utility. Use of spectroscopic and physical techniques to elucidate reaction mechanisms. Recommended for chemists planning careers in physical or biological sciences. Must be taken in sequence. Prereq: 1110-29-30. Corresponding laboratory. 3519-29-39 or 3529-39 as a coreq; latter is recommended. *3529-39 Organic Chemistry Laboratory I, II, III Experiments on topics discussed in 3221-31. Similar to 3529-39 except designed for students who have need for operating knowledge of various spectroscopic and chromatographic techniques. Corresponding lecture (3521-31 or 3521-31) is a coreq for students not having credit for the lecture. *3810 Radioactivity and Its Application (3) Radioactive material and its use in biological and chemical investigations. Radioactive decay, detection apparatus and techniques, tracer procedures and safety precautions in agriculture, biology, medicine, nutrition. Not for credit by chemistry or physics majors or minors. Prereq: 1 yr of general mathematics or equivalent, 1 yr of general laboratory science, and 1 yr of general physics. 4110 Physical Chemistry (3) Theoretical aspects of chemical kinetics. Quantum mechanics of atomic and molecular systems. Molecular symmetry, crystal structure, quantum mechanics. Prereq: 3430. Coreq: 4119. F, W 4119 Physical Chemistry Laboratory I (3) Solutions, phase equilibria, reaction kinetics and spectroscopy. The corresponding course 4110 is coreq. F 1160-70 Intermediate Physical Chemistry (3, 3) (Designed for entering graduate students who have had one year of physical chemistry.) 4160—The three laws of thermodynamics, chemical equilibria, and solutions, and chemical equilibria. 4170—Gases and kinetic theory, chemical kinetics, molecular transport phenomena, and introduction to chemical statistics. F, W 4210 Advanced Analytical Chemistry I (3) Chemical separations including chromatography, ion exchange, and solvent extraction; spectroscopic techniques. Prereq: Analytical chemistry. W 4219 Advanced Analytical Chemistry Laboratory I Experiments on topics discussed in 4210. Coreq: W 4210. W 4220 Advanced Analytical Chemistry II (3) Electroanalytical methods of analyses (including potentiometry, coulometry, polarography, and voltammetry); magnetic resonance methods; mass spectrometry; x-ray absorption and fluorescence techniques. Prereq: Analytical chemistry. Recommended: 3420 or 4920. Sp 4229 Advanced Analytical Chemistry Laboratory I Experiments on topics discussed in 4220. Coreq: W 4220. Sp 4420 Physical Inorganic Chemistry (3) Theoretical concepts leading to an understanding of inorganic chemistry of the elements; quantum principles; theory of molecular structure, and elementary nuclear chemistry. Prereq: 3410-20-30, 4110. W 4430 Intermediate Inorganic Chemistry I (3) Application of the theoretical concepts to inorganic elements, their chemical states, and their reactions. Prereq: 4240. Sp 4510 Organic Qualitative Analysis I (3) Identification of functional groups and organic compounds. Prereq: 3211-21-31, 3219-29-39 or 3219, 3529-39. 3 labs. Not open to students who have completed 4610. F 4550 Organic Reaction Mechanisms I (3) Prereq: 1 yr of organic chemistry. W 4560-20 Advanced Chemical Experimentation (2, 2) Laboratory course in application of modern experimental techniques to solution of chemical problems. Synthesis and characterization of organic and inorganic compounds with emphasis on independent study using advanced techniques. Prereq: 3219-29-39 or 5529-39, 4350, 4390, 4220. 4610 not open to students who have completed 4510. W 4910-20-30 Biophysical Chemistry (3, 3, 3) Physicochemical principles with application to biological systems. Prereq: 3219-29-39 or 3219, 3529-39. Not open to students having 3410-20-30, 4910—Gas laws; first, second and third laws of thermodynamics, equilibrium, reaction rates. 4920—Spectroscopy; optical and magnetic methods of spectroscopy, light scattering, macromolecular properties. Prereq: 1110-20-35; Mathematics 1540-50 or equivalent. F, W, Sp 5000 Thesis (1-15) E 5110-20-35 Advanced Organic Chemistry (3, 3, 3) Structure, reactions and reaction mechanisms of organic compounds, and alicyclic compounds. Prereq: 3211-21-31. E 5129 Advanced Organic Chemistry Laboratory I Synthesis of organic compounds illustrating modern techniques. Prereq: 1 yr of organic chemistry. Sp 5139 Spectroscopic Characterization of Organic Compounds (2) Organic structure elucidation using spectroscopic methods; nuclear magnetic resonance; infrared; ultraviolet; mass spectrometry; nuclear magnetic resonance; infrared; ultraviolet; mass spectrometry. 5191-21-29-31-39 or equivalent. Sp 5140 Introductory Polymer Chemistry I (3) Fundamental principles, role of chemistry in interdisciplinary field of polymer science; relation of molecular structure to bulk properties of polymers. Prereq: 1 yr each undergraduate organic and physical chemistry courses. Not for graduate credit for chemistry majors.
5150 Kinetics of Polymerization (3) kinetics of formation and molecular weight distribution of polymers, from molecular to macroscopic, by a variety of growth and chain growth polymerizations. Prereq: 5410 and 4140-70 or equivalent.

5160 Organic Chemistry of Polymers (3) Synthesis of polymers and methods of polymer detection. Prereq: 5140. A

5200 Analytical Chemistry of Environmental Pollutants (3) Application of modern analytical chemistry to problems in aquatic and atmospheric pollution. Prereq: 5250-60-70 or consent of instructor. Sp

5240 Electronics for Chemists (4) Includes material of Chemistry 4640 plus special project. Prereq: Consent of instructor.

5250-60-70 Advanced Analytical Chemistry (3, 3, 3) 5250—Absorption and emission spectrophotometry, structure elucidation by IR, NMR, UV, and mass spectra; 5260—Chemical separation methods; solvent extraction, chromatography, electrophoresis; radiochemical methods; fluorescence; x-ray methods, 5270—Electroanalytical, magnetic and optical analytical methods; on stream and automatic analysis. Prereq: 1 yr of physical chemistry. F, W, Sp

5340 Quantum Chemistry (3) Postulate approach to fundamental principles of quantum mechanics. A

5350 Quantum Chemistry (3) Electronic excited states; introduction to group theory; perturbation theory, reactivity of organic molecules. F

5410-20-30 Advanced Physical Chemistry (3, 3, 3) 5410—Classical thermodynamics, 5420—Molecular spectroscopy and structure, 5430—Chemical kinetics. Prereq: 4110 or 4140-70. F, W, Sp


5521 Survey of Analytical Chemistry (3) Volumetric and gravimetric analysis, spectrophotometry, colorimetry, titrimetric determination, complexation and precipitation equilibria; spectrosopic, electroanalytical, and separation methods. F

5531 Survey of Organic Chemistry (3) Bonding in organic molecules, chemistry of hydrocarbons, aliphatic compounds and conformational analysis, monofunctional oxygenated derivatives, carbonyl compounds, stereochemistry, aromatics, and nmr analysis of organic molecules by infrared, ultraviolet, nuclear magnetic resonance and mass spectral techniques. F

5550 Industrial Chemical Research (3) Practice of modern industrial research taught by case studies and industrial research practices. Prereq: Completion of a 5000 chemistry course sequence.

6120-30 Chemical Energy Conversion (1, 1, 1) Chemistry of various energy and fuel conversion systems. Introduction to homogeneous and heterogeneous catalysis, thermodynamics of energy conversion systems, fossil fuels chemistry, and electrochemical and photochemical conversion systems. Prereq: 5140 and one 5000 sequence. F, W, Sp

6170-20-30 Theoretical Inorganic Chemistry (3, 3, 3) 5170—Nuclear properties of molecules, valence, electronic, metal containing, molecular 5720—Coordination compounds. Prereq: 5730—Investigational methods of structural inorganic chemistry. Prereq: 1 yr of physical chemistry. F, W, Sp

5810 Nuclear Chemistry (3) Nuclear properties, radioactivity, radioactive decay processes, nuclear structure and models, nuclear reactions, radiations and matter, radiation detection. Prereq: 1 yr of physical chemistry. A

5911-21-31 Chemistry Seminar (1, 1, 1) Discussion of departmental research, current research literature and general topics. May be registered. Registration required each quarter except summer resident graduate students. S/D only. F, W, Sp

6000 Doctoral Research and Dissertation (3-19) E 6111 Selected Topics in Inorganic Chemistry (3) Subject matter varies among important topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6130 Natural Product Chemistry (3) Structure, chemistry, and synthesis of naturally occurring substances of biological or environmental significance. Course content may vary with each offering to relect areas of current chemical interest. Prereq: Two of 5110-20-30-35. A


6160 Physical Organic Chemistry (3) Solvent and solvent effects in chemical equilibrium and chemical reaction. Organic reaction mechanisms. Prereq: Two of 5110-20-35.

6165 Orbital Symmetry Control (3) Application of Woodward-Hoffmann and other theories to mechanism and stereochemistry of concerted organic reactions. Prereq: Two of 5110-20-35.

6175 Organic Photochemistry (3) Physical and chemical effects of electron excitation of organic molecules. Experimental and theoretical techniques of photochemical importance. Inter- and intramolecular reactions of alkenes, ketones, dienes, aromatic compounds, and other photoactive species. Prereq: Two of 5110-20-35.

6190 Organometallic Chemistry (3) Structure, bonding, and applications of metal and metal containing radicals. Application to current problems in organic synthesis. Prereq: Two of 5110-20-35.

6210 Advanced Analytical Spectroscopy (3) Newer methods of spectroscopic analysis, including transform methods, lasers in spectroscopy, fiber optics, spectro-electrochemistry, modern liquid chromatography, new electroanalytical methods, biochemical methods, and microprocessor techniques. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6211 Selected Topics in Analytical Chemistry (3) Subject matter varies among important topics of current significance: environmental chemistry, spectro-electrochemistry, modern liquid chromatography, new electroanalytical methods, biochemical methods, and microprocessor techniques. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6215 Selected Topics in Inorganic Chemistry (3) Subject matter varies among important topics of current significance: photoelectron spectroscopy, transuranium chemistry, organometallic compounds, inorganic solution kinetics and mechanistic crystal chemistry, nonaqueous chemistry, chemistry of halogens and compounds. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6230 Natural Polymers (3) Structure, modification, and nonbiological utilization of natural polymers. Structural and properties of molecules in chemical instrumentation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6450 Electrochemistry (3) Electrical double layer: electrode kinetics; transport properties of electrolytes; electroanalytical methods. Prereq: 5430 or 5270.

6475 Electronic Structure of Radicals (3) Applications of electron spin resonance to study of molecular conformation, structure, and bonding in organic and inorganic radicals; comparison of experimental results with theoretical predications based on Walsh rules and other molecular orbital calculations. Prereq: 5340-50 and 5250.

6480 Statistical Thermodynamics (3) Application of statistical mechanical methods to systems of chemical conformational and conformational level including topics such as dynamics of molecular collisions, potential-energy surfaces, reactions cross sections, "direct" vs "complex" modes of reaction, photofragmentation, energy partitioning and transfer, chemical ionization, and chemical lasers. Prereq: 5430.

6510 Thermodynamics of Solutions (3) Theory of regular solutions and of electrolyte solutions; measurement of activity coefficients and other thermodynamic properties; selected topics from literature. Prereq: 5410.

6520 Magnetic Resonance (3) Principles of magnetic resonance spectroscopy underlying nuclear magnetic resonance and electron spin resonance. Chemical applications to solid and liquid systems. Prereq: 5340.

6711 Selected Topics in Inorganic Chemistry (3) Subject matter varies among important topics of current significance: photoelectron spectroscopy, transuranium chemistry, organometallic compounds, inorganic solution kinetics and mechanistic crystal chemistry, nonaqueous chemistry, chemistry of halogens and compounds. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A


6750 Molten Salt Chemistry (3) Structure, spectroscopic properties, solution thermodynamics, electrochemistry and phase equilibria of molten salts. Solutions of metals in molten salts. Prereq: 4110 and 5410 or equivalent.

6810 Vibrational Problems in Molecular Spectra (3) Same as Physics 6810.

6811 Selected Topics in Nuclear Chemistry (3) Subject matter varies among important topics of current significance: nuclear decay schemes, nuclear models, nuclear reaction theory, nuclear detection techniques, activation analyses. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6820 Molecular Vibration-Rotation Theory (3) Same as Physics 6820.

### Classics

Professors: A. Rapp (Emeritus), Ph.D., Ohio State; A. Rapp (Emeritus), Ph.D., Illinois
Associate Professors:  
G. C. Gesell, Ph.D. North Carolina;  
E. J. Sheldon, Ph.D. Vanderbilt.  
Assistant Professors:  
C. H. Craig, Ph.D. North Carolina;  
D. W. Tandy, Ph.D. Yale.

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

Greek  
3010 Plato (3) A  
3020 Herodotus (3) A  
3030 Euripides (2) A  
4020 Aeschylus, Sophocles (3) A  
4030 Lysias (3) A  
4040 Aristophanes (3) A  
4500-60-70 Directed Readings in Greek (3, 3, 3) F; W; Sp

Latin  
3440 Livy (3) A  
3450 Pliny and Martial (3) A  
3460 Elegiac Poets (3) A  
4120 Horace, Satires and Epistles (3) A  
4310 Selected Readings from Latin Literature (3, 3) A  
4322-30 Selected Readings from Latin Literature (3, 3, 3) May be repeated. A; A; A

3450 Horace, Odes (3) A  
4350 Tacitus (3) A  
4360 Lucretius (3) A  
4370 Readings in Medieval Latin (3) A

5410-20-30 The Latin Epic: Lucretius, Vergil, Lucan (3, 3, 3) A; A; A  
5510-20-30 Roman Comedy; Plautus, Terence (3, 3, 3) A; A; A

GENERAL COURSES  
3210 Early Greek Mythology (3) Comprehensive study of Greek myths through readings, lectures, and discussion with emphasis on significance for Greek thought and religion. Slides and tapes illustrate Greek myths on art, music, and literature of ancient Greek and later cultures. (Same as Religious Studies 3210.) F  
3220 Greek Mythology in the Classical Period (3) A study of use of myth in literature, history, religion, philosophy, and art of Classical Age of Greece, and change of attitude toward myth from earlier periods. Familiarity with basic Greek myths is assumed. Readings, lectures, slides, and discussion. (Same as Religious Studies 3220.) W

3230 Roman Mythology (3) Study of myths created by Romans, as well as those the Romans borrowed from the Greeks, with reference to Roman attitude toward history, religion, and society. Readings, lectures, and discussion. (Same as Religious Studies 3230.) Sp

3310 Art and Archaeology of the Aegean Bronze Age and Early Greece (3) Troy, the Cyclades islands, Greek mainland, and Crete. Emphasis on palaces of Crete and Mycenae, Tiryns, and Pylos; their fall, the following Dark Age, and rebirth of Greek civilization. Illustrated lectures. F

3320 Art and Archaeology of archaic and Classical Greece (3) Survey of development of Greek architecture, sculpture, and painting from 650 B.C. to death of Alexander. Illustrated lectures. W

3330 Art and Archaeology of Hellenistic Greece and Rome (3) Hellenistic Greek, Etruscan, and Roman sculpture, painting, and architecture with attention to city planning. Illustrated lectures. Sp

5340 Cities of the Greek and Roman World (3) Archaelogical survey of Greek and Roman cities from 3000 B.C. to 500 A.D. with emphasis on development of city planning and quality of life. Such cities as Mycenae, Athens, Priene, Alexandria, Rome, and Lepcis Magna will be studied. F

3350 Shrines and Sanctuaries of the Greek and Roman World (3) Survey of shrines and sanctuaries of Greek and Roman world with emphasis on archaeological remains. Such sites as Olympia, Epidaurus, Paestum, Cumae, Praeneste, and Baalbek will be considered. Readings in selected classical authors will add to understanding of place and significance of Greek and Roman shrines and sanctuaries. Reading prepared with consent of department. F

4010 Greek Drama in English Translation (3) Survey of dramatic masterpieces of Greek literature. A

4210 Teaching of Latin (3) Carries no language credit. Purposes, techniques, mate-rial, and evaluation; directed observation in public schools; preparation of teaching plans and materials. A

4220 Seminar in Classical Studies (3) Special problems in literature and other arts of Greece and Rome. May be repeated with consent of department. W

4230 Classical Mythology and its Uses (3) Intensive review and survey of Greek and Roman mythology. Emphasis on Greek and roman mythology in literature, music, and plastic arts, especially of modern times. F

4500 Selected Readings in Latin Literature in Translation (3) Content varies; may be repeated with consent of department. A

5620 Problems in Old World Archaeology (3) (Same as Anthropology 5620.) A

5950 Advanced Research  
5951 Research (1-6) A

TO M.S. PROGRAM

MAJOR  
Computer Science

DEGREE

M.S.

Professors:  
F. Donaldson, Ph.D. Texas;  
R. C. Gonzalez, Ph.D. Florida (Electrical Engineering);  
R. W. Heile, Ph.D. (Southern Methodist);  
D. L. Matuszek, Ph.D. Texas;  
J. M. Moshell, Ph.D. North Carolina;  
R. W. Heller, Ph.D. (Southern Methodist);  
C. P. Pileeger, Ph.D. North Carolina;  
G. C. Gesell, Ph.D. North Carolina;  
J. M. Moshell, Ph.D. North Carolina;

Associate Professors:  
A. A. Aho, Ph.D. (Mathematics);  
D. L. Matuszek, Ph.D. Texas;  
J. M. Moshell, Ph.D. North Carolina;  
R. W. Heller, Ph.D. (Southern Methodist);  
C. P. Pileeger, Ph.D. North Carolina;  
G. C. Gesell, Ph.D. North Carolina;  
J. M. Moshell, Ph.D. North Carolina;

Assistant Professors:  
J. W. Newton, Ph.D. Texas;  
D. L. Matuszek, Ph.D. Texas;  
J. M. Moshell, Ph.D. Texas;  
G. C. Gesell, Ph.D. North Carolina;  
J. M. Moshell, Ph.D. North Carolina;

Graduate Assistant:  
C. W. Thompson, M. A. Texas

ENTRANCE REQUIREMENTS

TO M.S. PROGRAM

Upon admission to the Graduate School, students who wish to enter the Master's degree program in Computer Science should have the following background:  
1. Mathematical maturity at least equivalent to that of a student who has completed the calculus sequence through one year of multivariable calculus and matrix algebra.

2. Computer Science 3150 or an equivalent introductory numerical algorithms course.

3. An introduction to probability and statistics at least at the level of Statistics 3540.

4. Completion of an equivalent introductory course in discrete structures and logical foundations of computer science.

5. Computer Science 3510 and 3520 or equivalent courses in advanced FORTRAN programming, machine organization and assembler language programming.

THE MASTER'S PROGRAM  

All students must receive departmental credit for or exhibit proficiency in the following courses:  
1. Computer Science 4550, 4510, 5100 and 5109.

2. Electrical Engineering/Computer Science 5175 and 5940.

3. One of the three courses Computer Science 4710, 4730, or 4225. The student may then select either Plan A or Plan B.

Plan A: Thesis Option  
1. Complete 38 hours of courses at the 4000 level or above, including at least 18 hours at the 5000 level, excluding of Electrical Engineering/Computer Science 5175 and 5940.

2. Complete at least 9 additional hours of thesis credit, Computer Science 5950.

3. Pass an oral examination by a committee of at least three faculty members.

Plan B: Non-Thesis Option  
1. Complete 45 hours of courses at the 4000 level or above, including at least 27 hours at the 5000 level, excluding of Electrical Engineering/Computer Science 5175 and 5940.

2. Pass written and oral comprehensive examinations.

Under either plan, courses which are taken from a department other than computer science must have the approval of the Computer Science Department.

3150 Introduction to Numerical Algorithms and Programming (3) Roots of equations, systems of linear equations, least-squares data fitting, numerical integration, numerical methods for ordinary differential equations. Introduction to programming in FORTRAN. 3150 and 3155 may not both be taken for credit. Students with a knowledge of FORTRAN should take 3155. Prereq: Computer Science 5935. Prereq or coreq: Mathematics 2860. (Same as Mathematics 3150.) E

3155 Introduction to Numerical Algorithms (3) Roots of equations, systems of linear equations, least-squares data fitting, numerical integration, numerical methods for ordinary differential equations. 3150 and 3155 may not both be taken for credit. Students with a knowledge of FORTRAN should take 3155. Prereq: 1510 or 1610 or consent of instructor. Prereq or coreq: Mathematics 2860. (Same as Mathematics 3155.) E

3510 Computer Organization and Programming I (3) Problem formulation and advanced programming in FORTRAN: operation and control of digital computers. Prereq: 1510, 2510, 3150, or consent of instructor. E


3715 Discrete Structures (3) Introduction to discrete structures useful in computer science. Sets, set logic, relations, functions, proof techniques, induction, logic. Graphical representations and algorithms. Prereq: 1510 or 1610 or 3150 or equivalent. Prereq or coreq: Mathematics 2860. (Same as Mathematics 3715.) F, Sp

3725 Advanced Discrete Structures (3) Advanced topics in discrete structures useful in computer science. Graphs and algorithms for manipulating data, algebraic structures, Boolean algebra, lattices, groups, monoids. Prereq: 3715 or equivalent. (Same as Mathematics 3725.) F, Sp

4950 Number Systems for Digital Computers (3) Floating-point number representation, mixed-radix number representation, multiple-modulus residue number representation, finite-segment p-adic
number representation, errors in floating-point computation, finite fields and exact computation using digital computers. Prereq: 3155. A

4210 Introduction to Artificial Intelligence (3) Intelligence in terms of computer. Organization, storage, searching and retrieval of information. Introduction to computer science and artificial intelligence. Prereq: 4510 and 4550. F

4215 Language in Computer Science (3) Organization, storage, searching and retrieval of information. Introduction to computer science and artificial intelligence. Prereq: 4510 and 4550. W


4280 Introduction to Computer Graphics (3) Point plotting, vector generation, interactive graphical techniques, two- and three-dimensional transformation, perspective depth, hidden line elimination, shading, software and hardware system design. Discussion of use of these techniques in design, problem solving, mapping, architecture, and many other areas. Prereq: Senior standing in Computer Science. Electrical Engineering or Geography and a knowledge of computer programming, or consent of instructor. (Same as Geography 4750.)

4280 Introduction to Pattern Recognition (3) (Same as Electrical Engineering 4820.) W

4280 Digital Image Processing (3) (Same as Electrical Engineering 4820.) S

4305 Small Computer Systems (3) (Same as Electrical Engineering 4830.) E

4310 Statistical Data Processing (3) (Same as Mathematics 4245.) F

4325 Numerical Solutions to Equations and Numerical Approximations (3) (Same as Mathematics 4245.) W

4340 Statistical Data Processing (3) Statistical data processing using interactive computer systems. Sources of data, statistical packages, output requirements, data and design, implementation. Procedures, open store, sequence control, data analysis, and storage management. Detailed discussion and programming experience in LISP and other SNOBOL, APL, or SIMULA. Prereq: 4510.

4510 Data Structures and Non-Numeric Programming (3) Data structures and algorithms for their manipulation. Arrays and orthogonal lists; stacks, queues, rings, doubly-linked lists, trees, dynamic storage allocation; organization of files, programming languages for information structures. Prereq: 2710 and 1610. W

4550 Systems Programming (3) Computer organization and advanced programming. Machine language. Assembly language, machine code, representation of information, microprogramming, software systems, input-output systems, interpreters, macro-assemblers, and preprocessors. Prereq: 4410 and 4450 or equivalent. W

4610 Operating Systems—Concepts and Facilities (3) Detailed examination of major operating system. Memory, processor, device, and data management. Interrupts, management of input-output device, parameters for input and output, device characteristics, data set organizations, SPOOLING. Prereq: 4510 and 4550. F

4620 Operating Systems—Case Studies (3) Alternative operating system designs, programming environment, user interface, device management, batch versus interactive systems, system interfaces, system resource allocation, system security and protection, system performance, stability, and user interface. Prereq: 4610 or equivalent or consent of instructor. W

4640 Computer Organization and Instruction Set Architecture (3) Practical experience with design of compilers. Scanning, parsing, semantic processing, code generation and optimization, assembler language, architecture. Project includes a complete compiler for a block structured language. Prereq: 4510. W

4710 Formal Languages and Automata (3) Grammars of Chomsky hierarchy and their recognizers. Properties of languages and machines. Emphasis on regular and context-free languages. Introduction to computability and enumerability. Prereq: 3715. F


4750 Interactive Computer Graphics (3) Point plotting, vector generation, interactive graphical techniques, two- and three-dimensional transformation, perspective depth, hidden line elimination, shading, software and hardware system design. Discussion of use of these techniques in design, problem solving, mapping, architecture, and many other areas. Prereq: Senior standing in Computer Science. Electrical Engineering or Geography and a knowledge of computer programming, or consent of instructor. (Same as Geography 4750.)

4820 Introduction to Pattern Recognition (3) (Same as Electrical Engineering 4820.) W

4830 Digital Image Processing (3) (Same as Electrical Engineering 4820.) S

4850 Small Computer Systems (3) (Same as Electrical Engineering 4830.) E

4910 Analysis and Management of Data Structures and Algorithms for their implementation. Implementation, justifiability, personalization in systems; perspective on system. Prereq: 3520 or equivalent. F

4980-90 Special Topics In Computer Science (1-4, 1-4) Credit determined at registration. Prereq: Recommendation of Computer Science staff. May be repeated with consent of department. Maximum 9 hrs.

5000 Thesis (1-15) E

5020 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered in the program. The student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. Prereq: 3520 or equivalent. E

5010 Computer-assisted Instruction (3) History and development of CAI systems. Emphasis on studying success and failure of major projects, future role of CAI in education. Use of a CAI programming language to implement a CAI course. Prereq: 3510 or consent of instructor.

5050 Computer Modeling and Simulation of Physical Systems (3) Advanced techniques for computer modeling and simulation. Inputs, driving functions, errors, outputs, interactive simulations as applied to various physical systems and their component subsystems. Prereq: 3510 or 3155, and 3520 and Statistics 3450.

5100 Immigration to Computer Science (3) Designed for international students with limited science background who wish to enter computer science major or minor program. Advanced computer science topics in FORTRAN; control of input-output devices; machine organization and assembly languages programming; introduction to data structures and algorithm analysis. Prereq: 1510 or 1610 or 3150 or consent of instructor.

5109 Immigration to Computer Science Practicum (3) Design and implementation of medium to large-scale computer systems. Prereq: 5090.

5175 Introduction to Logic Design (3) (Same as Electrical Engineering 5175.)

5210 Artificial Intelligence (3) Simulation of intelligent processes by computer. Techniques of representing knowledge. Role of pattern recognition problem. Role of pattern recognition problem. Use of pattern recognition algorithms. Syntactic pattern classification algorithms. Prereq: 4510 or consent of instructor. (Same as Electrical Engineering 5690.) W

5250 Medical Computing (3) Achievements and limitations of medical computing; laboratory data systems, patient monitoring systems, diagnostic assistance, patient records, automatic history taking, and hospital administration systems. Prereq: 4510. Sp

5430 Theory of Compilers (3) Development of major components of compiler using constructs provided by various languages: abstract syntax trees, symbol tables, semantic routines, allocation of storage, code optimization. Prereq: 4510, 4550, and 5780.

5450 Finite Difference Methods for Partial Differential Equations (3) (Same as Mathematics 5456.) F

5465 Finite Element Methods (3) (Same as Mathematics 5465.) W

5475 Advanced Topics in Numerical Partial Differential Equations (3) (Same as Mathematics 5475.) Sp

5570 Advanced Data Base Management Systems (3) Data model theory, comparison of several existing data base systems, implementation technology, selection and evaluation techniques, integrity, security, authorization and protection, hardware architecture, and future trends in DBMS area. Prereq: 4510 or equivalent background. W

5650-65-75 Numerical Mathematics (3, 3, 3) (Same as Mathematics 5650-65-75.) F, W, Sp


5730 Computability and Computational Complexity (3) Computability and decidability. Turing machines and halting problems. Complexity of recursively enumerable sets; partial and total recursive functions. Time and space bounded computations; the P vs NP problems. Prereq: 4710. Sp

5750 Theory of Formal Languages (3) Phrase-structure languages, their generators and processors. Type 0, 1, 2, and 3 languages; operations on languages and grammars; deterministic context-free languages. Theory of translation. Prereq: 4710. W

5775 Combinatorial Algorithms (3) Algorithms for solving optimization problems in graphs, networks and matroids. Precise notions of time and space complexity. Prereq: 4730. (Same as Mathematics 5775.) F

5810 Information Organization and Retrieval (3) Organization, storage, searching and retrieval of information. Development of IR systems from off-line to on-line information retrieval. Information storage and dictionary construction and operations. Search and matching procedures; retrieval process. Information dissemination systems. Data base retrieval systems. Prereq: 4510 or 4550. F


5880 Data Security (3) Need for security and methods for achieving it; encryption, machine architecture, hardware and software implementations, historical and current approaches. Case studies in fraud and misuse. Prereq: 3520 or consent of instructor.

5910-20 Special Topics in Computer Science (1-6, 1-6, 1-6) May be repeated. Maximum 9 hrs.

5940-50 Advanced Small Computer Systems (3, 3) (Same as Electrical Engineering 5940-50.)
THE MASTER'S PROGRAM

The departmental requirements for the M.A. degree in English include (1) thesis and 36 quarter hours of courses in the Department of English or 45 quarter hours without a thesis, (2) evidence of proficiency in one foreign language, and (3) a final examination. The courses should include 12 hours at the 6000 level, 12 hours of additional courses at the 5000-6000 level, and 12 hours at any level for graduate credit, including the 3000-4000 level.

For the degree of Master of Arts in College Teaching (MACT) the requirements include (1) 45 quarter hours of courses in English, arranged as for the non-thesis M.A., (2) 2 hours in a special course designed for MACT students, (3) 3 hours of a tutorial in the teaching of freshman composition, (4) a thesis or 9 additional quarter hours of 5000- and/or 6000-level courses in English, (5) evidence of proficiency in one foreign language, (6) a final examination, and (7) a program of supervised teaching approved by the department.

THE DOCTORAL PROGRAM

The departmental requirement for the Ph.D. degree in English is completion of a minimum of three academic years of resident graduate study. This includes a balanced program of at least 72 quarter hours (or the equivalent) in English: 36 hours at the 6000 level; 24 additional hours at the 5000-6000 level; and 12 hours for graduate credit at any level, including the 3000-4000 level. In addition, 9 (or 6) hours approved by the department must be taken for graduate credit in a subject or subjects other than English. Normally a student with the M.A. from another university may transfer at least 36 quarter hours.

After all, or most, of the course work has been taken and after the language requirements have been satisfied, the student will take four comprehensive examinations from several areas divided as the department directs. Successful completion of these examinations will be followed by the writing of the dissertation and by an oral examination in the field of the dissertation.

Any course in the 5000 or 6000 series may be repeated for credit with the permission of the department.

*1211 Written and Oral English for Foreign Students (5) Rapid review of English grammar structures and pronunciation with intensive oral, aural, and written drill. Required during the first quarter of residence of all foreign students (graduates, undergraduates and transfer students) who are not excluded from it on the basis of the English Proficiency Examination required of every new foreign student. A, B, C, I, F, W grading. Students registered for this course are permitted to register for only 2 other courses.

*1221 Written and Oral English for Foreign Students (5) Emphasis on the more advanced structures of English grammar and on paragraph writing. Required during the first quarter of residence of foreign students who on the English Proficiency Examination demonstrated need for work in English structure, but not at the intermediate level of 1211. Required also of foreign students who complete 1211. A, B, C, I, F grading. Students registered for this course are permitted to register for only 2 other courses. E

3070 Modern British Poetry (3) From Housman and Thomas and more recent poets.

*Literary and Cultural Studies

5102 Off-campus Study (1-12) See page 99.
5103 Independent Study (1-12) See page 99.

*Young Professor.
*Alumni Distinguished Service Professor.

College of Liberal Arts

5970 Independent Study in Computer Science (1-3) Special project under faculty guidance. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

5421-22 Comparative Literature (3, 3, 3) Content varies; may be repeated. F, W, Su.
5420-21-22 Dante and Medieval Culture (3, 3, 3, 3) (Same as Italian 4050-60-70). A; A; A
5012 Comparative Theories of Literature (3) Croce, Richards, Frye, Wellek, and others. Prereq: Completion of three literature courses in foreign language above 3000, or equivalent.
5022 Approaches in Comparative Literature (3) French and American schools; "comparative literature" vs. "general literature"; Van Tilgham, Carre, Baldensperger, Wellek. Prereq: 5012; completion of three literature courses in foreign language above 3000, or equivalent.

5101 Foreign Study (1-12) See page 99.

*Not available for graduate credit.

Linguistics

4000 Topical Linguistics (3) Content varies. May be repeated. Maximum 9 hrs.
4020-30 Historical Linguistics, Neogrammarian School, and Growth of Structuralism (3, 3, 4) Development of scientific approach to linguistics from Jacob Grimm and Franz Bopp through nineteenth century. 4030—Traces change in linguistics through interest born by Saussure's Cours and growing impact of anthropology and behaviorism on linguistic studies.
4250 Introduction to Descriptive Linguistics (3) (Same as French, German, Russian, Spanish 4260.)
4260 Introduction to Historical and Comparative Linguistics (3) (Same as French, German, Russian, Spanish 4260.)
4270 Introduction to Romance Linguistics (3) (Same as French, Spanish 4270.)
4271 Introduction to Slavic Linguistics (3) (Same as Russian 4271.)
4440 Sociolinguistics (3) (Same as English 4440.)
4450 Dialectology (3) (Same as English 4450.)
4460 Special Topics in English Linguistics (3) (Same as English 4460.)
4471-81 English as a Second or Foreign Language (3, 3) (Same as English 4471-81.)

Economics

See College of Business Administration.

English

MAJOR DEGREES

English

M.A., M.A.C.T., Ph.D.

Professors:
J. B. Ingraham (Head), Ph.D. Princeton;
E. M. Wellek, Ph.D. Columbia;
R. M. Kelly (Director of Graduate Studies), Ph.D. Texas;
R. Y. Dana, Ph.D. Yale;
N. J. Sanders, Ph.D. Shakespeare Institute, Stratford-upon-Avon;
W. T. Stewart, Ph.D. North Carolina;
R. Walker, M. A. Texas;
T. V. Wheeler, Ph.D. North Carolina;
J. M. White, M. A. Cambridge; N. Wright, Ph.D. Yale.

Associate Professors:
J. M. Armistead, Ph.D. Duke;
E. M. Wellek, Ph.D. Columbia;
M. A. Lozano, Ph.D. Maryland;
C. J. Maland, Ph.D. Michigan; M. L. Pryse, Ph.D. California (Santa Cruz).

Visiting Lecturers:
W. Dykman, B. A. Northwestern; G. Griffith, Ph.D. Vanderbilt; F. M. O'Hara, Ph.D. Illinois.

Detailed information about the Master's and doctoral programs, and about individual graduate courses, may be obtained by writing to the Director of Graduate Studies of English, McClung Tower. For admission forms, write to the Graduate School.

Assistant Professors:
D. R. Cox, Ph.D. Misellaneous;
T. A. Jeffers, Ph.D. Cambridge;
M. A. Lofaro, Ph.D. Maryland;
C. J. Maland, Ph.D. Michigan; M. L. Pryse, Ph.D. California (Santa Cruz).

Assistant Professors:
D. R. Cox, Ph.D. Misellaneous;
T. A. Jeffers, Ph.D. Cambridge;
M. A. Lofaro, Ph.D. Maryland;
C. J. Maland, Ph.D. Michigan; M. L. Pryse, Ph.D. California (Santa Cruz).

VISITING PROFESSORS:
E. W. Bretton (Associate Head), Ph.D. Illinois;
J. B. Trahern (Head), Ph.D. Princeton;
R. Walker, M.A. Texas;
J. B. Trahern (Head), Ph.D. Princeton;
R. Walker, M.A. Texas;
N. Wright, Ph.D. Oregon.

Visiting Professors:
E. W. Bretton (Associate Head), Ph.D. Illinois;
J. B. Trahern (Head), Ph.D. Princeton;
R. Walker, M.A. Texas;
J. B. Trahern (Head), Ph.D. Princeton;
R. Walker, M.A. Texas;
N. Wright, Ph.D. Oregon.

*Not available for graduate credit.
6550 Studies in Mode and Genre (3) Content varies. May treat drama, novel, short story, poetry, or satire, the comic, the tragic, etc., depending on professor.

6590 Special Topics (3) Content varies. Histor. of ideas, bibliography, autobiography, literature of travel, extra-curricular literary, etc.

6610-20-30 Studies in English Romanticism (3, 3, 3)

6710-20-30 Studies in Eighteenth-century Literature (3, 3, 3)

6810-20-30 Studies in Drama and Theatre (3, 3, 3)

6910-20-30 Studies in Twentieth-century Literature (3, 3, 3)

French

See Romance Languages

Geography

MAJOR

DEGREES

M.S., Ph.D.

Professors:

S. R. Jumper (Head), Ph.D. Tennessee; C. S. Atken, Ph.D. Georgia; E. H. Hammond, Ph.D. California; P. K. Albers, Ph.D. Milwaukee; J. B. Rhodes, Ph.D. Wisconsin.

Associate Professors:

T. L. Blair, Ph.D. Iowa; L. W. Brinkman, Jr.; W. N. Cherry, M.S. Tennessee; R. Foresta, Ph.D. Tennessee; C. T. Paludan, Ph.D. Denver (UT Space Institute); J. R. Carter, Ph.D. Georgia; T. H. Schmudde, Ph.D. Wisconsin.

Assistant Professors:

W. N. Berry, M.S. Tennessee; R. Frelon, Ph.D. Utah; L. Pulsipher (Visiting); R. Foresta, Ph.D. Tennessee; W. N. Cherry, M.S. Tennessee; R. Foresta, Ph.D. Tennessee; C. T. Paludan, Ph.D. Denver (UT Space Institute); J. R. Carter, Ph.D. Georgia; T. H. Schmudde, Ph.D. Wisconsin.

The Department of Geography offers the degrees of Master of Science and Doctor of Philosophy with concentrations in geography of development, physical geography and human systems, urban geography, geography of Anglo-America, and rural and nonmetropolitan geography.

THE MASTER'S PROGRAM

The department requires a minimum of 45 quarter hours beyond completion of a sound undergraduate major program. At least one-half of the total courses in the graduate program must be at or above the 5000 level, of which no more than 9 hours may be thesis courses, and must include 5150, 5160, and (at each offering during residency) 5100. Thesis and final examination required.

THE DOCTORAL PROGRAM

The doctorate is a research degree and is granted only to those persons who demonstrate proficiency in conducting independent research. Students must have achieved the equivalent of a comprehensive Master's program before they will be admitted to the doctoral program. Course requirements for the degree shall be determined by the student's faculty committee in accordance with specific interests and needs. The program of study must include sufficient course work within the independent research. Students must have achieved the equivalent of a comprehensive Master's program before they will be admitted to the doctoral program. Course requirements for the degree shall be determined by the student's faculty committee in accordance with specific interests and needs. The program of study must include sufficient course work within the independent research. Students must have achieved the equivalent of a comprehensive Master's program before they will be admitted to the doctoral program.

a foreign language, cartography, and quantitative techniques are required. Other techniques pertinent to the student's areas of specialization may be required. The language will be French or Spanish unless otherwise approved by the student's faculty committee. Comprehensive examinations required for admission to candidacy include a written comprehensive, written examinations on two special fields in geographic 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.

3410 Intermediate Economic Geography (4) Concepts, theories, and practices in location planning. Location patterns in agriculture, manufacturing, and service activities. F or W

3430 Urban Geography (4) Concepts and theories concerning development and significance of systems of cities and internal morphology of cities. F, W

3450 Rural Geography (4) Geographical appraisal of rural areas of the United States, including small towns and urban fringes. Problems and potentials of rural America. W

3490 Geography of Resources (4) Study of factors related to variations in resource availability from time to time and place to place, particularly with emphasis upon energy and metallic resources. F, W

3520 Climatology (4) General circulation system leading to world pattern of climates. Climatic change and modification. Interrelationships of climate and human activity. F

3530 The Land-Surface System and Man (4) Nature and regional variations in relationships among surface form, water, vegetation, and surface materials. Human as evaluator and agent of change. W, Su

3610 Political Geography (4) Importance of geographic factors for understanding political relationships within and between nations; spatial implications of political decision-making process; geography of administrative units. F, W

3650 Cultural Geography (4) Basic concepts of culture, methods and background of cultural geography; world patterns of cultural phenomena. A

3790 Geography of Middle America (4) Covers Mexico, Central America, and the West Indies. W

3800 Geography of South America (4) F, Sp

3870 Geography of Asia (4) A survey of the physical, cultural and economic characteristics of the countries of Asia, after examination of the Soviet Union. Sp

3910 Regional Geography of United States and Canada (4) Major physical, economic, and social distributions as they interrelate to give distinctive character to regions of United States and Canada. W, Sp

3920 Geography of the American South (4) Geographical appraisal of southeastern United States, including physical environment and human resources, Origin and development of contemporary economic and cultural traits of the area. F, Sp

3940 Geography of Appalachia (4) Interrelation of physical, economic, and social patterns to give distinctive character to the region and its parts, especially Southern Appalachia. Appalachia in perspective in the southeastern United States.

4075 Geography of Transportation (4) Geographic examination of transportation systems, emphasizing transport of people on highways and by public facilities. Relationship of transportation to regional development.

4100 Quantitative Methods in Geography (4) Geographic applications of statistical techniques, point patterns, areal analysis, and aerial photography. A

4210 Problems in Geographic Method (4) Examples of problems and approach to geographic analysis and solution. Emphasis on use of geographic data, areal sampling, generalization, classification, regionalization, and questions of scale. A

4240 Historical Geography of the United States (4) Survey of changing human geography of United States during four centuries of settlement and development. Emphasis upon regional development patterns, development of agricultural regions and patterns of urban development. Sp

4510 Principles of Geomorphology (4) (Same as Geology 4510)

4550 Geography of Soils (4) Soils as physical systems and their relationship to environments. Investigation of specific cases of the role of soil in management of environment and soil-landscape relationships. F

4610 Industrial Geography (4) Factors affecting location of manufacturing activities, with emphasis on the United States. Prereq: 3410 or consent of instructor. A

4630 Geography of Agriculture (4) A

4710 Cartographic Design and Production (4) Principles and practice of design, construction, and reproduction of maps. Recommended prerequisite: 3700. 2 hrs and 2 labs. Sp

4720 Data Mapping (4) Automated techniques of representing surfaces, using geographic information systems. Recommended prerequisite: 3700 and knowledge of a computer language. F

4730 Advanced Cartographic (4) Map production from design through color printouts. Prereq: 3700, 4710, and 4720 or consent of instructor. W

4740 Remote Sensing: Types and Applications (4) Basic principles and uses of aerial photography and other remote sensing techniques. Emphasis upon value of various types of imagery for geographic interpretation and simple mapping. Prereq: Consent of instructor. W

4750 Interactive Computer Graphics (3) (Same as Computer Science 4750)

4799 Practicum in Cartography/Remote Sensing (2-6) May be repeated. Maximum 6 hrs.

5000 Thesis (1-15) E

5100 Colloquium in Geography (1) Discussion of departmental research, current research literature, and general topics. Registration at each offering required of resident graduate students. May be repeated. Maximum 8 hrs. SNC only. W, Sp

5101 Foreign Study (1-12) See page 59. E

5102 Off-campus Study (1-12) See page 59. E

5150 Introduction to Geographical Research (3) Aims of geographical research; survey of printed source materials; practice in effective presentation of research findings. F

5160 Research Design and Field Problems (4-6) Development of research problems, preparation of appropriate study designs, and practical field application. W

5170 Geographic Concept and Method (3) Traditional and modern theories of geography, scale, scope, problems, and methods of geography. A

5200 Special Problems in Geography (2-6) Reading and research on problems or topics of interest to individual students. Students must define topic and receive instructor's approval of study plan before registering for course. May be repeated with consent of instructor. E

5250 Topics in Historical Geography (3) Examination of trends, concepts and methods in historical geography. Prereq: 4240 or consent of instructor. May be repeated with consent of instructor. Maximum 9 hrs. F, Sp

5260 Advanced Cultural Geography (3) Geographic analysis of rural settlement in Eastern United States, with emphasis upon New England, Tidewater East, and Upland South, and specific application to Southern Appalachia. Includes field work and final report. Prereq: 3860 or consent of instructor. Sp

5310 Topics in Regional Geography of the United States (3) Intensive analysis of problems and trends in one or more regions of United States, excepting American South. May be repeated with consent of instructor. Maximum 9 hrs. A

5320 Topics in the Geography of the American
South (3) Geographic perspective on economic and cultural aspects of southeastern United States. Topical, may be repeated with consent of instructor. Maximum 9 hrs. A

5410 Advanced Topics in Economic Geography (3) Examination of trends, problems, and methods in modern economic geography. Prereq: 3410 or consent of instructor. May be repeated. Maximum 9 hrs. A

5520 Advanced Urban Geography (3) Analysis of research on urban systems, internal morphology, urban economy and urban spatial behavior. Prereq: 3430 or consent of instructor. A

5550 Topics in Geography of Land-Surface System (3) Examination of trends, problems, and methods in geography of land-surface system. Prereq: 3530 or consent of instructor. May be repeated with consent of instructor. A

5610 Topics in Climatology (3) Examination of trends, problems, and methods in modern climatology. Prereq: 3520 or consent of instructor. May be repeated with consent of instructor. F

5710 Seminar in Geography (3)

5720 Topics in Quantitative Geography (3) Multivariate analysis applied to problems in geography; research on theories developed using appropriate packaged computer programs; usefulness to geographic research of techniques developed by other disciplines. Prereq: 3000 consent of instructor. Sp

5740 Advanced Topics in Remote Sensing (3) Applied research using remote sensing and aerial photographic imagery for interpretation and mapping of geographic data. Prereq: 4740 or consent of instructor. Sp

5790 Topics in Cartography (3) Trends, concepts, problems, and methods in cartography. Prereq: 4740 or consent of instructor. Maximum 9 hrs. A

5915 Regional Geomorphology (4) (Same as Geology 5915.)

6000 Doctoral Research and Dissertation (3-15) E

6110-20 Seminar in Economic Geography (3, 3) A

6220-30 Seminar in Urban Geography (3, 3) A

6240-50 Seminar in Historical Geography (3, 3) A

6260-70 Seminar in Cultural Geography (3, 3) A

6310 Seminar in Rural Geography (3, 3) A

6410-20 Seminar in Regional Geography of the United States (3, 3) A

6510 Seminar in Regional Geography of Latin America (3, 3) A

6710-20 Seminar in Physical Geography (3, 3) A

NOTE: Registration in 6000-level courses may be repeated with consent of department.

Geological Sciences

MAJOR

DEGREES

M.S. Ph.D.

Professors:

K. R. Walker (Head), Ph.D. Yale; G. Briggs (Associate Dean), Ph.D. Wisconsin; H. J. Klepper (Emeritus), Ph.D. Ohio State; G. C. Kopp, Ph.D. Columbia; R. E. McLaughlin, Ph.D. Tennessee; D. H. Roeder, Ph.D. Goethe (Germany); L. A. Taylor, Ph.D. Lehigh; J. G. Walls (Emeritus), Ph.D. North Carolina.

Associate Professors:


Assistant Professors:

T. W. Broadhead; Ph.D. Iowa; D. W. Byerly, Ph.D. Tennessee; P. A. Delcourt, Ph.D. Minnesota; J. B. Higgins, Ph.D. Virginia Polytechnic Institute; J. C. Jones, Ph.D. Yale; N. V. McCracken, Ph.D. Harvard; A. Tankard, Ph.D. Rhodes.

THE MASTER'S PROGRAM

The department requires a minimum of 45 quarter hours including at least 18 hours in courses (other than thesis) numbered above 4000. A minimum of 24 hours in geology courses, in addition to thesis, is required. Students who enter without having had an acceptable background and are required to take Geology 4440, or an equivalent course elsewhere, as part of the above department requirements. One year of general physics is required, if not taken as an undergraduate. Thesis committee must be approved by graduate program committee. Qualifying examination is given the second quarter.

THE DOCTORAL PROGRAM

Specific course work and thesis topic determined by candidate's faculty committee.

1. Program to be determined by faculty committee. Requirements include a minimum of 84 quarter hours in courses for graduate credit, in addition to dissertation. These courses must include a minimum of 45 hours in the 5000 or 6000 series, of which at least 15 hours must be in the 6000 series. Up to one-third of the required hours may be taken in related fields. A Master's degree is recommended.

2. Comprehensive examination will be both written and oral. The exam must be taken by the end of the second academic year.

3. Each Ph.D. student must satisfy a research tool requirement which will be determined by his/her faculty committee and which will consist of one of the following:

a. Demonstration by examination of a reading knowledge in one modern foreign language in which there is a significant body of geological literature.

b. Completion of course 3030 in an appropriate foreign language with a B or better.

c. Courses (minimum of 6 hours) at 3000 level or higher taken for undergraduate credit and completed with a grade of B or better.

4. Each Ph.D. student must satisfy a research tool requirement which will be determined by his/her faculty committee and which will consist of one of the following:

a. Demonstration by examination of a reading knowledge in one modern foreign language in which there is a significant body of geological literature.

b. Completion of course 3030 in an appropriate foreign language with a B or better.

c. Courses (minimum of 6 hours) at 3000 level or higher taken for undergraduate credit and completed with a grade of B or better.

*3160 Introduction to Earth Materials (4) Study of minerals and rocks. Laboratory includes both hand specimen and analytical methods of identification. Prereq: 1410; Chemistry 1110-20 or equivalent. 3 hrs and 1 lab. A

*3180 Mineralogy (4) Introduction to crystallography and study of minerals. Laboratory includes hand specimen, chemical and x-ray methods of identification. Prereq: 1410; Chemistry 1110-20 or equivalent. 3 hrs and 1 lab. A

*3210-20 Invertebrate Paleontology (4, 4) Systematic review of important Metazoa fossil invertebrate fossil groups. 3210-Perifera to Annelida, including chitons, echinoderms, brachiopods, and conodonts. 3220-Mollusca through lesser Chordata, including arthropods and echinoderms may be taken separately or in sequence. Prereq: 3260; Biology 1210-20 or consent of instructor. 3 hrs and 1 lab period.

*3260 Micropaleontology (4) Microscopic remains of animals and plants with special emphasis on stratigraphically important groups. Prereq: 3210 or consent of instructor. 3 hrs and 1 lab period.

*3260 Paleobiology (4) Introduction to principles and materials of paleontology as applied to interpretation of earth history. Prereq: 1420. 3 hrs and 1 lab or field period.

*3270 Geological History of Land Organisms (4) Geological history and development of terrestrial biota, ecosystems and environmental history. Prereq: 1210-20 or consent of instructor. 3 hrs and 1 lab or field period.

*3310 Introductory Petrology (4) Introduction to classification and properties of igneous and metamorphic rocks, processes which produce them, and petrologic and geochronologic classification of rocks. Laboratory includes both hand specimen and microscopic study of important rock types. Prereq: 3180. 3 hrs and 1 lab.

*3330 Geology of East Tennessee (4) Lectures and field excursions. Prereq: 12 hrs of geology and consent of instructor.

*3380 Stratigraphy-Sedimentation (4) Introductory study of stratigraphic principles and practices and of sedimentary processes and interpretation of depositional environments. Prereq: 1420 and 3180. 3 hrs and 1 lab or field period.

*3370 Structural Geology (4) Introductory discussion of structures such as folds, faults, joints, cleavage, and primary structures. Laboratory work includes depth and thickness problems, structure sections, structure contour maps. Prereq: 1420; Mathematics 1540-50 or equivalent. 3 hrs and 1 lab.

*3410 Principles of Ground Water Geology (3) Geological materials and processes affecting the occurrence and behavior of water. 2 hrs and 1 lab.

*3510introductory Environmental Geology (4) Geologic problems involving earth environment and resources, and geologic parameters associated with their control and misuse. Prereq: 1420 or consent of instructor. 2 hrs and 1 lab period.

*3610 Quaternary Geology for Engineers (3) Evolution and depositional processes, landforms, ground water. Prereq: 2160 or equivalent. 2 hrs and 1 lab or field period.

4110 Principles of Economic Geology (4) Formation of mineral deposits. Prereq: 3180, 3370, or equivalent.

4115 Elementary Applied Geophysics (4) Basic principles of electrical, seismic, gravity and magnetic surveying. Recommended: 1420, Physics 2220 or 2320. 3 hrs and 1 lab.

4130 Sedimentology (4) Introduction to physical processes of sedimentation: transport of sediments and formation of sedimentary structures, river flows, waves, tides, and ocean circulation. Prereq: 3310. 3 hrs and 1 lab.

4230 Paleogeology (4) Principles of environmental analysis applied to fossil assemblages and associated lithologies. Prereq: 3260 or consent of instructor. 3 hrs and 1 lab.

4240 Paleoecology (4) Survey of fossil record of plants with particular emphasis on comparative morphology and evolutionary trends in major plant groups, and chronological succession and geographic distribution of past floras on earth. Prereq: 1420 or 2210; Botany 3010-20 or consent of instructor. (Same as Botany 4240.) 3 hrs and 1 lab or field period.

4250 Evolution of Higher Taxa (4) Current evolutionary theory in context of paleontology, patterns of evolution in fossil organisms at family level or higher. Prereq: 3260. Recommended prerequisite: 3210-20. 2 hrs and 1 2-hr seminar.

4260 Biostratigraphy (3) Application of paleontologic data to stratigraphic study, codification of stratigraphic nomenclature and recommended practice. Prereq: 3260 and 3360. 1 hr and 1 2-hr seminar.

4310 Geologic Mapping (4) Interpretation of maps and classified data. Prereq: 12 hrs geology. 3 hrs and 1 lab or field period.

4331 Quaternary Geology of North America (4) Quaternary geologic processes, stratigraphy, geomorphology and geology of glaciated and unglaciated North America and oceans. Prereq:
5120 Geochemistry of Ore Mineral Deposits (3) Principles of chemical thermodynamics related to geologic processes. Prereq: Chemistry 1110-20-30 and calculus of a single variable or equivalents.

5670 Geochronology (3) Theory and practice of geochronologic dating. Prereq: Geology 4110 or consent of instructor. 3 hrs per course.

5690 Cathodoluminescence Petrography (2) Application to geologic problems. Prereq: 3180 and 4550 or consent of instructor. 1 hr and 1 lab.

5710 Advanced Paleontology (4) Fossil invertebrates.

5720 Paleontological Nomenclature and Techniques (4) Nomenclature of fossils as it applies to paleontology; basic techniques in preparation and mounting of fossils and manuscript preparation for publication. 3 hrs and 1 lab.


5820 Strata-bound and Stratiform Sulfide Deposits (4) Classification, distribution, characteristics and genesis of strata-bound and stratiform sulfide deposits. Mississippi Valley-type Pb-Zn deposits, stratiform Pb-Zn deposits, and deposits of sedimentary and metamorphic associations, and stratiform Cu deposits. Prereq: 4110 or consent of instructor. 2 hrs and 2 lab/field/period seminar.

5830 Magmatic Mineral Deposits (4) Distribution, characteristics and genesis of magmatic deposits related to magmatic processes. Magmatic segregation deposits of ultramafic-mafic association and porphyry Cu-Mo deposits. Prereq: 4110 or consent of instructor. 2 hrs and 2 lab/field/period seminar.

5840 Ore Petrology (4) Ore mineral assemblages by reflected-light microscopy. Identification of ore minerals and interpretation of paragenesis from textures. Typical samples from different types of ore deposits, suite of choice. Prereq: 4110 and 4550, or consent of instructor. 2-4 hrs.

5850 Regional Studies in Geology (1-3) Literature study and seminars on specific regions of geologic interest, supervised by field trip. Prereq: Consent of instructor.

5860 Coal Depositional Environments (4) Coal stratigraphy and depositional environments. Carboniferous rocks of Appalachian region, problems in coal mining and coal quality. Prereq: 3360 and 4130.

5915 Regional Geomorphology (4) Selected geographic and geological topics. Focus on common elements such as history or development, related processes which have produced genetically similar assemblages of landforms. May be repeated with consent of department. (Same as Geography 5915.)

6000 Doctoral Research and Dissertation (3-15) E *6110 Seminar in Stratigraphic Geology (3)

*6210 Seminar in Paleontology (3)

*6310 Seminar in Structural Geology (3)

*6410 Seminar in Mineralogy (3)

*6510 Seminar in Petrology (3)

*6610 Seminar in Economic Geology (3)

*6710 Seminar in Geochemistry (3) Prereq: 4610 or consent of instructor.

*6810 Seminar in Geochemistry (3) Prereq: 4510 or consent of instructor.

Note: Registration for 6000-level courses may be repeated with consent of department. Maximum 9 hrs per course.
Germanic and Slavic Languages

MAJORS

German

Germ Anxiety and Literature

Ph.D.

Emirers: Professors: E. T. Hankens, Ph.D., Bonn (Germany); R. W. Nordsiek, Ph.D., Ohio State.

Professors: H. Kratz (Heidelberg, Ph.D., Ohio State), E. Feilen, Ph.D., Pennsylvania; H. W. Foder, Ph.D., Wisconsin; R. L. Miller, Ph.D., Cornell; J. C. Osborne, Ph.D., Northwestern; M. P. Rice, Ph.D., Vanderbilt.

Associate Professors: J. L. Elliott, Ph.D., Michigan; D. M. Flane, Ph.D., Indiana; N. A. Lauckner, Ph.D., Wisconsin; D. E. Lee, Ph.D., Stanford.

Assistant Professors: C. J. Mellor, Ph.D., Chicago; U. Ritzenthaler, Ph.D., Connecticut.

The Department of Germanic and Slavic Languages offers three advanced degrees. They are the Master of Arts (M.A.) in German, the Master of Arts in College Teaching (MACT) in German, and the Doctor of Philosophy (Ph.D.) in German Language and Literature.

THE MASTER'S PROGRAM

In addition to the general Graduate School regulations as stated on page 19, the department requires 36 quarter hours in approved courses, including at least 16 hours in courses numbered above 5000. In addition to course work, the student is required to write a thesis, for which he/she may get a maximum of 9 hours credit. The minimum quarter hour credit for the M.A. is 45 quarter hours.

M A S T E R O F A R T S I N C O L L E G E T E A C H I N G PROGRAM

The MACT program is essentially an expanded M.A. program. The minimum requirement is 60 hours of graduate study, including 9 hours of thesis and a 3 quarter-hour seminar in college teaching. The aim of this program is to prepare highly qualified college teachers. Students receiving the MACT degree would be well prepared to go to the Ph.D.

THE DOCTORAL PROGRAM

The student must fulfill the general requirements for the Ph.D. degree set by the Graduate School. The candidate for the doctoral degree must complete a minimum of 81 quarter hours of course work beyond the Bachelor's degree in addition to 36 hours of doctoral research and dissertation. At least 45 quarter hours of the minimum must be taken in 5000 or 6000 courses. Of these 45 hours, a minimum of 18 hours must be chosen from the Proseminar (5200) and the literary or philological seminars. The candidate must be in residence at least 18 hours per quarter (or equivalent) in courses numbered above 5000. At least 9 hours must be taken in a cognate field. Students are encouraged to take additional work in allied fields. The minor in an allied field must consist of at least 18 hours of 5000 or 6000 courses.

Students must show a fluent command of German, both oral and written, and a knowledge of two foreign languages, French and another language, such as Italian, Latin or Russian, appropriate to the field of research. A comprehensive examination, both written and oral, on German language and literature and the minor field or fields, must be passed before the student may be admitted to candidacy. The student will be examined on an extensive reading list which covers the whole range of German literature, and will be expected to show familiarity with major works of world literature. The candidate will be required to defend the dissertation in an oral examination, which will cover also the general area of the dissertation. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

The field of study is divided into (1) German literature and (2) German (or Germanic) philology or linguistics. A student may concentrate on one or the other. Dissertation and seminar research topics will be chosen in accordance with the varying preferences and specific interests of the faculty. Detailed programs will be established in each case by the student's faculty committee.

3010-30-30 Elements of German for Upper Division and Graduate Students (3, 3, 3) Elements of language, elementary and advanced readings. Open to graduate students preparing for language examinations, and upper division students desiring reading knowledge of the language. Undergraduate credit only. Required of students having completed a master's degree in German. E

3210-20-30 German Literature in English Translation (3-4, 3-4, 3-4) No foreign language credit. No change in graded or ungraded after add deadline. Students opting for 4 hrs credit will be expected to present an appropriate amount of extra work above that required for 3 hrs credit. E

3260 Old Norse Literature in English Translation (3-4) Prose readings of sagas of Norwegian kings, great Icelandic family sagas, and Viking land sagas, narrating discovery of America around year 1000. Mythological and heroic poems of the Edda.

4110-20-30 Studies in Classical and Modern Writers (3, 3, 3) Content varies. Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation) or equivalent. May be repeated with consent of department.

4140-50 Selected Topics in German Literature from 1750 to the Present (3, 3) Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation) or equivalent. Su

4160 Studies in German Authors (3) Life and works of a single outstanding German literary figure. Content varies. Prereq: (Prose courses (exclusive of 3010-20-30, or courses in English translation). Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation). May be repeated. Su.

4170 Theatrical German (1-3) Performance in one or more German plays. Prereq: Intermediate German or equivalent or consent of instructor. May be repeated with consent of department. W, Sp

4210-20-30 Studies in German Literary Types (3, 3) 4210-Lyric poetry. 4220-Drama. 4230-Narrative prose. Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation). Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation). May be repeated. W

4250 Introduction to Descriptive Linguistics (3) (Same as French, Russian, Spanish, and Linguistics 4260.) F

4260 Introduction to Historical and Comparative Linguistics (3) Linguistic change, protolanguages. Phono logical and morphological change. Historical, sociological influences upon the development of language. Semantic change. Lexicography. All these topics copiously illustrated by selected examples from Indo-European languages. Prereq: F; 9 hrs of upper division English, or 9 hrs of upper division courses in a modern or ancient language (exclusive of German and French 3010-20-30, courses in literature in any language, and general courses in Latin and Greek requiring no knowledge of these languages), or consent of department. (Same as French, Russian, Spanish, and Linguistics 4260.) W

4310-30 History of German Language (3, 3)
Ph.D. Columbia; R. G. Landen, Ph.D.
Princeton.

Associate Professors:
J. D. Bing, Ph.D. Indiana;
S. R. Bashara, Ph.D. Bryn Mawr;
J. R. Finger, Ph.D. Washington; C. W. Johnson,
Ph.D. Michigan; P. A. Marr, Ph.D. Harvard;
M. C. McDonald, Ph.D. Pennsylvania; J. H. Morrow,
Ph.D. Pennsylvania; J. Maldwyn, Ph.D. Yale;
P. J. N. Howitt, Ph.D. Berkeley;
E. H. Trainer, Ph.D. Emory; J. G. Ulity,
Ph.D. Illinois; W. B. Wheeler, Ph.D. Virginia.

Assistant Professors:
S. D. Bekker, Ph.D. Case-Western Reserve;
J. Bonstedt, Ph.D. Harvard; N. L. Brann,
Ph.D. Stanford; R. B. Rice, Ph.D. Harvard.

THE MASTER'S PROGRAM

Master of Arts—Plan I: Course requirements include History 5240, and either 5250 or 5260; one M.A. reading course; at least 6 additional hours 5300 or above of which 3 hours must be 6300 or above. Total hours, including thesis—45.

Plan II: History 5240, and either 5250 or 5260; two M.A. reading courses; 12 additional hours 5300 or above, at least 2 of which must be 6300 or above. Total hours—45. Plan I and Plan II require evidence of proficiency in one foreign language before the M.A. degree is granted.

Masters of Arts in College Teaching

Course requirements include History 5240-50-60, 5271-72-73, and Continuing and Higher Education 5110. Students must spend one year as a graduate assistant and one year as a teaching assistant. Total hours, including thesis—60. Students seeking the M.A.C.T. degree may substitute 9 quarter hours of courses numbered 6300 or above for the Master's thesis.

THE DOCTORAL PROGRAM

1. Admission: (a) Acceptable scores on the Graduate Record Examination (General Aptitude and History Achievement).
   (b) Students successfully completing the M.A. degree at The University of Tennessee must be recommended by the Department of History.
   (c) Students from other institutions should have an M.A. degree and must be reviewed and approved by the Graduate Awards and Review Committee after their first year of work at The University of Tennessee.

2. Residence and Course Work: Beyond the Bachelor's degree a minimum of 75 credit hours in course work is required, of which not less than 6 must be grades A or B. Not less than 6 quarters of the required 9 quarters of residence work shall be under the supervision of the staff of The University of Tennessee.

3. Language Requirements: Candidates must possess a reading knowledge of one foreign language and such additional languages as may be determined by the student's committee. Under normal circumstances, those specializing in European history will need two languages. The committee may also specify any other research tools, such as statistics, essential for the student's preparation. Upon student petition, may accept in place of a language B a better performance in appropriate statistical courses and History 5290.

The foreign language requirements may be satisfied in one of two ways:

(a) By examination. When the student is ready to take a language examination he/she should consult with an advisor. The appropriate forms and the time of the examination may be obtained from the Graduate School.

(b) By coursework. Upon consultation with the advisor, a student may elect to complete an appropriate 3010-20-30 sequence in a language department (or an intermediate sequence in a language in which no 3010-20-30 sequence is available). Satisfactory completion requires that a student must have at least a B in the final quarter.

4. Comprehensive Examination and Committee: Incoming students will be advised by the department head.

The comprehensive examination must be taken after all course work is completed, language requirements fulfilled, and at least nine months before the degree is expected. This exam should normally be taken before beginning the ninth quarter of work toward the doctorate. The candidate must present four fields, distributed as follows: one major field (history); two minor fields (history); and one minor field which may be either in history or outside the department. In any case, the student is required to have 9 hours of graduate course work outside the History Department. Three of the four areas listed below must be represented by a major or a minor field, or both.

I. Ancient and Medieval
   (1) Ancient Near East
   (2) Greece
   (3) Rome
   (4) Early Middle Ages, 375-1125
   (5) Late Middle Ages, 1095-1450

II. Early Modern
   (1) Renaissance and Reformation
   (2) Europe, 1559-1615
   (3) American History to 1815
   (4) Latin America 1492-1825

III. Modern
   (1) Europe, 1815-1914
   (2) European World Since 1914
   (3) United States, 1815-present
   (4) Latin America, 1879-present
   (5) East Asia, 1879-present
   (6) Middle East, 1796-present

IV. National, Sectional and Topical
   (1) England, 1485-1763
   (2) Great Britain, 1760-present
   (3) France, 1559-1815
   (4) France, 1789-present
   (5) Germany, 1555-1806
   (6) Germany, 1806-present
   (7) Russia, 1600-1800
   (8) Russia, 1800-present

Greek
See Classics

History

MAJOR

DEGREES

History

M.A., M.A.T., Ph.D.

Professors:
P. H. Bergeron, Ph.D. Vanderbilt;
E. V. Chiploss, Ph.D. Harvard; R. E. Duncan,
Ph.D. California (Berkeley); H. S. Fink
(Emeritus); Ph.D. Princeton; L. P. Graf,1
Ph.D. Harvard; G. Haas, Ph.D. Harvard;
R. H. Watson, Ph.D. California (Berkeley);
C. O. Jackson, Ph.D. Emory; M. M. Klein,2

1 Distinguished Service Professor.
2 Alumni Distinguished Service Professor.

100 College of Liberal Arts
6635 Seminar in Jacksonian Period (3)
6650 Seminar in the American Westward Movement (3)
6670 Seminar in American Colonial History (3)
6690 Seminar in Twentieth-century American History (3)
6700 Seminar in Medieval History (3)
6710 Seminar in Medieval Institutions (3)
6770 Seminar in Central European History (3)

Mathematics

MAJOR

6100 Seminar in Latin American History (3)
6110 Seminar in the Civil War Era (3)
6130 Seminar in Twentieth-century America (3)
6140 Seminar in the History of the South (3)

Note: Registration in topics and seminar courses may be repeated for credit with consent of department.

Latin

See Classics
Students may not take examinations in both courses. The student's supervisory committee or the selected to fulfill this requirement must be of concentration. The use of the course course in mathematics outside of his/her area student's doctoral committee may require French, German, or Russian; this one foreign language, normally from among are to include a demonstrated proficiency in at some time after the requirements in 1. have committee appointed by the department head another round of exams.

The written exams mentioned in 1. are to be taken must be approved by the student's supervisory committee.

Pass an intensive exam in the field of specialization. This exam will be given by a committee at some time after the requirements in 1. have been met. A student may take this exam only twice.

The conditions for the doctoral degree are to include a demonstrated proficiency in one foreign language, normally from among 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.

In addition, the department requires that each student take a one year, 6000-level course in mathematics outside of his/her area of concentration. The use of the course selected to fulfill this requirement must be approved by the department head and either the student's supervisory committee or the student's Doctoral Committee. (Such approval may occur after completion of the course.)

The written exams mentioned in 1. are normally given twice each year, once in the fall and once in the spring. The fall exams usually are given before the fall quarter begins, and the spring exams are given during the spring quarter.

3050 Elementary Probability and Statistical Analysis (3) Combinatorial problems; sample spaces, sets, and events; statistical independence; axiom; probability theory; random variables and their distributions; simple random processes. Does not satisfy requirements of major or minor in mathematics. Prereq: 1550-60 or equivalent. W; Sp

3060 Elementary Statistical Analysis (3) Elementary probability distributions used in statistics: binomial, Poisson, and normal and their properties; sampling distributions, statistical tests of hypotheses; least squares and linear regression. Does not satisfy requirements of major or minor in mathematics. Prereq: 3050 or consent of instructor. Sp, Su

3090 Polynomials and Rings (3) An introduction to abstract algebra, beginning with study of integers followed by study of notions of rings, integral domains, and fields. Emphasis is given to certain ring theoretic properties shared by integers and polynomials over fields. Prereq or coreq: 3100 or consent of instructor.

3100 Logic and Sets (3) Elements of mathematical logic; elementary algebra of sets. Primarily for students in the College of Education. Does not satisfy requirements of major or minor in mathematics. Prereq: 1 yr college mathematics. Su

3110 Real Number System (3) Laws of arithmetic; rational and irrational numbers; fields. Prereq: 1 yr of college mathematics. Primarily for students in the College of Education. Does not satisfy requirements of major or minor in mathematics. Su

3140 Mathematical Modeling (3) Survey of construction and development of mathematical models used in science and industry. Markov chains, linear optimization, differential equations, difference equations, and dynamical systems. Prereq: 3150 or equivalent.

3150 Introduction to Numerical Algorithms and Programming (3) (Same as Computer Science 3150.) E

3155 Introduction to Numerical Algorithms (3) (Same as Computer Science 3155.)

3220 History of Mathematics (3) Survey of development of various branches of mathematics, from ancient to modern times. Prereq: 1860 or 2550 or equivalent.

3310 Advanced Euclidean Geometry (3) Triangles and circles, constructions, modern concepts. Prereq: 1 yr of college mathematics. F

3320 Non-Euclidean Geometry (3) Foundations of geometry. Elliptic and hyperbolic plane geometry. Prereq: 1 yr of college mathematics. W

3330 Transformational Geometry (3) Fundamental transformations in Euclidean geometry. Classification of isometries and similarities; symmetries of a polygon and its inversions. Prereq: 1 yr of college mathematics. Sp

3510 Intermediate Analysis for Teachers (3) Primarily for students in secondary mathematics education. Covers elementary calculus but provides a more advanced viewpoint with emphasis on proofs of basic theorems. Topics covered include limits of sequences and functions, continuous functions, derivatives, definite integral, and fundamental theorem of integral calculus. Does not satisfy requirements of major or minor in mathematics. Prereq: 1550-60 or 1860. Su


3715 Discrete Structures (3) (Same as Computer Science 3715.) E


3725 Advanced Discrete Structures (3) (Same as Computer Science 3725.)

3780-90 Introduction to Combinatorial Theory (3, 3) Introduction to problems of arrangement and selection. Permutations and combinations. Enumeration by recurrence relations and generating functions, graph theory, finite geometries and finite fields, partitions, block designs. Prereq: 2860 or consent of instructor. F; W; or W; Sp

3810 How To Prove It (3) Course is designed to improve understanding of nature and methods of mathematical proofs and to foster development of participation in seminar setting. Variable content but will include certain standard topics such as elementary set theory, relations and functions, and mathematical induction. Coreq: 2850 or 2550. E

3861 Mathematical Models in the Life Sciences (3) Introduction to difference equations and differential equations, with applications to mathematical biology. Emphasis by recurrence relations and generating functions, graph theory, finite geometries and finite fields, partitions, block designs. Prereq: 2860 or consent of instructor. F; W; or W; Sp

3990 Studies in Mathematics (1-4) Credit determined at registration. Prereq: Consent of instructor. May be repeated with consent of department. Maximum 9 hrs.

4050-60 Matrix Algebra and Applications (3, 3) Vector spaces, linear transformations, eigenvalues and eigenvectors, similarity and unitary transformations, singular value decomposition, linear algebraic matrix techniques applied to biological phenomena. Does not satisfy requirements of major or minor in mathematics. Prereq: 1841-51 or consent of instructor.

4070 Matrix Algebra and Applications (3) Topics to be chosen at discretion of instructor.

4120 Linear Algebra (3) Abstract vector spaces, linear transformations, and their matrices, systems of linear equations and determinants, inner products, and diagonalization of symmetric matrices. Prereq: 2860 or 4050. F

4150-60 Abstract Algebra (3, 3) Equivalence relations and partitions, properties of integers, elementary theory of groups and rings, polynomial rings, integral domains, divisibility, unique factorization domains, fields. Must be taken in sequence. Prereq: 2860.

4225 Numerical Solution to Equations and Numerical Approximations (3) Numerical solution to equations and numerical approximations. Introduction to computation, interpolation, approximation, solution of a single nonlinear equation; introduction to iterative methods for linear and nonlinear systems. Polynomial interpolation, use of matrices, iterative methods for eigenvalues. Approximation by polynomials, piecewise polynomials, trigonometric and more, quadrature, orthogonal polynomials. Prereq: 2860 or 4150. F

4235 Numerical Methods for Ordinary Differential Equations (3) Interpolation by polynomials and piecewise polynomials; quadrature; single-step and multi-step methods for differential equations. Stability, consistency, and convergence. Current algorithms, variable step and order, stiff systems. Boundary value problems. Prereq: 3150 or 3155 and 4610 or 4225. (Same as Computer Science 4235.) W; Su


4250-60 Introduction to Complex Analysis (3, 3) 4250—Complex numbers, Cauchy-Reiman equa- tions, Cauchy's theorem. Taylor and Laurent series, residues and their applications. 4250—Conformal mapping, Schwarz-Christoffel transformations, Di- richtlet problem, applications (steady temperatures, electrostatics, fluid flow). Additional topics in com-
plex function theory. Must be taken in sequence. Preq: 2860; one 4000-level mathematics course recommended.


5011 Elementary Functions from an Advanced Standpoint (4-3) Order and completeness of the real number system; sequences and series of functions, uniform convergence, Taylor series. Should be taken in sequence. Preq: 2860 or 4510-20-30. F, W, Sp.


5310-20-30 Introduction to Higher Geometry (3, 3, 3) Projective spaces; coordinates and transformations, conics and conics in central projection, foundations of geometry. Preq: 5512 or consent of instructor. A

5370-80-90 Mathematical Principles of Fluid Mechanics (3, 3, 3) Equations of motion for incompressible and compressible fluids, flows of compressible perfect gases, shock waves in perfect fluids, viscous flows and boundary layer phenomena, additional special topics. Preq: 4530 or 4710 or consent of instructor. A

5430 Integral Equations (3) Solution of integral equations by methods of Fredholm, Volterra, and Hilbert, Preq: 4510 or equivalent.
5540 Galois Theory (3) Fields and their extensions, separable and normal extensions, algebraic closure, groups of automorphisms, fundamental theorem, solution of equations by radicals. Prereq or coreq: 5520.

5560-70-80 Theory of Matrices in Numerical Analysis (3, 3, 3) 5560—Fundamental matrix identities; non-regularization in matrix problems; generalized reciprocals, Hadamard inequalities. Lanczos reductions, 5570—Vector and matrix norms, singular value decomposition, inclusion of roots of matrices; the field of values; minmax and maximin theorems for Hermitian matrices. Kantorovic inequalities, 5580—Computational methods for inverting matrices, direct and by successive approximation; methods of reduction to normal form; successive approximations to roots of matrices; measures of error. Prereq: Consent of instructor.

5590 Theory of Rings (3) Direct and subdirect sums of rings; rings of endomorphisms; radicals; Wedderburn-Artin structure theory. Prereq: 5520.

5610-20-30 Mathematical Methods in Physics (3, 3, 3) (Same as Physics 5640.)


5775 Combinatorial Algorithms (3) (Same as Computer Science 5775.)

5810-20-30 Tensor Analysis (3, 3, 3) Absolute differential calculus in three-dimensional Euclidean space, tensors, differential forms, applications to physics; extension to n-dimensional space. Prereq: Major in mathematics or physics. Must be taken in sequence.

5890-90-100 Topological Vector Spaces (3, 3, 3) Linear spaces with additional structure; locally convex and topological vector spaces; weak topologies, Krein-Milman theorem, Banach spaces and their duals, Gelfand transforms, Gelfand-Naimark theorem, spectral theorem for normal operators.

5900-10-20 Mathematical Systems Theory (3, 3, 3) Analytic and discrete and continuous dynamical systems, fundamentals of control theory, linear problems, linear perturbation theory, nonlinear analysis methods, stability aspects, applications to ecological systems, role of dynamical systems in ecological modeling, optimal control problems. Prereq: 4110, 4510 or consent of instructor. F, W, A

5990 Graduate Reading in Mathematics (1-3) Open to graduate students with consent of department head. Independent study with faculty guidance may be repeated. Maximum 9 hrs.

5991 Seminar Analysis (1-3)

5992 Seminar Topology (1-3)

5993 Seminar Algebra (1-3)

5994 Seminar Foundations (1-3)

5995 Seminar Applied Mathematics (1-3) May be taken for S/N or letter grade.

NOTE: Registration for seminars may be repeated with consent of department.

6000 Doctoral Research and Dissertation (3-15) E


6450-60-70 Partial Differential Equations (3, 3, 3) Advanced topics in classical and modern theories of partial differential equations. Prereq or coreq: 5110-20-30 and 5210-20-30 or consent of instructor.

6510-20-30 Advanced Linear Algebra (3, 3, 3) Intensive study of some major branch of algebraic theory. Subject matter will vary according to interests and preparation of students. Prereq: 5510-20-30.

6540-50-60 Theory of Semigroups (3, 3, 3) Congruences and homomorphisms; ideal theory; representations, decompositions, and extensions; free, regular, inverse, simple, and completely simple semigroups. Prereq: 5520.

6570 Theory of Groups (3) Structure of groups, free groups, nilpotence and solvability, extensions and products, permutation groups, abelian groups. Prereq: 5520.

6610-20-30 Advanced Ordinary Differential Equations (3, 3, 3) Theory of ordinary differential equations from advanced viewpoint. Topics from current literature, covered only according to interest of students and preparation of students. Prereq or coreq: 2610 or 4610, 4150-50, and 5110-20-30 or 5210-20-30 or consent of instructor.


6810-20-30 Topological Algebra (3, 3, 3) Topological groups, transformation groups, topological lattices; relations in topological spaces; topological rings, fields, algebras. Prereq or coreq: 5910-20-30.


5970-80 Mathematical Systems Theory (3, 3, 3) Analytic and discrete and continuous dynamical systems, fundamentals of control theory, linear problems, linear perturbation theory, nonlinear analysis methods, stability aspects, applications to ecological systems, role of dynamical systems in ecological modeling, optimal control problems. Prereq: 4110, 4510 or consent of instructor. F, W, A

6991 Seminar Analysis (1-3)

6992 Seminar Topology (1-3)

6993 Seminar Algebra (1-3)

6994 Seminar Foundations (1-3)

6995 Seminar Applied Mathematics (1-3)

6996 Seminar in Numerical Mathematics (1-3)

NOTE: Registration for 6000-level courses may be repeated with consent of department.
music research, (d) 9 hours in music theory, (e) 3 hours in recital, (f) 6 hours in music history/literature, and (g) 6 hours in music electives.

Strings: 45 hours distributed as follows: (a) 12 hours in applied music, (b) 6 hours in area literature and/or pedagogy, (c) 3 hours in research techniques, (d) 6 hours in ensemble, (e) 3 hours in theory, (f) 3 hours in recital, and (g) 12 hours in music electives.

Wind and Percussion Instruments: 45 hours distributed as follows: (a) 12 hours in applied music, (b) 6 hours in area literature, (c) 3 hours in music research, (d) 3 hours in advanced conducting, (e) 3 hours in music theory, (f) 3-6 hours in ensemble, (g) 3 hours in recital, and (h) 9-12 hours in music electives.

Composition: 45 hours distributed as follows: (a) 3 hours in applied composition, (b) 3 hours in music research, (c) 15 hours in music theory, (d) 6 hours in music history/literature, (e) 9 hours in thesis, and (f) 3 hours in electives.

Music Theory: 45 hours distributed as follows: (a) 18 hours in music theory, (b) 3 hours in music research, (c) 6 hours in music history/literature, (d) 9 hours in thesis, and (e) 9 hours in electives.

Orchestral Conducting: 45 hours distributed as follows: (a) 6 hours in conducting, (b) 6 hours in choral literature/techniques, (c) 3 hours in music research, (d) 9 hours in theory, (e) 6 hours in ensemble, (f) 3 hours in choral conducting performance or document, and (g) 12 hours in electives.

Suzuki String Techniques: 45 hours distributed as follows: (a) 12 hours in applied music, (b) 6 hours in Suzuki literature, (c) 3 hours in music research, (d) 3 hours in music theory, (e) 3 hours in recital, (f) 6 hours in ensemble, and (g) 12 hours in electives.

THE MASTER OF ARTS PROGRAM

Music Theory: 45 hours distributed as follows: (a) 18 hours in theory, (b) 3 hours in music research, (c) 9 hours in music history/literature, (d) 9 hours in thesis, and (e) 6 hours in electives.

Musicology: 45 hours distributed as follows: (a) 21 hours in music history/literature, (b) 3 hours in music research, (c) 6 hours in theory, (d) 9 hours in thesis, and (e) 6 hours in electives.

A reading knowledge of French or German must be demonstrated by candidates for the Master of Arts degree.

Specific course requirements will be prescribed by the department for all degree programs and elective courses must have the approval of the student's advisor.

3041 Keyboard Harmony (3) Melody harmonization, figured bass realization, and improvisation. Prereq: 1131-33, and keyboard proficiency at the 2000 level.

3122 Orchestration (3) Advanced techniques in instrumental writing with emphasis on scoring for the concert orchestra. Prereq: 3112 or consent of instructor.

3230 The Concerto (3) Survey of literature from seventeenth century to present.

3240 The Symphony (3) Survey of symphonic literature from precursors of classical symphony to present.

3290 Chamber Music (3) Survey of chamber music from 1750 to present.

3271-81 History of Opera (3, 3) Dramatic, vocal and orchestral elements in opera of Italian, French, and German School. 3271—1600-1800; 3281—1800 to present.

3350-52 Flute (1-4)

3350 Oboe (1-4)

3351 Bassoon (1-4)

3354 Clarinet (1-4)

3350 Saxophone (1-4)

3325 Horn (1-4)

3350 Trumpet (1-4)

3355 Trombone (1-4)

3364 Baritone (1-4)

3345 Tubas (1-4)

3350 Percussion (1-4)

3355 Voice (1-4)

3350 Violin (1-4)

3355 Viola (1-4)

3350 Cello (1-4)

3355 String Bass (1-4)

3350 Flute (1-4)

3355 Harpsichord (1-4)

3350 Organ (1-4)

3355 Guitar (1-4)

3357 Composition with Electronic Media (1-3) Prereq: Consent of instructor.

3357 Composition with Electronic Media (1-3) Prereq: Consent of instructor.

3399 Composition (1-3) Prereq: Consent of instructor.

3500 Evolution of Jazz (3) Study of origin, development, and styles of jazz music and its exponents.

4003-04-05 The Organ and Its Literature (3, 3, 3) Development of organ and organ literature from Medieval Ages to present; problems of style and interpretation; pedagogical literature and methods; organ design. Prereq: Organ 3 or consent: 2310-20-30-40 and consent of instructor.

4007-17-27 String Techniques (1, 1, 1) Problems of string playing, development of string techniques, styles and interpretation, program building. Prereq: Consent of instructor.

4036-37-38 Advanced Piano Literature (2, 2, 2) Piano music for pre-classic period to present. Prereq: Consent of instructor.

4041 Styles in Opera Acting (3) Study and practices of styles in opera acting based on historical and national characteristics. Prereq: 3015 or consent of instructor.

4045 Projects in Opera Theatre (1-3) Prereq: Consent of instructor. May be repeated.

4050 Advanced Instrumental Conducting (3) Development of knowledge and skills in instrumental conducting; study of various periods and composers and relationship of different styles to the conductor's art; musical analysis and practice in conducting. Prereq: Music Education 4430 or equivalent.

4055-56-57 Elementary and Intermediate Piano Pedagogy (3, 3, 3) Piano methods and materials designed for teaching pre-college level students. Prereq: Consent of instructor.

4100 Choral Techniques I (3) Techniques and methods in producing total choral program.

4104-46 Church Music Seminar (3, 3) History and philosophy of church music, liturgies and liturgical music; church music administration. Prereq: Consent of instructor.

4085 Harpsichord Techniques (1) Techniques of playing baroque keyboard instruments. Prereq: Consent of instructor. Maximum 3 hrs. May be repeated.


4112 Twentieth-Century Compositional Techniques (3) Study and compositional devices from Debussy to present. Analysis of scores; idiomatic writing. Prereq: 2131 or equivalent.

4113 Pedagogy of Music Theory (3) Techniques, methods and materials involved in college-level theory programs. Prereq: Consent of instructor.

4114 Stage Band Arranging (3) Analysis of scores and scoring for the stage band. Prereq: 3112 and consent of instructor.

4115 Variation (3) Study and application of variation procedures. Prereq: 3112 or equivalent.

4116 Set Structure in Musical Composition (3) Theory of sets and its application to analysis of music. Prereq: Consent of instructor.

4117 Choral Arranging (3) Analysis of scores and writing of arrangements for men's, women's and mixed choirs. Prereq: 3112 or consent of instructor.

4124 Marching Band Arranging (3) Study and application of techniques employed in scoring for marching band. Prereq: 3112 or equivalent.

4134 Concert Band Arranging (3) Study and application of techniques employed in scoring for concert band. Prereq: 3112 or equivalent.

4210 Music in the Romantic Period (3) Survey of music from Beethoven through post-Romantic instrumental and vocal styles.

4230 Contemporary Music: 1945 to Present (3) Survey of new and avant-garde music in Europe and America since World War II.

4241 American Music (3) American music from colonial times to present. Emphasis on twentieth century. Includes both folk and cultivated traditions. Prereq: 1210-20 or equivalent.


4290 Gregorian Chant (3) Chants of Latin rite. Masses and Offices examined as functional music as well as by type.

4310 History of Art Song (3) Survey of art song from fifteenth century to 1930.

4331 Wind Chamber Music (3) Study of wind chamber music from eighteenth through twentieth century. Emphasis placed on style interpretation, rehearsal techniques, programming and musical significance, both historical and theoretical.

4340-50 Works of Bach (3, 3) Detailed examination of sonatas, canons, church, keyboard, and orchestral works; cantatas, motets, passions and oratorios. 4340—instrumental works. 4350—vocal works.

4400 Jazz Directing (1) Rehearsal techniques for jazz ensembles; special conducting techniques, repertory, library systems, programming, and supervised laboratory experience in rehearsing university jazz ensembles. Prereq: Enrollment in Applied Music with jazz emphasis or consent of instructor.

**4500 Flute (1-4)

**4505 Oboe (1-4)

**4510 Bassoon (1-4)

**4515 Clarinet (1-4)

**4520 Saxophone (1-4)

**4525 Horn (1-4)
**4530 Trumpet (1-4)**
**4535 Trombone (1-4)**
**4540 Baritone (1-4)**
**4545 Tuba (1-4)**
**4550 Percussion (1-4)**
**4555 Voice (1-4)**
**4560 Violin (1-4)**
**4565 Viola (1-4)**
**4570 Cello (1-4)**
**4575 String Bass (1-4)**
**4580 Piano (1-4)**
**4585 Harpsichord (1-4)**
**4590 Organ (1-4)**
**4595 Guitar (1-4)**

**4597 Composition with Electronic Media (1-3)**
Prereq: Consent of instructor.
**5595 Guitar (1-4)**
**5590 Organ (1-4)**
**5585 Harpischord (1-4)**
**5570 Cello (1-4)**
**5560 Violin (1-4)**
**5550 Percussion (1-4)**

**5535 Trombone (1-4)**
**5530 Trumpet (1-4)**

128 **Prereq: Consent of instructor.**

328 Further development of individual skills and solving

4860 Advanced Improvisation (2) Emphasis on

further development of individual skills and solving

individual problems in jazz improvisation. Prereq: 3052-53.

5000 Thesis (1-15) E


5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

*5010 Organ Literature Seminar (3) Topics vary. Prereq: Organ literature.

5012-22-32 Pedagogy of Voice (2, 2, 2) 5012—Survey of voice production processes in singing including: voice classification, quality, diction registration, breath support, and control. 5022—Examination of teaching materials, preparation of programs for various vocal categories and levels of study. Observation of studio teachings. 5032—Analysis of vocal problems of a selected group of students. Supervised teaching. Prereq: 4012-22-32 or consent of instructor.


*5030 Choral Literature Seminar (3) Topics vary.

*5040 Vocal Literature Seminar (3) Topics vary.

5050 Graduate Recital (3)

5051 Opera Performance (3)

5052 Vocal Chamber Music Performance (3)

5053 Choral Conducting Performance (3)

5054 Lecture-Recital (3)

5055-56 Practicum for Instrumental Conductors (1, 1) Intern experience in choral music and in an instrumental field other than the area of major interest. S/NC only.

5057 Instrumental Conducting Seminar (3) Rehearsal and performance problems and techniques allied to score reading and preparation. Particular attention to individual problems. Prereq: 4050 or equivalent.

5060 Seminar in Choral Performance (3) Rehearsal and performance problems and techniques allied to score reading and preparation. Particular attention to individual problems. Prereq: 4060 or equivalent.

5061 Choral Conducting (3) Development of choral conducting skills.

5070 Opera Production (1-3) Prereq: Consent of instructor.

5080 Instrumental Conducting Performances (1) Jury performance; conducting band or orchestra in public.

*5090 Special Topics in Performance (1-3) Prereq: Consent of instructor.

*5100 Independent Study in Music Theory (1-3) Prereq: Consent of department head.

5111 Advanced Harmony (3) Analytic survey of harmonic trends in compositions from 1700 to present. Exercises employing and illustrating these techniques. Prereq: Consent of instructor.

5114 History of Music Theory (3) Work and contributions of theorists from ancient Greece to present. Emphasis on 1600 to present. Prereq: Consent of instructor.

5116 Musical Styles (3) Elements of design and their role in definition of musical styles. Exercises in aural and visual identification. Prereq: Consent of instructor.

5121 Analytical Techniques (3) Analytical techniques with emphasis on contemporary approaches. Tonal and neotonal music. Prereq: Consent of instructor.

*5125 Practicum in Computers and Music Research (3) Programming languages, design and implementation of projects in musical analysis, composition and indexing. Prereq: Consent of instructor.

5150 Seminar in Music Theory (3) Topics vary. Prereq: Consent of instructor.

*5200 Independent Study in Music History and Literature (1-3) Prereq: Consent of department head.

5210 Introduction to Music Research (3) Principles and techniques of research. Required of all candidates with concentrations in musicology or in music theory. Recommended for all music students who intend to enroll in a doctoral program.

5220 Music Bibliography (3) Bibliographic methods; illustrative projects in information retrieval and problem solving in music.

*5270 Seminar in Musicology (3) Topics vary. Prereq: Consent of instructor.

5315 Band Literature (3) Band literature and origins of band emphasizing its important, expanded cultivation during past century in United States and Europe.

5350 Music in the Middle Ages (3) Emphasis on early Christian chant, medieval secular song, early theory, and the development of polyphony and musical notation.

5352 Music in the Renaissance (3) From 1400 to 1600. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genre.

5353 Music in the Baroque Period (3) From 1600 to 1750; rise of opera and oratorio, church and secular cantata, instrumental forms, performance practice.

5355 Music in the Classic Period (3) Preclassic music (Rococo) and music of Haydn, Mozart and early Beethoven. Includes background of other cultural and artistic activities.

5400 Musical Aesthetics (3) Nature of music and musical experience, sense perception and emotions, value in music, and role of artist in society. Aesthetic viewpoint of individuals and historical eras through selected writings.

*5500 Flute (1-4)

*5505 Oboe (1-4)

*5510 Bassoon (1-4)

*5515 Clarinet (1-4)

*5520 Saxophone (1-4)

*5525 Horn (1-4)

*5530 Trumpet (1-4)

*5535 Trombone (1-4)

*5540 Baritone (1-4)

*5545 Tuba (1-4)

*5550 Percussion (1-4)

*5555 Voice (1-4)

*5560 Violin (1-4)

*5565 Viola (1-4)

*5570 Cello (1-4)

*5575 String Bass (1-4)

*5580 Piano (1-4)

*5585 Harpischord (1-4)

*5590 Organ (1-4)

*5595 Guitar (1-4)

5597 Composition with Electronic Media (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

*5599 Composition (1-3) Prereq: Consent of instructor.

**5600 Small Ensemble (1)**

**5602 Brass Choir (1)**

**5604 Jazz Ensemble (1)**

**5606 Trombone Choir (1)**

**5610 Percussion Ensemble (1)**

**5611 Marimba Choir (1)**

**5612 Baroque Ensemble (1)**

**5620 UT Singers (1)**

**5630 Chamber Singers (1)**

**5632 Collegium (1)**

**5634 Saxophone Choir (1)**

**5640 Opera Theatre (1)**

**5642 Opera Workshop (1)**

**5650 Concert Band (1)**

**5652 Campus Band (1)**

**5654 Varsity Band (1)**

**5656 Laboratory Band (1)**

**5657 Marching Band (1)**

**5670 Symphony Orchestra (1)**

**5680 Concert Choir (1)**

**5682 University Chorus (1)**

**5684 Campus Chorus (1)**

**5686 Men's Glee Club (1)**

**5687 Women's Chorale (1)**

*5699 Accompanying (1)
Professors:
J. W. Davis (Head), Ph.D.; E. Aguda, Ph.D.; D. M. Edens, Ph.D.; G. D. C. E. Edsall, Ph.D.; M. H. Moore (Emeritus), Ph.D. Chicago; D. Van de Vate, Jr., Ph.D. Yale.
Associate Professors:
J. O. Bennett, Ph.D., Tulane; G. B. Breckert, Ph.D. Michigan; K. A. Emmett, Ph.D. Ohio State; F. R. Jones, Ph.D. Chicago; J. E. Nof, Ph.D. Ohio State; M. L. Osborn, Ph.D. Tennessee; D. E. Oster, Ph.D., Texas (Austin); J. Reaven, Ph.D. California (Berkeley).
The MASTERS PROGRAM
See general requirements on page 19.
Courses below 4000 may not be taken for graduate credit by philosophy majors except with special permission.
THE DOCTORAL PROGRAM
Specific requirements for doctoral students in Philosophy include a minimum of three academic years of graduate study involving at least 72 quarter hours credit in courses work (normally 24 quarter courses or the equivalent of a 4-year major, 2-year minor, and a thesis). The number of courses will be determined by the student's faculty committee.

Two foreign languages, normally French and German, are required. As an alternative to the two-language requirement, candidates for the Ph.D. may elect to demonstrate a substantially more advanced proficiency in reading knowledge of one language.

Requirements for this option may be obtained in the department office.
Registration in any course in the 5000 or 6000 series (except 5050 and 5910-20-30) may be repeated for credit with the consent of the department. That is, courses having the same number, but with different subject matter, may be taken with each separate subject description.

MEDICAL ETHICS
The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Details concerning the program can be obtained from the department.

RELIGIOUS STUDIES
The department has an M.A. program of graduate study with a concentration in philosophy of religion and other religious studies. Details concerning the program can be obtained either from the Department of Philosophy or Religious Studies.

3111 Ancient Western Philosophy (4) F
3121 Medieval Philosophy (4) F, Sp
3131 Seventeenth- and Eighteenth-century Philosophy (4) F, Sp
3141 Nineteenth- and Early Twentieth-century Philosophy (4) F, Sp
3151 Contemporary Philosophy (4) Survey of recent movements in philosophy. F
3270 Russian Philosophical and Theological Theology (4) Same as Religious Studies 3270 and Russian 3270.
3311-12 American Philosophy (4, 4) 3311—Colonial to late nineteenth century. 3312—Late nineteenth century to present. W; Sp
3320 Philosophy of Law (4) Nature, sources, function of law. A
3330 Philosophy of History (4) Speculative and critical aspects of the philosophy of history. A
3410 Philosophical Ideas in Literature (4) Philosophical assumptions and implications in major literary works. F, W, Su
3420 Philosophy of Literature (4) Study of the nature, functions, value and epistemical principles of literary arts. A, F
3430 Concepts of Woman (4) Examination of some of the theoretical foundations of feminism and antifeminism. F, W, Sp
3440 Social Ethics (4) Ethical theory as related to politics, economics, law, religion and the family. F
3510 Existentialism (4) E
3550 Marxism as Philosophy (4) W
3650 Philosophy and Religion in India (4) (Same as Religious Studies 3650). F
3660 Buddhist Philosophy and Religion (4) (Same as Religious Studies 3660). W
3671 Religion and Philosophy in China (4) (Same as Religious Studies 3671). F
3690 Philosophy of Religion (4) Analysis of basic issues in religion. (Same as Religious Studies 3690). F, Sp, Su
3740-50 Conceptual History of Science (4, 4) The Scientific Revolution: historical evolution of thought in astronomy, mechanics and philosophy of nature up to Newton. 3750—The development and decline of Newtonian science: historical evolution of thought on the nature of matter and of light, and on that of life. Prereg: 8 hrs of physical science or consent of instructor. F, W
3770 Introduction to Philosophy of Science (4) Standard topics in philosophy of science: scientific method, nature of laws and theories, problems of induction, explanation, measurement. No background in logic presupposed. F
3810 Introductory Symbolic Logic (4) Techniques for formal analysis of deductive reasoning (propositional logic and quantification theory.) Sp
3910 Contemporary Aesthetics (4) Philosophical discussion of contemporary art. F, W, Sp
4000 Special Topics (4) A student- or instructor-initiated course to be offered at convenience of department. May be repeated with mutual consent of students and instructor with approval of department. Prerequisites to be determined by the instructor. May be repeated.
4111-21 Modern Religious Philosophies (4, 4) (Same as Religious Studies 4111-21.)
4310 Intermediate Ethics (4) Topics in metaethics or ethics. Sp
4370 Theoretical Issues in Medical Ethics (4) Prereg: 3141 or 3161 or consent of instructor. (Same as Religious Studies 4370.) Sp
4410 Plato (4) Prereg: 8 hrs philosophy or consent of instructor. A
4420 Aristotle (4) Prereg: 8 hrs philosophy or consent of instructor. A
4450 Continental Rationalism (4) Prereg: 8 hrs philosophy or consent of instructor. A
4460 British Empiricism (4) Prereg: 8 hrs philosophy or consent of instructor. A
4470 Kant (4) Prereg: 8 hrs philosophy or consent of instructor. A
4480 Advanced Topics in Existentialism and Phenomenology (4) Prereg: 8 hrs philosophy or consent of instructor. A
4511 Advanced Topics in Logic (4) Prereg: Consent of instructor. May be repeated.
4510 Philosophical Analysis (4) Prereg: 8 hrs philosophy or consent of instructor.
4620 Philosophy of Mind (4) Problems of mind and body in relation to consciousness and personal identity. Prereg: 8 hrs philosophy or consent of instructor.
4630 Philosophy of Language (4) Prereg: 8 hrs philosophy or consent of instructor.
4710 Philosophy of Natural Science (4) Consideration of standard topics pertinent to natural science including reduction of theories and teleological explanation. Familiarity with symbolic logic is recommended. Prereg: 3770 or 2 yrs natural science.
4720 Philosophy of Social Science (4) Examination of methods of inquiry and modes of explanation in social sciences. Prereg: 3770 or 2 yrs social science.
4810 Metaphysics (4) Prereg: 8 hrs philosophy or consent of instructor.
5000 Thesis (1-15) E
5050 Symbolic Logic (4)
5080 Philosophy of Logic (4) Nature of logic; epistemological, metaphysical and axiomatic assumptions and implications of various theories of logic. Prereg: 4510 or equivalent.
5101 Foreign Study (1-12) See page 99. E
5102 Off-campus Study (1-12) See page 99. E
5103 Independent Study (1-12) See page 99. E
5290 Studies in the History of American Philosophy (4) Intensive, critical work on major philosopher or school.
5355 Orientation to Medical Ethics (4) Survey of ethical theories in application to issues in medical ethics. (Same as Religious Studies in 5355). F
5360 Applied Ethical Theory (4) Single author, tradition, or topic in ethical theory with special attention to application to issues in health, business, technology, ecology, and other practical fields. (Same as Religious Studies in 5360).
5370 Topics in Medical Ethics (4) Prereg: 4370-71 or consent of Medical Ethics Committee.
5375 Clinical Practicum Orientation (4) Medical terminology, history of medical ethics; preparation for UT Center for the Health Science Clinical Practicum. Sp
5410 Philosophy of History (4) Theories of history and historical processes.
5430 Philosophy and Literature (4) Mutual influence of philosophy and literature, possibility of a philosophy of literature, philosophy of criticism.
5450 The Problem of the Self (4) Current studies in sociology, social psychology, and philosophy to amand elucidate traditional philosophical treatments of problem of self.
5460 Philosophy of Mind (4) Relation of mental to physical and of role of words in discourse for mental activities such as thinking and feeling.
5550-60 Philosophy of Science (4, 4) Nature of subject matter and method of sciences. 5560—Natural sciences. 5560—Social Sciences.
20-30 or 2210-20-30, and calculus; 3510 for 3520 and 3530. 3 labs.
3610-20 Electronics (3, 3) Electronic components and circuits of interest to physicists. Prereq: 2310-20 or equivalent. 3 labs. 3 F; Su.
3630 Nuclear Electronics Laboratory (3) Elementary circuits of interest in nuclear instrument design and fabrication, and their characteristics are tested over a function of various parameters. Prereq: 3610-30. Sp.
4004 Foundations of Physics (3) Selected topics from history and philosophy of classical and modern physics. Prereq: 1 yr general physics and consent of instructor. Required of MACT candidates. Sp.
4140 Elementary Nuclear Physics (3) General properties of atomic nuclei including nuclear structure, nuclear forces, nuclear models, nuclear reactions, nuclear disintegrations and beta-decay, nuclear spin and magnetic moments. Prereq: 3230 or 4120. Sp.
4210-20 Electricity and Magnetism (3, 3, 3) Intermediate level electrostatics; steady and alternating currents; laws of electromagnetism; Maxwell’s equations; radiation of electromagnetic waves; refraction and reflection; electromagnetic fields of moving charges. Must be taken in sequence. Prereq: 2320 or 2220 and Mathematics 2830. F, W, or Sp.
4230-40 Modern Optics (4, 4) 4230—Geometrical Optics: Reflection and transmission of light at a dielectric interface; paraxial theory of interfaces, lenses, and mirrors; thick lenses, lens systems, ray tracing; polarization; imagery; laser light. 4240—Physical Optics: Mathematics of wave motion, superposition of waves; interference; Fraunhofer and Fresnel diffraction; Fourier operator calculus. Prereq: 4210 or consent of instructor. 3 hrs and 3 hrs lab. W.
4540-50 Experimental Nuclear and Radiation Physics (4, 4) Interaction of charged particles and electromagnetic radiation with matter; theory and characteristics of various detectors; statistics of counting, nuclear properties. Experiments illustrate recent techniques for investigating the nucleus and nuclear radiation. Prereq: 2530. 1 hr and 6 hrs lab. F; Su.
4580 Principles of Nondestructive Testing (3) Detection and characterization of discontinuities in materials by nondestructive physical measurements. Ultrasonic, electromagnetic, holographic and penetrating radiation techniques are discussed. Prereq: 2310-20-30 or consent of instructor. (Same as Engineering Science 4580). W.
4710-20-30 Introduction to Health Physics (3, 3, 3) Radiocomplex, interaction of electromagnetic radia-

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THE MASTER'S PROGRAM

See general requirements on page 19.

MAJORS

DEGREES

Political Science M.A., Ph.D.

M.P.A.

Professors:

T. D. Unger (Head), Ph.D. Iowa; R. S. Avery (Emeritus), Ph.D. Northwestern; D. H. Callish, Ph.D. North Carolina; J. S. Greene (Emeritus), Ph.D. Wisconsin; V. R. Iredell, Ph.D. Chicago; D. D. Nimmo, Ph.D. Idaho; B. W. Plapp, Ph.D. Utah; N. M. Robinson, Ph.D. Syracuse; O. H. Stephens, Ph.D. Johns Hopkins; D. M. Wellborn, Ph.D. Texas.

Associate Professors:

R. B. Cunningham, Ph.D. Indiana; J. Dodd, Ph.D. Tulane; A. Elliott, Ph.D. Columbia; G. Evans, Ph.D. Columbia; H. A. Hopkins, Ph.D. Syracuse; W. Lyons, Ph.D. Oklahoma; R. Peterson, Ph.D. Utah; R. B. Peterson, Ph.D. Michigan State; T. M. Simpson, Ph.D. Johns Hopkins; T. A. Smith, Ph.D. Ohio State.

Assistant Professors:


Registration in any courses in the 5000-6000 series may be repeated for credit with consent of the department.

THE BUREAUCRACY PUBLIC ADMINISTRATION

The University maintains in the College of Liberal Arts a Bureau of Public Administration for the purpose of promoting sound governmental administration through research, publication, and consultation. The staff includes the Professor Unger (director); Professors Lyons (associate director); Fitzgerlad, Freeman (assistant professors); Research Associates Durant, Koehler.

*Distinguished Professor.
College of Liberal Arts 133


4575 Special Topics in United States Government and Politics (4) May be repeated with consent of department. W or Sp.

4610 Budgetary Process (4) Fiscal planning, budget and expenditure processes in government, their policy and administrative implications. W or Sp.

4620 Public Personnel Administration (3) Development of the merit system in government, career systems, public personnel management functions, organization for personnel management. F or W.

4665-66 Policy Making in Democracies (4, 4) Comparative approach to theory and process of making public policies. F or W; Sp.

4675 Special Topics in Comparative Government and Politics (4) May be repeated with consent of department. Maximum 8 hrs.

4701-02 International Organization (4, 4) The League of Nations and the United Nations. F or W.

4711 International Law (4)

4727 Politics of Inter-American Relations (4) Analysis of selected theoretical and policy issues concerning political relations between the Americas with emphasis upon imperialism, intervention, and the Cuban Revolution, nationalism, foreign assistance, trade and economic integration. Sp. or W.

4740 Political Parties and Elections (4) Analysis of party systems and electoral process. F, W.

4750 Political Campaigns (4) All aspects of campaign process. F, W.

4815 Contemporary Soviet Marxism-Leninism (4) Soviet applications of Marx- Leninist theory.

4875 Special Topics in Political Thought (4) May be repeated with consent of department. Maximum 8 hrs.

4940 Politics and the Environment (4) Examination of formulation and implementation of public policies relating to physical environment with emphasis upon water and air pollution control. Sp.

4975 Prospective in Political Science (4) Selected research for seniors; primarily for majors. May be repeated with consent of department. Maximum 8 hrs.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered for a degree when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree. May be repeated. S/N/C only. E

5101 Foreign Study (1-12) See page 99. E

5102 Off-campus Study (1-12) See page 99. E

5103 Independent Study (1-12) See page 99. E

5110-20 Seminar in Political Theory (3, 3) Selected topics dealing with political problems of less developed countries. May be repeated with consent of instructor and student's advisor. Maximum 9 hrs. S/N/C only. E

5310-20 Seminar in Comparative Government (3, 3) Selected topics in modern governments.

5340-50 Seminar in Latin American Politics (3, 3) E

5370-80 Seminar in Soviet Politics and Government (3, 3) W

5410-20 Seminar in Public Law (3, 3) Special problems in constitutional and administrative law. F.

5440-50 Theory and Analysis of U.S. Foreign Policy Processes (4, 4) Theoretical approaches to decision making in foreign policy area and analysis of policy-making process. W.

5510-20 Seminar in International Organization (3, 3) 5510—Introduction to regional international organizations; political integration at international level. 5520—Structural and functional analysis of organizations. Sp.

5540 Seminar in Comparative Public Administration (3) Approaches to and methods used in comparative analysis.

5550 Seminar in Administration in Developing Countries (3)

5600 Public Administration (3) Public administration theory and functions, approaches to public management, contemporary problems in public administration. W.

5605 Research and Methodology in Public Administration (3) Basic assumptions and techniques of research in public administration; measurement, analysis, and reporting of data. W.

5610-20 Seminar in Organization Theory (3, 3) Appraisal of major theories of organization and their applicability to public sector. F.

5611-21-31 Seminar in State-local Administration (3, 3, 3)

5630 Seminar in Public Policy and Technology (3) Technological change and policy process, government interactions with scientific community, political characteristics of scientific enterprise.

5635-45 Operations Research for Public Administration (3, 3) Operational research methodology; applications and limitations in public sector, linear programming, transportation and assignment problems, network analysis, PERT, dynamic programming and other methods.

5640-50-60 Seminar in Metropolitan Areas (3, 3, 3)

5641 Seminar in Contemporary Public Policies (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor.

5670-80 Seminar in Policy Analysis (3, 3) Role of administrators in policy analysis and decision making with special attention to historical and current issues. Sp.

5710 Seminar in the Politics of Administration (3) Examination of public administration in context of American political system with emphasis upon policy making and political roles of public administrators and agencies. W.

5730 Seminar in Public Budgeting and Fiscal Management (3) Budgetary process, fiscal management, and finance in American government. Sp.

5740 Seminar in Organizational Analysis (3) Organization theory applications in public management; field analysis of public organizations.

5750-55 Seminar in Public Administration (3, 3) Selected problems. F, W.

5765-75 Law and the Administrative Process (3, 3) Constitutional position; decisional processes, regulation and management; limitations on governmental action; questions of structure, role, and administrative choice. W.

5770 Practicum in Public Administration (3) Sp.

5785-95 Seminar in Staff Functions (3, 3) Functions of administrative staff personnel serving political executives, public agencies, public boards, and advisory and community groups in public sector.

5790 Seminar in Public Personnel Management (3) Functions and organizations of personnel administration in public service. Sp.

5810 The American Political Process (4) Principal patterns of political activity linking citizens and political institutions. Sp.


5831-32 The Study of Politics (3, 3) Scope, methods and procedures of analysis in political science. F, W.

5840 Ethical Values, and Morality in Public Administration (3) Moral-ethical-value dilemmas confronting administrators in American political system.

5850 Seminar in Comparative State Politics (3) Intensive readings in comparative state politics focusing on environment of state politics, institutions and policy making.

5910-20 Quantitative Political Analysis (3, 3) Methods and techniques in quantitative political analysis. F, W.

5930 Topics in Quantitative Political Analysis (3) Selected topics in quantitative methods.

6000 Doctoral Research and Dissertation. 3-15 E

6210 Advanced Studies in International Politics (3)

6310 Advanced Studies in Political Theory (4) Research into selected topics.

6410 Advanced Studies in International Organizations (3) Research in selected topics.

6440 Advanced Studies in Comparative Politics (3) Research into selected topics. Sp.

6510-20 Advanced Studies in American Constitutional Law (3, 3) Systematic investigation of federal relationships, civil liberties, courts in political settings, judicial institutions, personnel, and public policy content.


6710 Directed Research in Political Science (3) May be repeated with consent of instructor and student's advisor. Maximum 9 hrs. May be taken for letter grade or S/N/C.

6810-20 Advanced Studies in the Political Process (3, 3) Open to advanced graduate students upon approval of instructor. F, W.

Psychology

MAJOR DEGREES

Psychology

Professors: W. H. Calhoun (Head), Ph.D., Ph.D., California (Berkeley); G. M. Burghardt, Ph.D., Ph.D., Chicago; J. F. Byrn, Ph.D., Ph.D., Pennsylvania; G. C. Pollock, Ph.D., Kansas; H. J. Fine, Ph.D., Syracuse; S. J. Handel, Ph.D., Johns Hopkins; H. Handler, Ph.D., Michigan State; J. A. Knowles, Ph.D., Tennessee; M. G. Johnson, Ph.D., Johns Hopkins; F. Samejima, Ph.D., Keio (Japan); R. P. Lorin, Ph.D., Rochester; J. F. Lubar, Ph.D., Chicago; R. P. Lorin, Ph.D., Tennessee; M. G. Johnson, Ph.D., Johns Hopkins; F. Samejima, Ph.D., Keio (Japan); R. R. Shladov, Ph.D., Tennessee; W. S. Verplanck, Ph.D., Brown, R. G. Water, Ph.D., Washington; J. A. Wiberley, Ph.D., Syracuse.

Associate Professors: J. M. Barlow, Ph.D., Ph.D., Pennsylvania; E. A. Elliott, M.S.W., Tennessee; D. S. Freeman, Ph.D., Tennessee; H. R. Friedmann, Ph.D., Tennessee; G. M. Johnson, Ph.D., Johns Hopkins; J. Kandiyak, Ph.D., Tennessee; J. E. Lawler, Ph.D., North Carolina; W. L. Lounsbury, Ph.D., Michigan State; A. McIntyre, Ph.D., Yale; J. C. Malone, Ph.D., Duke; W. G. Morgan, Ph.D., Pennsylvania; R. S. Sandargas, Ph.D., Florida State; E. D. Sundeen, Ph.D., Utah; C. B. Travis, Ph.D., California (Davis).

Part-time.

**Alumni Distinguished Professor.**
Knoxville, Tennessee 37916.

Psychology, University of Tennessee, write: Graduate Secretary, Department of

Complete a Master's degree as part of their
comparative psychology, psycholinguistics,
experimental, cognitive, physiological, and
comparative psychology, psycholinguistics,
and specializations in clinical, school,
doctoral degree programs with

Ph.D. Georgia State; J. A. Jones, Ph.D.
N. W. Dye,* Ph.D. Tennessee; S. Friedlander,
Assistant Professors:

3720 Ethology and Sociobiology (3) Evolutionary

well as to University students, on referral by a
medical consultants, to the general public as

graduate training in clinical psychology.

THE PSYCHOLOGICAL CLINIC

The Psychological Clinic supports

graduate training in clinical psychology.

Psychological diagnosis and psychotherapy
and offered on a basis, with medical consultants, to the general public as well as
to University students, on referral by a
physician.

3720 Ethology and Sociobiology (3) Evolutionary

approach to behavior with special reference to con-
temporary issues in connections to psychology, so-
cial sciences, and arts.

4107 Experience in Individualized Instruction (1-6)
PreReq: Consent of instructor. May be repeated.
Maximum 12 hrs.

4120 Topics in Social Psychology (4) Intensive
analysis of selected research topics. Prereq: 3120 or
Sociology 3130. (Same as Sociology 4120.)

4230 Sensory Processes and Perception (4) Survey
of sensory and perceptual processes with emphasis
on audition and vision. Prereq: 3150. Recom-
mended: 2520. F

4239 Laboratory in Sensory Processes and Per-
ception (2) Prereq or coreq: 4230. F, W, Sp

4460 Organizational-Industrial Psychology (3)
Cannot be taken for credit by students who have
credit for Management 3460. E

4510 Personality Theories (4) Prereq: 3650 or con-
sent of instructor. F, Su

4520 Personality and Social Systems (4) Prereq:
2540.

4610 Group Processes (3) Study and experience of
theory and techniques of group processing and
facilitation. Those participating in 4610 are ex-
pected to complete courses 4620 and 4630. Prereq:
3610-25 and consent of instructor. F

4620-30 Seminar in Group Processes (3, 3) Didactic
and laboratory experience for those qualified for
further training as group facilitators. Prereq: 4610
and consent of instructor. W, Sp

4640 Psychological Tests and Measures (4) Theory
and construction of individual and group measures;
survey of various methods of assessment of intelli-
gence, personality, special abilities, and educa-
tional achievement. Prereq: 3150. F, Su

4650 Symbolic Processes (4) Logic of signs and
symbols; directed and associative thinking; mem-
ory, problem solving, and concept formation, na-
ture, use, and development of language. Prereq:
3210 or consent of instructor.

4660 The Psychology of Language (4) Theories and
descriptions of phonology, syntax, and semantics as
applied to psychology and related disciplines. Rec-
ommended: 4640 or linguistics background.

4670 Cognitive Development (4) Theory and re-
search on development of language and thinking in
children and adolescents. Prereq: 3210 or 3550.

4710 Physiological Psychology (4) Nervous system
and physiological correlates of behavior. Prereq: 1
yr of biology or zoology and 2520. W

4719 Physiological Psychology Laboratory (4) Labora-
tory studies of nervous system and physio-
lological correlates of behavior. Coreq: 4710. W

4720 Comparative Animal Behavior (4) Methods
and principles. (Same as Zoology 4720.) F

4729 Comparative Animal Behavior Laboratory (4)
Laboratory and field studies. Coreq: 4720. (Same
as Zoology 4729.) F

4750 Evolution and Ontology of Social Behavior (4)
Genetic, evolutionary, ecological, and develop-
mental processes as they apply to social organiza-
tion and dynamics of vertebrates. Prereq: Consent
of instructor.

4830 History and Systems of Psychology (4) Pre-
req: 9 hrs of upper division psychology.

4850 Learning Theories (4) Historical and theoreti-
cal development of learning models. Prereq: 3210.

4860 Programmed Learning (3) (Same as Cur-
riculum and Instruction 4860.)

4870 Contemporary Research in Behavior of
Women (4) Study of interaction of cultural and
biological factors in determining the behavior of
women, with emphasis on physiological mecha-
nisms involved. Sp

4880 Afro-American Psychology (4) Review and
analysis of psychological literature on Afro-
Americans. Prereq: Consent of instructor. (Same
as Black Studies 4880.)

5000 Thesis (1-15) E

5002 Non-thesis Graduation Completion (3-15) Re-
quired for the non-thesis student not otherwise reg-
istered during any quarter when such a student uses
university facilities and/or faculty time before de-
gree is completed. May not be used toward degree
requirement, in any quarter in which repeated. S/NC only. E

5017 Colloquium in Ethology (1-5) May be repeated.
Maximum 8 hrs. (Same as Zoology 5017.) S/NC only.

5019 Research Practicum (1-3) Required of all
first-year students in experimental, physiological,
and comparative psychology. May be repeated.
Maximum 9 hrs. S/NC only.

5050 Methods of Research in Applied Psychology
(3) Techniques and principles for designing and
conducting psychological research in natural set-
tings.

5070 Seminar in College Teaching (2) Concepts,
methods, and materials in introduction of psychol-
yogy at college level. Emphasis on research. Re-
quired of all S/NC only.

5079 Practicum in College Teaching (2) Supervised
participation in college teaching. S/NC only. Sp

5100 Developmental Psychology (3) Prereq: 3550 or
Educational Psychology 2430. (Same as Educa-
tional Psychology 5100.) F, Sp, Su

5105 Developmental Assessment (3) Techniques for
assessing development in infants and children.
Does not include practicum. Prereq: 5100 or equiva-
 lent and consent of instructor.

5110 Clinical Aspects of Human Sexuality (3) Na-
ture of sexuality; societal perspectives, personal
identity, attraction and isolation including
psychosocial and sexual identity and models for decisions. Intended for graduate stu-
dents in clinical psychology, social work, and
community and mental health professions. Prereq: Con-
sent of instructor.

5111-12-13 Seminar in Current Issues in School
Psychology (1, 1, 1) Historical, legal, ethical and
technological issues in practice of school psychol-
ogy. Multiple instructors. (Same as Educational
Psychology 5111-12-13) S/NC only. W, Sp

5140-50-60 Psychoeducational Assessment (3, 3, 3)
Naturalistic, psychometric, and sociometric as-
seessment methods in school learning environments.
Must be taken in sequence. Prereq: Admission to School Psychology Program or consent of instruc-
tor. (Same as Educational Psychology 5140-50-60.) W, Sp

5149-59-69 Practicum in School Psychology (2, 2, 2)
First-year School Psychology Program practicum core
sequence. Coreq: 5140-50-60. (Same as Educa-
tional Psychology 5149-59-69 Practicum in School
Psychology) F, W, Sp

5170-80-90 Proseminar in Professional and Organiza-
tional Psychology (3, 3, 3) (Same as Management
5170-80-90.) F, W, Sp

5200 Topics in Developmental Psychology (3) Pre-
req: 3100 or equivalent and consent of instructor.
May be repeated. Maximum 6 hrs.

5210 Readings in Psychology (1) S/NC only. E

5220 Readings in Psychology (2) S/NC only. E

5230 Readings in Psychology (3) S/NC only. E

5240 Readings in Psychology (4) S/NC only. E

5250 Readings in Psychology (5) S/NC only. E

5260 Special Problems in Psychology (1) S/NC only. E

5270 Special Problems in Psychology (2) S/NC only.
E

5280 Special Problems in Psychology (3) S/NC only.
E

5290 Special Problems in Psychology (4) S/NC only.
E

5300 Special Problems in Psychology (5) S/NC only.
E

5319 Field Work in School Psychology: Level I (2) Sup-
ervised on-the-job training in school psychol-
yogy. Only to students who are fully admitted to doctoral program in school psychology who are assigned to
program approved field settings. Prereq: 5140-50-60 or equivalent. May be repeated. Maximum 8 hrs.
(Same as Educational Psychology 5319.) S/NC only. E, W, Sp

5325 Behavioral Interventions (3) Principles and

5330 Special Problems in Psychology (5) S/NC only.
E

5340 Group Dynamics (3) (Same as Educational
Psychology 5340.)

5350-60-70 Seminar in Psychology (3, 3, 3) May be
repeated. Maximum 18 hrs.

5400 Psychophysics and Scaling Methods (3) Pre-
req: One course in statistics.

5420-30-40 Advanced Psychological Statistics (3, 3, 3)
Must be taken in sequence. W, Sp; Su; F

5450 Human Problems in Administration (3) (Same
as Management 5230.)

5460 Continuing Education in Mental Health (1-4)
Topics of interest to persons in mental health and
allied fields. Workshop, seminar, or lecture; topic
and format to be announced. Prereq: Graduate
standing or consent of instructor. May be repeated.
Maximum 9 hrs.

5500 Fundamentals of Psychometrics (4) Basic
ideas and orientation in psychometrics. All graduate
students who plan to take one or more courses in
psychometrics required to take course. Prereq or
coreq: 4640.

5610 Instrumentation for Psychological Research (3)

5520 Theory of Mental Measurement (3) Reliability,
validity, scaling and equating, norms, combining
tests into batteries. Prereq: 1 qr of graduate-level
statistics and 5500 or consent of instructor.

5530 Issues in Applied Psychological Measure-
ment (3) Applications of measurement in commu-
nity and organizational research. Prereq: Statistics
5530-70 or equivalent and consent of instructor.

5540 Probability Models in Psychology (4) Introduc-
tion to use of probability models in theory of binary
test items, differential psychology, comparison of
different cognitive theories, and psychological param-
ers, individual choice behavior, and testing of
psychological hypotheses in human and animal be-
havior. Reliability theory, decision theory. Prereq:
1 qr calculus or consent of instructor.
Biochemistry, Botany, Chemistry, Microbiology, Physics, Zoology; the Memorial Research Center and the Comparative Animal Research Laboratory of The University of Tennessee; the Biology and Environmental Sciences Divisions of the Oak Ridge National Laboratory; and the Medical Division of Oak Ridge Associated Universities.

Formal courses in this program are offered mainly on the Knoxville campus. The program may be carried on either at the University or at one of the Oak Ridge laboratories. Problems selected for thesis research shall involve the interaction of radiations or long-lived fission products and radiometric chemicals with biological systems, at the molecular, cellular, organismal, or ecological level of complexity. Areas of radiation specialization currently include photobiology, environmental, microbial, botanical, and biochemical and biophysical radiobiology.

ADMISSION REQUIREMENTS

The minimum requirements for admission to the Institute are: (1) A Bachelor's degree from an accredited college or university, (2) a major in either biological science, or chemistry or physics, (3) college mathematics: potential candidates for the Master's program, 9 quarter hours; potential candidates for the doctoral program, differential and integral calculus, (4) Biomedical Sciences at Oak Ridge.

THE UNIVERSITY OF TENNESSEE GRADUATE SCHOOL OFFERS two advanced degrees: the Master of Science (M.S.) and the Doctor of Philosophy (Ph.D.) in Radiation Biology.

THE MASTER'S PROGRAM

Course requirements include: (1) Zoology 5610, (2) Zoology 5620 or 5780, (3) Zoology 5350 or Plant and Soil Science 3610, (4) Chemistry 3810, (5) Biochemistry 4110-20 or 5510-20. At least one-half of the student's program must be at the 5000 level. A thesis is required of all students.

THE DOCTORAL PROGRAM

(1) Courses: In addition to those required for the Master's degree, Chemistry 4910-20-30; Physics 3710-20-30 (Chemistry 3510 may be substituted for Physics 3730); Radiobiology 5620; 5780. Additional course requirements are determined by the student's faculty committee. The student's special field of interest and plans for a career determine these requirements. The more important courses from which selection may be made are advanced courses in biochemistry, botany, chemistry, electrical engineering, mathematics, microbiology, physics, and zoology. Courses are available in the University of Tennessee Graduate School of Biomedical Sciences at Oak Ridge. (2) The comprehensive examination will consist of oral and written portions in radiation biology and in allied fields in which the candidate has received training. (3) The student's dissertation committee determines whether a foreign language is required for the doctoral degree. (4) The final examination will be an oral examination covering the candidate's dissertation and such other fields as the candidate's faculty committee may specify. Regular attendance at the weekly Radiation Biology Seminar or an appropriate Departmental Seminar is expected of all students.

5000 Thesis (1-15) E

5300 Graduate Research Participation (3-9) May be repeated. Maximum 12 hrs. E

5610-20 Foundations of Radiation Biology (4, 4) (Same as Zoology 5610-20.)

5780 Radiation Physiology (4) (Same as Zoology 5780.)

6000 Doctoral Research and Dissertation (3-15) E

6910 Seminar in Radiation Biology (2) (Same as Zoology 6910.)

Religious Studies


Associate Professors: W. L. Humphreys, Ph.D. Union; D. E. Linge, Ph.D. Vandy.

Assistant Professors: R. R. Earl, Ph.D. Vandy; J. L. Fitzgerald, Ph.D. Chicago; J. Kim, Ph.D. Chicago.

An M.A. in Philosophy with a concentration in religious studies is available for graduate work in these areas. (Details of this program are available in the office of either department.) Graduate courses in religious studies further provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

3060-70-80 History of Western Religious Thought and Institutions (3, 3, 3) 3060—First Century to Fifth Century. 3070—Sixth Century to Fifteenth Century. 3080—Sixteenth Century to 1900. (Same as History 3060-70-80.) A

3210 Early Greek Mythology (3) (Same as Classics 3210.) F

3220 Early Greek Mythology in the Classical Period (3) (Same as Classics 3220.) W

3230 Roman Mythology (3) (Same as Classics 3230.) Sp

3270 Russian Philosophical and Theological Thought (4) (Same as Philosophy 3270 and Russian 3270.)

3411-12 The Reformation (3, 3) (Same as History 3411-12.)

3440 Religion of Primitive Peoples (3) (Same as Anthropology 3440.)

3650 Philosophy and Religion in India (4) (Same as Philosophy 3650.) F

3660 Buddhist Philosophy and Religion in India (4) (Same as Philosophy 3660.) W

3671 Religion and Philosophy in China (4) (Same as Philosophy 3671.)

3690 Philosophy of Religion (4) (Same as Philosophy 3690.) W

4111-21 Modern Religious Philosophies (4, 4) Examination of the religious implications of major thinkers and movements. 4111—Nicolas of Cusa to Hume. 4121—Kant and the nineteenth century. Prereq: 9 hrs in philosophy other than logic. (Same as Philosophy 4111-21.)

4210 Topics in Ancient Israelite and Ancient Near Eastern Religions (4) Prereq: 3110-20 or consent of Instructor. May be repeated. Maximum 8 hrs.

4310 Jesus and Paul Compared (4) Jesus' teaching and activity in the context of first-century Palestine; the tradition of and about Jesus. Recommended prereq: 2610 or 2611.

4370 Theoretical Issues in Medical Ethics (4) (Same as Philosophy 4370.)

4410 American Religious Thought (4) Selected figures, movements, and problems in American religious thought from colonial period to present.

4450 Topics in American Religion (4) Prereq: One of the following: 3510, 3520, 4410, or consent of instructor. May be repeated. Maximum 8 hrs.

4540 Social and Religious Change (4) (Same as Sociology 4540.)

4610 Topics in Western Religious Thought and Institutions (4) Selected figures, issues, and institutions. Prereq: Consent of Instructor. May be repeated. Maximum 12 hrs.

4670 Topics in Eastern Religions (4) Selected figures, issues, and institutions. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

4810-20-30 Readings and Research in Religious Studies (3-4, 3-4)

4840 Readings in Selected Languages Related to Religious Studies (3-4) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

4940 Sociology of Religion (4) (Same as Sociology 4940.)


4960 Tradition, Change and Modernity in Asia (4) Comparative study of processes of religious and social change seen in historical context in Asian societies. Comparative focus of course will vary each year (e.g., China and Japan, India and South Asia). May be repeated. Maximum 8 hrs. (Same as Sociology 4960.)

5101 Foreign Study (1-12) See page 99.

5102 Off-campus Study (1-12) See page 99.

5103 Independent Study (1-12) See page 99.

5310-20 Topics in Religion and Society (4, 4)

5355 Orientation to Medical Ethics (4) (Same as Philosophy 5355.)

5365 Applied Ethical Theory (4) (Same as philosophy 5365.)

5510-20 Topics in the History of Religion (4, 4)

5710-20 Topics in Religious Thought (4, 4)

Romance Languages

MAJORS

French

Spanish

DEGREES

M.A.

M.A., Ph.D.


Assistant Professors: T. R. Armstrong, Ph.D. Kentucky, E. J. Campion, Ph.D. Yale; M. Handlesman, Ph.D. Florida.

The Department of Romance Languages offers two advanced degrees: the Master of Arts (M.A.) in French and Spanish, and the Doctor of Philosophy (Ph.D.) in Spanish.
Survey from origins to modern period of major Islamic literature, excluding Arabic, Persian and Turkish. Readings include The Arabian Nights, The Rubaiyat of Omar Khayyam and Gibran's The Prophets.

5070-80-90 Hispanic-Asian Literature and Culture (3, 3, 3) Prereq: same as 5070-80-90. A

5101 Foreign Study (1-12) See page 99. E

5102 Off-campus Study (1-12) See page 99. E

5103 Independent Study (1-12) See page 99. E

French

3010-20-30 Elements of French for Upper Division and Graduate Students (3, 3, 3) Elements of language, elementary and advanced readings. Open to graduate students preparing for language examinations, and upper division students desiring reading knowledge of the language. No credit for those having had Elementary French. No auditors. F; W; Sp; Su

4001-02-03 Introduction to Conversational and Simultaneous French Translation (3, 3, 3) 4001—Oral translation into English; 4002—Conversational translation to and from English; 4003—Simultaneous translation to and from English. Training of students with intermediate or advanced knowledge of French for conversational and simultaneous oral translation from French into English, and vice versa, on variety of practical subjects such as business, economics, politics, and social issues. Open mainly to language lab with additional classroom supervision by instructor. Prereq: 3440 or equivalent. Must be taken in sequence.

4101 Masterpieces of French Literature in English Translation (3) No foreign language credit. A

4200 Masterpieces of French Drama in English Translation (3) No foreign language credit. A

4110-20-30 French Literature of the Seventeenth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A

4150 Théatral French (1-3) Performance in one or more French plays. Prereq: Intermediate French or equivalent and consent of instructor. May be repeated with consent of department. A

4160-70-80 Advanced Conversation (2, 2, 2) Intensive training in prepared and spontaneous conversations. Subjects range from travel and current events to literature and aspects of national culture. Prereq: Completion of 9 hrs of courses on 3000 level. F; W; Sp

4210 Phonetics (3) Prereq: 2130, 2520, or equivalent. F

4220-30 Advanced Grammar (3, 3) Prereq: 2130, 2520, or equivalent. W; Sp

4250 Introduction to Descriptive Linguistics (3) Phonetics and phonemics, morphology and syntax. Types of languages, linguistic groups, 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: 9 hrs of upper division English or 9 hrs of upper division courses in a modern or ancient language (exclusive of German and French 3010-20-30, 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, Russian, Spanish and Linguistics 4250.) A

4280 Introduction to Historical and Comparative Linguistics (3) (Same as German, Russian, Spanish and Linguistics 4280.) W

4270 Introduction to Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into the major Romance languages. (Same as Spanish and Linguistics 4270.) Sp

4310-20-30 French Literature of the Eighteenth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A

4500-60-70 Medieval French Literature (3, 3, 3) Medieval works in modern French texts. Prereq: Intermediate French or equivalent. A

4410-20-30 French Civilization (3, 3, 3) Prereq: Intermediate French or equivalent. A

4520-30 French Literature of the Nineteenth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A

4640-50-60 French Literature of the Sixteenth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A

4710-20-30 French Literature of the Twentieth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the master's degree. Not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5011 Techniques in Literary Analysis (3) Required for either Plan A or Plan B of M.A. program. Intensive training in explication de texte. F

5101 Foreign Study (1-12) See page 99. E

5102 Off-campus Study (1-12) See page 99. E

5103 Independent Study (1-12) See page 99. E

5120-20 Old French (3, 3, 3) Medieval French language and literature. A

5121 College Teaching of Romance Languages (3) Seminars, demonstrations, and practical applications of techniques and procedures for teaching and evaluating basic structure, culture, and literature. Its practice, and beginning literature. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantsships except those whose previous training or experience warrants their being excused by department. F

5151-61-71 Bibliography and Methods of Research (1, 1, 1) (Same as Italian and Spanish 5151-61-71.) S/NC only. A

5210-20-30 French Literature of the Sixteenth Century (3, 3, 3) A


5241 French Theatre of the 18th and 19th Centuries (3) Development of new dramatic forms and evolution of traditional forms in serious and comic theatre of eighteenth and nineteenth century France.

5310-20-30 French Directed Readings (3, 3, 3) E

5350-60-70 The Philosophes (3, 3, 3) Textual analysis of the works of Voltaire, Diderot, Rousseau, and other eighteenth-century writers. A

5410-20-30 The French Novel (3, 3, 3) A

5450-60 Lyric Poetry of the Nineteenth Century (3, 3, 3) D450—German and English influences on French Romanticism and generation of the poets of "le mal du siecle." 5460—Victor Hugo; the Parnassians. A

5470 Baudelaire and the Symbolists (3) Les Fleurs du mal and Petits poemes en prose with emphasis on theories of color and "correspondances" and their influence on Symbolist school. A

5610-20-30 Trends in Contemporary French Literature (3, 3, 3) A

5650-60 Advanced Syntax and Stylistics (3, 3) Readings and written imitations of modern literary styles in form of compositions, sketches, and original stories. A

5670 Problems in Romance Linguistics (3) Topics vary. May be repeated with consent of department. Prereq: 4270 or equivalent. (Same as Spanish 5670.) A

5710-20-30 Seminar In French Literature (3, 3, 3) Topics vary. May be repeated with consent of department. Su

5910 Literary Criticism: The Foundations of Roman Criticism (3) (Same as Spanish 5910.) A
Italian

3210-20-30 Civilization and Culture (3, 3, 3) Prereq: Intermediate Italian or equivalent. A
3310-20-30 Italian Literature in English Translation (3-4, 3-4, 3) 3310—Sicilian School, the Florentine School, Dante, Petrarch, Boccaccio, Machiaveli, Ariosto and other Baroque figures. 3320—Nineteenth to twentieth century, commedia dell'arte, Vico, Leopardi. 3330—Twentieth century, Carducci, Pirandello, Quasimodo, D'Annunzio, Croce, Moravia. No change in credit hours after add deadline. Option of 4 hrs credit must present appropriate amount of extra work above that required for 3 hrs. A
3510-20 Aspects of Italian Literature (4, 4) Prereq: Intermediate Italian or equivalent. Recommended for literature majors. F; W
4010-20 Italian Drama in English Translation (3-4, 3-4) 4010—La commedia dell'arte and major works of Machiaveli, Metastasio, Afflitti, Goldoni. 4020—Twentieth-century theatre: operatic drama, the Grottesco, Pirandello, Di Filippo, Frail. No change in credit hours after add deadline. Option of 4 hrs credit must present appropriate amount of extra work above that required for 3 hrs. A
4050-50-70 Dante and Medieval Culture (3, 3, 3) Readings and lectures in English for students majoring or minoring in other departments. Readings, reports, and term papers in Italian for students majoring or minoring in Italian. (Same as Comparative Literature 4050-50-70.) A
4220 Petrarch (Prereq: 3130, 3520 or equivalent) (3) A
4330 History of Italian Language (3) (Prereq: 3130, 3520 or equivalent) A
4410-20-30 Literature of the Rinascimento (3, 3, 3) From Pucil to Tasso, the Quattrocento and the Cinquecento. Prereq: 3130, 3520 or equivalent. A
4530 The Modern Novel (3) Prereq: Intermediate Italian or equivalent. A
4540 The Modern Theatre (3) Prereq: Intermediate Italian or equivalent. A
4610 Contemporary Theatre (3) Prereq: Intermediate Italian or equivalent. A
4620 Contemporary Poetry (3) Prereq: Intermediate Italian or equivalent. A
4630 Contemporary Prose (3) Prereq: Intermediate Italian or equivalent. A
4760 Italian Folklore (3) Folk arts, music, traditions, rituals and lore of Italy from Middle Ages to present. (Same as Comparative Literature 4760.) A
5011 Techniques in Literary Analysis (2) Intensive course in explication de texte. A
5101 Foreign Study (1-12) See page 99, E
5103 Independent Study (1-12) See page 99, E
5151-71 Bibliography and Methods of Research (1, 1, 1) (Same as French and Spanish 5151-61-71.) S/N only. A
5101-20-30 Readings in Italian Literature (3, 3, 3) Topics vary and may be repeated with consent of department. A
5104-20-30 Seminar in Italian Literature (3, 3, 3) Topics vary and may be repeated with consent of department. A

Portuguese

3510-20 Aspects of Portuguese Literature (4, 4) Prereq: Intermediate Portuguese or equivalent. Readings: Tasso, D'Annunzio. A
4310-20-30 Directed Readings in Brazilian and Portuguese Literature (3, 3, 3) May be repeated with consent of instructor. F; W; Sp
5101 Foreign Study (1-12) See page 99, E
5102 Off-campus Study (1-12) See page 99, E
5103 Independent Study (1-12) See page 99, E

Spanish

4630 Masterpieces of Spanish Literature in English Translation (3) No foreign language credit. A
4650-60-70 Hispano-Arabic Literature and Culture (3, 3, 3) A
4110-20-30 Spanish Literature of the Golden Age (3, 3, 3) The picaresque novel; Cervantes; the Comedies. A
4160-10-30 Spanish Literature of the Nineteenth Century (3, 2, 2) Intensive training in prepared and spontaneous conversations. Subjects range from travel and current events to literature and aspects of national culture. Prereq: Completion of 8 hrs of courses on 3000 level. F; W; Sp
4210 Phonetics (3) Prereq: 2130, 2620, or equivalent. A
4220-30 Advanced Grammar (3, 3) Prereq: 2130, 2620, or equivalent. W, Sp
4250 Introduction to Descriptive Linguistics (3) (Same as French, German, Russian, Linguistics 4250.) A
4260 Introduction to Historical and Comparative Linguistics (3) (Same as French, German, Russian, and Linguistics 4260.) W
4270 Introduction to Romance Linguistics (3) (Same as French and Linguistics 4270.) Sp
4410 Spanish Civilization (3) Prereq: Intermediate Spanish or equivalent. F
4420-30 Latin American Civilization (3, 3) Prereq: Intermediate Spanish or equivalent. A
4450-50-70 Studies in Modern Spanish Style (3, 3) Prereq: 3410-20-30 or consent of instructor. A
4510 Special Topics in Nineteenth Century Spanish Literature (3) Prereq: Intermediate Spanish or equivalent. May be repeated with consent of department. Maximum 9 hrs. A
4710-20-30 Spanish Literature of the Twentieth Century (3, 3, 3) 4710—Non-dramatic prose fiction. 4720—Drama. 4730—Lyric poetry. A
4810-20-30 Topical Survey of Spanish American Literature (3, 3, 3) 4810—Prose fiction: major examples of the short story and novel. 4820—Poetry: landmark figures of past and present. 4830—Drama and essay: the modern period. A
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) A
5011 Techniques in Literary Analysis (2) Intensive course in explication de texte. A
5012 Foreign Study (1-12) See page 99, E
5013 Independent Study (1-12) See page 99, E
5151-71 Bibliography and Methods of Research (1, 1, 1) (Same as French and Spanish 5151-61-71.) S/N only. A
5101-10-20-30 Readings in Spanish Literature (3, 3, 3, 3) May be repeated . A
5101 Special Topics in Spanish Literature (3) May be repeated with departmental consent. Maximum 9 hrs. A
5550-60 The Golden Age Theatre (3, 3) 5550—Introduction to Spanish Theatre, Lope and Tirso. 5620—Castro, Alarcón, Moreto and Calderon. A
5610 Spanish American Prose to 1900 (3) Novel, chronicle, essay. A
5611-21 Spanish American Lyric Poetry (3, 3) A
5620-30 The Modern Novel in Spanish America (3, 3) A
5631 Spanish American Essay (3) A
5632 The Spanish American Short Story (3) Short story as major literary genre in Spanish America. A
5660-60-70 Advancement in Spanish Style and Stylistics (3, 3, 3) A
5700-80-90 Hispano-Arabic Literature and Culture (3, 3, 3) 5700—General culture history, philosophy in Arab Spain. 5800—Development of traditional marketplace story, or episodic prose narrative, into modern novel of character after invention of print. 5900—Mutual influence of traditional Arabic poetry and popular and native/Spanish choral lyric; development of classical muwashshah, the coloquial zajal, and the later villancico. Readings in Arabic and Spanish. (Same as Arabic 5700-80-90.) A
5101 Foreign Study (1-12) See page 99, E
5102 Off-campus Study (1-12) See page 99, E
5103 Independent Study (1-12) See page 99, E
5104-20-30 Spanish and Latin American Lyric Poetry (3, 3, 3) A
5110-20-30 Special Topics in Spanish or Spanish-American Literature (3, 3, 3) May be repeated. A
5340 Problems in Hispanic Culture (3) Prevailing social, political, artistic, literary and ideological conditions and patterns of any area or period within Spanish, Latin American, or Iberian cultures. A
5500-60 Hispano-American Short Story (3, 3) A
5550-60-70 Advancement in Spanish Style and Stylistics (3, 3, 3) A
5560-Castro, Alarcón, Moreto and Calderon. 5570—Sombra. A
5610 Spanish American Prose to 1900 (3) Novel, A
5620-30 The Modern Novel in Spanish America (3, 3) A
5631 Spanish American Essay (3) A
5632 The Spanish American Short Story (3) Short story as major literary genre in Spanish America. A
5660-60-70 Advancement in Spanish Style and Stylistics (3, 3, 3) A
5700-80-90 Hispano-Arabic Literature and Culture (3, 3, 3) 5700—General culture history, philosophy in Arab Spain. 5800—Development of traditional marketplace story, or episodic prose narrative, into modern novel of character after invention of print. 5900—Mutual influence of traditional Arabic poetry and popular and native/Spanish choral lyric; development of classical muwashshah, the coloquial zajal, and the later villancico. Readings in Arabic and Spanish. (Same as Arabic 5700-80-90.) A
5101 Foreign Study (1-12) See page 99, E
5102 Off-campus Study (1-12) See page 99, E
5103 Independent Study (1-12) See page 99, E
5104-20-30 Spanish Lyric Poetry (3, 3, 3) A
5910 Literary Criticism: The Foundations of Romance Criticism (3) (Same as French and Spanish 5910.) A
6000 Doctoral Research and Dissertation (3-15) E
6210-20-30 Seminar in Spanish Literature (3, 3, 3) Topics vary in field of Peninsular Literature. May be repeated with consent of department. A
6310-20-30 Seminar in Latin American Literature (3, 3, 3) Topics vary. May be repeated with consent of department. A
4120 Topics in Social Psychology (4) (Same as Psychology 4120.)

4130 Sociology of Punishment and Corrections (4) Traces development of correctional movement, develops a critical sociological perspective on contemporary correctional programs, and provides overview of evaluative research in corrections.

4150 Theory of Attitudes and Values (4) Organization, functions and measurement of attitudes and values: approaches to attitude change, and relationship to attitudes, values and behavior.

4130 Sociology of Punishment and Corrections (4) Traces development of correctional movement, develops a critical sociological perspective on contemporary correctional programs, and provides overview of evaluative research in corrections.

4150 Theory of Attitudes and Values (4) Organization, functions and measurement of attitudes and values: approaches to attitude change, and relationship to attitudes, values and behavior.

4140 Criminology (4)

4330 Urban Ecology (4) Examination of public, private, collective, and individual space. Classical school of ecology, its neoclassical reviewers, social area analysis, and cognitive symbolic ecology emphasized.

4410 Educational Sociology (3) (Same as Curriculum and Instruction 4410.)

4530 Community Organization (4) Structure, function, linkages, change and development and important community studies are reviewed and discussed. Emphasis on sociological analysis, not on implementation of change.

4540 Social and Religious Change (4) Critical review of historical and contemporary theories and methods employed in study of social change. Attention given to both macro and micro group change. (Same as Religious Studies 4540.) A

4560 Formal Organization (4) Analysis of bureaucratization process, division of labor, delegation of authority, control, and communication under a system of rationality.

4820 American Minority Groups (4) Minority groups and social structure in American society; analysis of intergroup relations with attention given to both past and present relationships of selected groups to broader society.

4930 Social Movements (4) Development, organization, and function of social movements; attention is given to the ideology, leadership and organization of political, religious and other types of social movements.

4940 Sociology of Religion (4) Interrelationship of society, culture, and religion. (Same as Religious Studies 4940.) A

4960 Tradition, Change and Modernity in Asia (4) (Same as Religious Studies 4960.)

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5010 Professional Seminar (1) Limited to sociology graduate teaching assistants or graduate assistants. May be repeated. Maximum 4 hrs. S/NC only. W, Sp

5040 Methodological Issues in Social Research (3)

5050 Seminar in Political Sociology (3) Political system from societal, organizational, and group perspectives.

5060-70 Special Social Investigation (3, 3) Directed readings and research projects. E

5125 Seminar in Environmental Sociology (3)

5200 Seminar in Collective Behavior and Social Movements (3)

5210 Social Theory (3) F

5220 Social Control (3)

5230 Seminar in Sociology of Medicine (3)

5251 Historical Demography (3) Family reconstitution, aggregate analysis, strategies for examining documents containing information on population. Research findings on historical patterns of change in fertility, mortality, migration and different types of family structure.

5310 Seminar in Methods of Sociological Research (3) Major methodological issues in sociology; selective techniques; reliability, validity, sampling, and qualitative methods.

5320-30 Social Statistics (3, 3) General survey of parametric and nonparametric procedures in analysis of sociological data; assumptions underlying procedures; advantages, disadvantages, and special applications. Must be taken in sequence. F, W

5420-30 Social Theory (3, 3) W

5520 Crime, Law, and Social Control (3)

5530 Seminar in Community (3)

5550 Seminar on Community Power (3) Analysis of theories and methods used in studying social power in communities.

5560-70 Field Research in Deviance (3, 3)

5580 Sociology of Mental Disorders (3) Relationship between formal sociological models and substantive theories of mental illness. Historical development of theoretical and methodological approaches.

5620 Seminar in Occupations (3) Continuation from material in Sociology 5610; interface between occupations and settings in which they are performed.

5630 Seminar in Occupations (3) Research participation directed projects on subjects developed in Sociology 5620. Prereq: Sociology 5610 or Sociology 5620.

5640 Theories of Social Psychology (3) Current and classical theoretical perspective in social psychology. May be used for credit in psychology.

5670 Social Organization (3) Structure and function of human groups, with special attention to voluntary associations and administrative organizations.

5720 Small Group Theory and Research (3) Critical assessment, a research oriented approach, contemporary theoretical orientations to study of small groups. Research designed to test selected theoretical problems. May be repeated.

5970 Seminar in Research Problems in Inter-group Relations (3) Research techniques and problems as encountered in race and intergroup relations are explored; actual field research projects are performed.

5910 Seminar in Race and Culture (3) Critical examination of theoretical and conceptual approaches in study of intergroup relations.

5910 Urban and Regional Sociology (3)

5920 Seminar in Social Attitudes (3)

5940 Delinquency and the Social Structure (3) Critical assessment of contemporary theories of delinquency, research findings related to them, and their implications for formal strategies of control and rehabilitation.

5960 Demographic Techniques (3) Life, table, standard rates, and survey techniques of population analysis. A

5970 The Sociology of Development and Modernization (3) Comparative approach to institutional and organizational correlates of modernization. Relations between urbanization, industrialization, and modernization.

6000 Doctoral Research and Dissertation (3-15) E

6040 Experimental Research (3)

6050 Seminar on Methods of Social Research (3) Experimental research projects. (Same as Psychology 6050.)

6070 Field Research (3)

6080 Reading in Social Psychology (3) Directed reading of works of current interest in social psychology.
6090.100 Survey Design and Analysis (3, 3) Application participation in design and analysis of survey (2 qtrs). May be repeated. Maximum 6 hrs.

6140 Advanced Readings in Sociological Theory (3) Advanced readings and selected topics in social psychology. Prereq: 3410.

6150 Advanced Readings in Sociological Methods (4) S/N only. E

6160 Advanced Special Social Investigation (4) E

6170 Cross-cultural Aspects of Human Fertility (3) Historical, topical, regional, and methodological approaches to human fertility and demographic problems. Consideration of relations obtained between socioeconomic and demographic change in various parts of world; fertility rates and national power; controversies on control of vital rates of growth.

6180 Theory and Method of Human Ecology (3) Theoretical perspective and research techniques of human ecology applied to selected research sites.

6190 Advanced Special Social Investigation (4) E

6200 Topics in Socialization (3) Process to learn concepts of general methodological principles to particular operating context of survey. Systematic exploration of survey problems through student participation in design and analysis of survey (2 qtrs).

6210 Seminar in Mass Behavior and Related Topics (3)

6410 Advanced Readings in Sociological Theory (4) S/N only. E

6500 Advanced Special Social Investigation (4) E

6620 Seminar in Class and Status (3) Classic and contemporary anthropological sociology and types of community change, and techniques used in community research.

6710 Seminar in Class and Status (3) Classic and recent studies of class and status. Methods used in research and current position of theory.

6810 Advanced Studies in Social Psychology (3) Social interaction and personality; genesis and functioning of self; interplay of social structures and individual actions; theories of social psychology related to these problems and recent research are discussed. May be repeated. Prereq: 3130 or 5640 or Psychology 5560.

6840-50 Social Change (3, 3) Major theories, methods, and research.

Spanish
See Romance Languages

Speech and Hearing Sciences
See Audiology and Speech Pathology

Speech and Theatre
MAJOR

DEGREE

Speech and Theatre
M.A. M.F.A.

Professors:  

Associate Professors:  

Assistant Professors:  
R. S. Ambler, Ph.D. Ohio State; M. L. Ambrose, Ph.D. Ohio (Athens); M. Custer, M.F.A. Wisconsin; B. V. Daniels, Ph.D. Cornell; J. D. deCuir, M.F.A. Tulane; M. E. Hampton, Ph.D. International College (Los Angeles); D. K. Sorenson, Ph.D. Louisiana State.

The Department of Speech and Theatre offers the Master of Arts degree in Speech and Theatre with area concentrations in speech communication and theatre and the Master of Fine Arts in Theatre with area concentrations in acting and directing, playwriting, and design and technical theatre.

In order to complete the Master's program, a student must satisfy a total of 36 semester hours and must complete a thesis or written comprehensive examination. A student's accumulating more than 60 hours in any one concentration is highly discouraged. A student may petition for approval of a nonconcentrated area of study.

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5220 Quantitative Projects in Speech Communications (3) May be repeated. Maximum 9 hrs. F
5440 Organizational Communication (3) May be repeated. Maximum 9 hrs. F
5550-60-70 Studies in Persuasion (3, 3, 3) W
5750-60-70 Studies in Rhetoric (3, 3, 3) F
5911 Directing the Forensic Program (4) Philosophy and methods of directing cocurricular and extracurricular forensic activities in high schools and colleges: competitive and noncompetitive approaches to directing debate, oral interpretation and public speaking events. (Same as Curriculum and Instruction 5911) Sp

Speech and Theatre
4170-80-90 Film History and Theory (3, 3, 3) Analysis of cinematic forms and styles. 4170—Narration. 4180—Exposition and persuasion. 4190—Experimental forms; films and other media.
4640 Group Performances of Literature (4) Oral interpretation of scenes from plays of American authors. (Same as Curriculum and Instruction 5911) F, W
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during summer quarter when such a 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
5110 Introduction to Graduate Research in Speech and Theatre (3) F
5120 Directed Reading and Research (3) May be repeated. Maximum 9 hrs. E
5160 Theory and Technique in Oral Interpretation (4) Literary, psychological, communicative, and aesthetic approaches to selection, adaptation, and oral presentation of literature. May be repeated. Maximum 8 hrs. W, Sp

Theatre
3121-22 Advanced Acting (4, 4) Historical styles of acting. 3121—Renaissance. 3122—seventeenth and eighteenth centuries. Prereq: Consent of instructor.
3151 Theatre Practicum: Performance (1-4) Supervised work on departmental productions. Available for credit only to theatre majors or with consent of department. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E
3152 Theatre Practicum: Production (1-4) Supervised work on departmental productions. Available for credit only to theatre majors or with consent of department. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E
3153 Summer Repertory Productions (4) Supervised work on summer repertory productions. Available only to members of summer company by consent of instructor. Su
3214-15 Technical Theatre (4, 4) Special techniques in scenery and property construction; stage management; problems in basic technical theatre practice. Prereq: 2211-21, or consent of instructor. Must be taken in sequence. W; Sp
3221-22 Introduction to Scene Design (4, 4) 3221—Problems in stage design with reference to space and form, movement, scale, and style; rudiments of rendering and groundplan preparation. 3222—Play interpretation through scenic means; setting as environment for dramatic action; rudiments of model-making. Must be taken in sequence.
3252-53-54 History of the Theatre (4, 4, 4) Drama in performance; particular emphasis on theatre architecture, scene design, and acting styles. 3252—Antiquity to the Renaissance. 3253—the European Theatre, 1650-1850. 3254—Modern Theatre.
3262-63 History of American Theatre (3, 3) Development of theatre as social institution in America. 3262—Beginnings to 1900. 3263—from 1900 to present.
3261-21 Introduction to Lighting Design (4, 4) Mechanics of stage lighting; elementary theory; problems in basic lighting practice. Prereq: 2211-21 and consent of instructor. Must be taken in sequence.
3451-52 Play Directing (4, 4) Must be taken in sequence. Prereq: 2211.
3511-12 Introduction to Costume Design (4, 4) Costume as an essential element of character on stage; the application of costume history to specific design projects. Prereq: 2231 or consent of instructor.
4133-34 Special Problems in Acting (3, 3) Advanced exercises in voice and movement; preparation of major role under performance conditions. Prereq: 3121-22 and consent of instructor. F; W
4151 Theatre Practicum: Performance (1-4) Continuation of 3151. Available for credit only to theatre majors. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E
4152 Theatre Practicum: Production (1-4) Continuation of 3152. Available for credit only to theatre majors. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E
4153 Summer Repertory Productions (4) Continuation of 3153. Available only to members of summer company by consent of instructor. Su
4214-15 Advanced Technical Theatre (4, 4) Advanced technical theatre management; advanced scenery and property execution; special problems in technical theatre. Prereq: Consent of instructor. F; W
4241-42 Advanced Scene Design (4, 4) 4241—Descriptive drawing as an approach to three dimensional design; theatrical graphic standards and preparation; application of surface color; construction of spatial illusion through color with reference to rendering, scenic painting, and preparation of painter's elements. Must be taken in sequence. Prereq: 2211-21, 3221-22 and consent of instructor. W; Sp
4341-42 Advanced Lighting Design (4, 4) Relationship of light to setting in creating stage environment. Prereq: 3221-22 and consent of instructor. Must be taken in sequence. F; W
4441-42 Advanced Play Directing (4, 4) Problems of play interpretation; directing period plays; preparation of a play for public performance. Prereq: 3451-52 and consent of instructor. Must be taken in sequence.
4541-42 Advanced Theatre Costume Design (4, 4) Advanced problems in costume design and construction; pattern drafting; draping. Prereq: 3511 or 3512. Sp
4751-52 Dramatic Theory and Criticism (3, 3) 4751—Theatre aesthetics. 4752—Dramatic theory. W; Sp
4951-52 Playwriting (4, 4) Prereq: Consent of instructor. F; W
5011-12-13 Projects in Lieu of Thesis (3, 3, 3) Available to Theatre majors not enrolling in 4951-52. Prereq: 3520 or 3530 or 3540 or 3550 or 3560 or 3570.
5250 Seminar in Playwriting (3) Sp
5310 Studies in European Theatre History (3) May be repeated. Maximum 9 hrs. F, W
5320 Studies in American Theatre History (3) May be repeated. Maximum 9 hrs. F, W
5620 Projects in Lighting Design (3) May be repeated. Maximum 9 hrs. E
5630 Projects in Play Directing (3) May be repeated. Maximum 9 hrs. E
5640 Projects in Scene Design (3) May be repeated. Maximum 9 hrs. E
5650 Projects in Costume Design (3) Problems of play interpretation and theatrical costume design centralizing around individual projects. Students will design costumes for complex play for public performance. May be repeated. Maximum 9 hrs. E
5660 Projects in Technical Theatre (3) Problems of set design, interpretation, and execution. E
5670-71-72-73-74-75 Master Class in Acting (5, 5, 5, 5, 5, 5) Available to Theatre M.F.A. students only.
5680-81-82 Design and Technical Theatre Seminar (1-6, 1-6, 1-6) Available to Theatre M.F.A. students only. May be repeated. Maximum 6 hrs.

5890 Studies in Theatrical Production (3) May be repeated. Maximum 9 hrs. Sp
5912 Play Production in Secondary Schools (4) Principles and methods for directing high school dramatic programs. (Same as Curriculum and Instruction 5912) Su
5950-50-70 Studies in Dramatic Theory and Criticism (3, 3, 3) F; W; Sp

Speech Pathology
See Audiology and Speech Pathology

University Studies
(Non-Departmental)
University Studies deal with important contemporary topics which are sufficiently comprehensive to require the study and attention of students and faculty from more than one college. They are open to all qualified members of the university community.

4100 Energy Needs and Our Environment (3) Problems of present and projected energy resources and demands; economic, behavioral, legal, technical, environmental, and energy-saving programs. Topical focus will change from quarter to quarter. May be repeated. May be taken by qualified non-thesis graduate students only.

5460 Zoology

MAJOR
DEGREES
M.S., Ph.D.

Professors:
J. H. Abel (Head), Ph.D. Brown; R. M. Babgy, Ph.D. Illinois; D. L. Bunting, Ph.D. Oklahoma State; J. G. Carlson (Emeritus), Ph.D. Pennsylvania; A. C. Cole, Jr. (Emeritus), Ph.D. Ohio; J. C. Daniel, Jr., Ph.D. Colorado; D. A. E given credit by Ecology majors.

Requirements for admission: Applicants must be qualified members of the university community.

4100 Energy Needs and Our Environment (3) Problems of present and projected energy resources and demands; economic, behavioral, legal, and environmental programs; regional impacts of energy production and consumption. Topical focus will change from quarter to quarter. May be repeated. May be taken by qualified non-thesis graduate students only.

Zoology

Associate Professors:
A. B. Buncham, Ph.D. Iowa; A. C. Echtmeich, Ph.D. Kansas; A. A. E-Banna, Ph.D. Washington State; D. J. Fox, Ph.D. Johns Hopkins; M. A. Handel, Ph.D. Kansas State; A. M. Jungreis, Ph.D. Minnesota; J. A. MacCab, Ph.D. California (Davis); M. L. Pan, Ph.D. Pennsylvania, S. E. Riechert, Ph.D. Wisconsin; G. A. Vaughan, Ph.D. Duke; M. C. Whitside, Ph.D. Indiana.

Assistant Professors:
T. T. Chen, Ph.D. Florida; L. D. Etkin, Ph.D. Indiana; N. Greenberg, Ph.D. Pennsylvania; G. F. McCracken, Ph.D. Cornell.

The Department of Zoology offers the Master of Science and Doctor of Philosophy degrees with concentrations in aquatic biology and ecology, cell biology and radiation biology, physiology, genetics, aquatic macrophyte biology, and reproduction and developmental biology.

Requirements for admission: Applicants for graduate study are expected to have a background no less extensive than that required of undergraduate majors in this department. This includes a knowledge of the basic principles of cell biology, genetics, and

Alumni Distinguished Service Professor.
ecology. Other requirements for admission are: (1) general zoology or general biology, 12 quarter or 8 semester hours; (2) upper division zoology, 18 quarter or 12 semester hours; (3) chemistry, two years including 12 quarter or 8 semester hours of general inorganic; (4) mathematics, 9 quarter or 6 semester hours including differential and integral calculus; (5) physics, 12 quarter or 8 semester hours; (6) Graduate Record Examination scores (Verbal, Quantitative and Advanced Biology); and (7) a grade point average of 3.0 out of a possible 4.0. Otherwise superior students, deficient in one or more of the above requirements, may be admitted at the discretion of the Graduate Affairs Committee.

A course in biostatistics is required of all candidates for an advanced degree in Zoology.

All aspirants for advanced degrees in Zoology must exhibit competency in six areas of zoology as determined by a qualifying examination. Students must take this examination during the fall quarter of the first year and may repeat this examination. The following fall quarter if unsatisfactory scores are received. Competency must be exhibited within this two-year period for a student to continue in the program.

Preparation for thesis or dissertation: During the first year a written examination and a special research problem in each of two faculty members' laboratories will determine the student's preparation for thesis or dissertation study.

THE DOCTORAL PROGRAM

Special requirements in Zoology are as follows: (1) course requirements shall be determined by the candidate's faculty committee; (2) the comprehensive examination will be an oral and written examination in zoology and in allied fields in which the candidate has had training; (3) the candidate for the Ph.D. degree must possess 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 at least a B in 3030 language courses. This requirement for the first language must be fulfilled before the student can take the comprehensive examination.

The student's faculty committee may require the student any level of training or proficiency in a second foreign language but may not require that the student take the official language examination in the second language.

3050 Comparative Vertebrate Embryology (5) Developmental morphology of selected vertebrates. 2 hrs and 3 labs. F, Sp

3060 Comparative Vertebrate Anatomy (5) Physiology and anatomy of organ systems. Dogfish shark and cat primarily used in laboratory. 3 hrs and 2 labs.


3110 General Entomology (5) Introduction to insects; basic structure, development, behavior; classification of insect orders and representative families; interpretation and use of keys. Prereq: Biology 3130 or consent of instructor. 3 hrs and 2 labs. F

3150 Invertebrate Zoology (5) Biology of invertebrates with emphasis on life history, behavior, and evolution. Prereq: Biology 3130. 3 hrs and 2 labs. F

3220 Physiology of Reproduction (3) (Same as Animal Science 3220). F, Sp

3230 History (4) Study of animal tissues. Prereq: Biology 3120. 2 hrs and 2 labs. F, Sp

3410 Bioethics (3) Relationship between biological discoveries and human values. Open discussion of selected dilemmas arising from new knowledge about medicine, behavior, resources, and technology. F, Sp

4007, 4010-4017 Minicourse in Zoology (2 hrs each) Selected, advanced topics in zoology, concentrated in time and subject matter. Consult departmental listing for actual topics offered. Prereq: As posted. May be repeated. E

4050 Developmental Biology (4) Experimental morpohogenesis, fertilization, cellular interactions, hormonal effects and related topics with examples drawn primarily from invertebrates and vertebrates. Prereq: 3050. 2 hrs and 2 labs. F, Sp

4120 Undergraduate Research Participation (2) Experience in active research projects under supervision of staff members. Prereq: Consent of instructor. E

4140 Practicum in Zoology (1-3) Participation in practical application of zoology in community institutions, government organizations and industry. Approximately 5 hrs and 2 lab or field periods. F, W, Sp

4180 Mammalogy (4) Classification, evolution, distribution, reproduction, populations, and behavior. 2 hrs and 2 lab or field periods. F

4200 Ichthyology (6) Classification, collection and identification, distribution, life histories, and economic importance of fishes. Prereq: Biology 3130 or consent of instructor. 2 hrs and 2 lab or field periods. F

4210 Cell Physiology (5) Development of modern concepts in cell physiology from point of view of information and control which examine kinetics and integration of cellular activities. Prereq: Cell biology, or any physiology, and organic chemistry. Recommended prereq: Biochemistry, 3 hrs and 1 lab. F

4240 Animal Ecology (4) Environmental factors determining distribution and numbers of animals; genotypic, environmental, and traspacific relations; problems and methods. Prereq: Biology 3130. 2 hrs and 2 labs. F

4250 Comparative Animal Physiology I (3) Environmental physiology. Survey of physiological mechanisms and their relation to ability of animals to survive in diverse physical environments. Prereq: Biology 3120-30 and 2 yrs chemistry. W

4259 Comparative Animal Physiology Laboratory I (1) Coreq: 4250. W

4260 Comparative Animal Physiology II (3) Sensory, effector and integrative physiology. Prereq: 3060. Sp

4269 Comparative Animal Physiology Laboratory II (1) Prereq: 3060 and consent of instructor. Coreq: 4260. Sp

4270 Immunology (3) (Same as Microbiology 4270.) F

4280 Comparative Endocrinology (5) Comparative analysis of the physiology and morphology of endocrine glands in vertebrates and invertebrates. Their role and interaction in maintenance of the organism and species. Prereq: 3060 or equivalent. W

4290 Herpetology (4) Classification, distribution, life histories, zoogeography and identification of amphibians and reptiles, primarily of local species. 2 hrs and 2 labs or field periods. Sp

4300 Ornithology (4) Morphology, physiology, behavior, reproduction, populations, evolution, field identification. 2 hrs and 2 labs or field periods.

4320 Microtechnique (4) Prereq: 3320 recommended. 2 hrs and 2 labs.

4330 General Cytology (4) Study of cellular organelles at the light and electron microscope levels and the functioning of these organelles. Prereq: Biology 3120. Sp

4359 General Genetic Laboratory (2) Mainly Drosophilae experiments designed to illustrate basic principles of inheritance. Prereq: Biology 3110. W

4380 Organic Evolution (2) Modern concepts of vertebrate evolution. Prereq: Biology 3110. F

4390 Human Genetics (3) Principles and problems of inheritance in humans. Prereq: Biology 2110. E

4410 General Parasitology (4) Morphology, taxonomy, and physiology of parasites. Major orders and post-parasite relationships. 3 hrs and 1 lab. Prereq: Biology 3130 or consent of instructor. F

4430 Medical Entomology (4) Distinctive morphology, behavior, and control of arthropods that parasitize human or serve as vectors of human pathogens. Recommended prereq: Entomology and Plant Pathology 3210 or Biology 3130. Sp

4450 Protozoology (4) Morphology, taxonomy, and physiology of protozoa in relation to fundamental biological concepts. 2 hrs and 2 labs. Recommended prereq: Biology 3120. Sp

4660 Introduction to Aquatic Ecology (4) Physico-chemical nature of inland waters. Biotic communities are described, interrelationships explored. Prereq: Chemistry 1110-20-30, Biology 3130. 2 hrs and 2 labs. F

4700 Arachnology (4) Biology of spiders, mites, and scorpions, and relatives. Prereq: 3110, or 3150. 2 hrs and 2 labs.

4720 Comparative Animal Behavior (4) Methods and principles. (Same as Psychology 4720.) F

4720 Comparative Animal Behavior Laboratory (4) Laboratory and field studies. Coreq: 4720. (Same as Psychology 4720.) F

4810-20-30 Insect Morphology and Taxonomy (4, 4) 4810—Internal morphology of both generalized and specialized forms. 4820—Taxonomy of major orders. 4830—Taxonomy of minor orders and immature forms. Prereq for 4820-30: 3110 or consent of instructor. 2 hrs and 2 labs. F, Sp

4940 Physiology of Exercise (4) Functions of body in muscular work; physiological aspects of fatigue, training, and physical fitness. Prereq: 2920-30 or 3060. 3 hrs and 1 lab. Sp

5000 Thesis (1-15) E

5017 Colloquium in Ethology (1) (Same as Psychology 5017.) E

5075 Zooplankton Ecology (4) Secondary productivity in aquatic systems. Prereq: 4860 or equivalent. Su

5540 Graduate Research Participation (3) Advanced research techniques studied under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students in good standing. Prereq: Consent of department and research director. May be repeated with consent of department. S/N only. E

5110-20-30 Special Problems (2, 2, 2) E

5140 Zoological Bibliography (4) Methods of locating and using zoological literature, bibliographies, and abstracts, and of preparing bibliographies and scientific papers.

5150 Zoological Bibliography (4) Ecology and taxonomy of fresh water invertebrates exclusive of insects. Laboratory and field study. Prereq: 3150. Sp

5210 Plant Parasitic Nematodes (4) (Same as Entomology and Plant Pathology 5210.) F

5260 Physiology of Hormones (4) Cellular and organismal actions of hormones in vertebrate and invertebrate animals. Prereq: 4260. Recommended prereq: Biochemistry 3221. Sp

5270 Advanced Neuromuscular Physiology (5) Cellular and molecular aspects of phenomena as...
5280 Insect Physiology (4) Functions and interrela-
tionships of systems relative to metabolism, growth,
coordination, movement, and reproduction. Prereq:
410, 1 yr general chemistry or consent of instructor.
3 hrs and 2 labs. W, A
5290 Quaternary Problems (4) (Same as Geology
5290 and Botany 5290.)
5310-20 Seminar in the Teaching of College Zo-
ology (2, 2) Current concepts and principles in teach-
ing of zoology; modern techniques and instrumen-
tation, supervised application of teaching principles
and methods. Must be taken in sequence. Prereq:
Consent of instructor. S/JNC only.
5330 Biomometry (3) Statistical methods used in
analysis of quantitative biological data. Prereq: 1 qtr
statistics or consent of instructor. F
5360 Isotopic Methods and Techniques: Lecture
(2) Theory of isotopic decay, measurement of
isotopic decay by liquid scintillation counting,
single and double isotope counting; applications
using Cerenkov radiation, radioimmunossay, syn-
thesis of metabolic intermediates, experimental de-
sign and data analysis. Coreq: 5389. Prereq: Upper
division laboratory course in either physiology, biochemistry, microbiology, or consent of instruc-
tor. F
5389 Isotopic Methods and Techniques: Labora-
tory (4) Use of liquid scintillation counter, optimiza-
tion of counting parameters for single and double
isotope counting, quenching and correction, mea-
surement of Cerenkov radiation, procedures for
measuring blood volume, solute uptake into cells,
radioimmunossay of steroid hormones, hormone
synthesis, metabolism of mammalian intermediates and
other topics. Coreq: 5380. Prereq: Graduate stand-
ing and one upper division laboratory course in
either biochemistry, physiology, microbiology or consent of instructor. Chemistry 3810 highly rec-
ommended. F
5410 Advanced Parasitology (4) Life cycles, tech-
niques of collection, preservation, and identification
of parasitic worms and protozoa. Prereq: Consent of
instructor. Spring
5430 Advanced Medical Entomology (3) Prereq:
4330.
5510-20 Advanced Animal Physiology (5, 5) Primar-
ily mammalian physiology; 5510—membrane neuron, central nervous system, muscle, cardiovas-
cular system, and control mechanisms; 5520—
respiratory, renal, gastrointestinal, and reproduc-
tive physiology, acid-base mechanisms, and
metabolism. Should be taken in sequence if both
courses are taken. Prereq: General undergraduate
anatomy and physiology and Biochemistry 4110 or
equivalent or consent of instructor. Biochemistry 4120 also recommended. (Same as Animal Science
5510-20.) 4 hrs and 1 lab. W, Sp
5550 Advanced Ornithology (4) Classification, dis-
tribution, and anatomy of birds. Prereq: 4300.
5570 Animal Populations (3) Characteristics and
methods of study of animal populations.
5610-20 Foundations of Radiation Biology (4, 4)
Physical, chemical, and biological mechanisms in-
volved in actions of different kinds of radiations on
living cell and its components. Recommended pre-
req: 1 yr biological science, general physics; biochemistry, calculus. (Same as Radiation Biology
5610-20.) 3 hrs and 1 lab.
5630 Methods of Experimentation with Laboratory
Mammals (3) Designed to give competence in han-
dling research mammals. Techniques of anesthesia,
drug administration, radiography and surgery, Pre-
req: 4550, or 4410, or consent of instructor.
5660 Physiology of Development (3) Chemical as-
psects of growth, morphogenesis, and cyto-
differentiation. Recommended prereq: Biochem-
istry 4110-20. F
5670 Cellular Immunology (4) Laboratory course
with emphasis on immunological phenomena at cel-
ular level. Preparation and use of immunofluores-
cent reagents, macrophage migration inhibition,
skin allograft reactions, diffusion chamber cultures,
Coil of Medicine-Knoxville Unit

James C. Hunt, Dean
Donald C. Chase, Acting Associate Dean,
Knoxville Unit

The major campus of the College of Medicine is located in Memphis, Tennessee. The College, however, is a statewide organization with other units in Chattanooga, Jackson, and Knoxville.

In addition to Department of Medical Biology faculty listed here, the Knoxville Unit has other College of Medicine faculty and students in undergraduate and graduate medical education.

The College of Medicine traces its origin to the establishment of the Medical Department of the University of Nashville in 1851. Later, through a merger of four medical schools, it became The University of Tennessee College of Medicine and moved to Memphis in 1911.

Department of Medical Biology/Memorial Research Center

Professors:
R. D. Lange (Chairperson and Director), M.D.
Washington; C. C. Congdon (Vice Chairperson and Associate Director), M.D. Michigan;
W. R. Forkas, Ph.D. Duke; S. Krauss, M.D.
Pennsylvania; B. B. Lozzio, M.D. Buenos Aires (Argentina); C. B. Lozzio, M.D. Buenos Aires (Argentina); T. F. McDonald, Ph.D.
Tennessee; A. Solomon, M.D. Duke;
P. W. Wigler, Ph.D. California (Berkeley).

Associate Professors:
J. P. Chen, Ph.D. Pennsylvania State;
C. R. Dunn, Ph.D. London (England);
J. E. Fuhr, Ph.D. St. John's; J. B. Jones, D.V.M. Illinois; E. A. Machado, M.D.
Buenos Aires (Argentina); E. C. Schroeder, D.V.M. Michigan State.

Assistant Professors:
E. W. Fuson, Ph.D. Tennessee; W. T. Hanna, M.D. Ain-Shams (Egypt); A. T. Ichiki, Ph.D.
California (Los Angeles); K. D. Lin, M.D.
National Taiwan (Taiwan); F. J. Miller, A.B. Alabama.

The Department of Medical Biology of The University of Tennessee College of Medicine-Knoxville Unit was formed from the faculty of The University of Tennessee Memorial Research Center and Hospital in 1978. The Research Center was established in 1936. Its faculty has education, research, and service interests in cancer, blood diseases, birth defects and clinical genetics, and biochemistry of disease. 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 by special arrangement.

The faculty with the College of Veterinary Medicine participates in the graduate program leading to M.S. and Ph.D. degrees in Comparative and Experimental Medicine. Other advanced degree students can do thesis research in the department by arrangement with other life science departments at the University.

Courses

4210 Introduction to the Study of Cancer (3) Lectures, classroom discussion, and case reports surveying the major topics of oncology. Prereq: Biology 3110-20 or consent of instructor.

4310 Introduction to Hematology (4) Pathophysiology of blood and blood forming systems. Lectures, class discussions and demonstrations. Prereq: Upper division biology background to include histology and/or general anatomy.

4430 Clinical Genetics (3) Human genetic disorders, case presentations. Prereq: General biology and general genetics background or consent of instructor.

5080 Graduate Research Participation (3) Advanced research techniques studied while conducting individual biomedical research projects under supervision of faculty. Prereq: Consent of instructor. Open to all graduate students. May be repeated with consent. Maximum 9 hrs. S/NC only.

5220 Special Topics in Cancer (1-3) Special topics in oncology. Prereq: 4210 and consent of instructor. May be repeated. Maximum 9 hrs.

5320 Special Topics in Hematology (1-3) Special topics in clinical hematology. Prereq: 4310 and consent of instructor. May be repeated. Maximum 9 hrs.

5410 Molecular Basis for Metabolic Disease (5) Metabolic disorders of humans and animals. Emphasis on molecular mechanisms in inborn errors of metabolism, toxic reactions, and deficiency states. Clinical and pathologic correlations. Prereq: Biochemistry 4110-20 or equivalent.

5420 Special Topics in Metabolic Disease (1-3) Biochemical and physiological basis of selected diseases of humans and animals. Clinical-pathological correlations. Prereq: 5410 and consent of instructor. May be repeated. Maximum 9 hrs.

5430 Metabolism of Drugs (2) Drug mechanisms of action: membrane transport, enzyme reactions, drug receptors, ionization, stereochemistry and metabolic pathways. For students interested in biochemical pharmacology. Prereq: Biochemistry 4110-20.
The College of Nursing offers a five-quarter program of study leading to the Master of Science in Nursing degree. The general purpose of the program is to prepare at the graduate level nurses who are qualified to function as practitioners, clinicians, educators, and administrators in all segments of the health care delivery system.

Upon successful completion of the program, graduates will be able to:

1. Provide advanced high quality, comprehensive nursing care to individuals and groups in a variety of settings;
2. Collaborate with other health professionals in systematic implementation and evaluation of health care delivery to large groups in agency and community settings;
3. Utilize appropriate advanced teaching, administrative and clinical practice skills in the discharge of one's professional responsibilities;
4. Utilize appropriate research findings in the implementation and evaluation of nursing care;
5. Participate in clinical research activities by means of data collection, tabulation, and analysis, and by generating research topics for referral to nurse researchers.

GENERAL REQUIREMENTS

FOR ADMISSION

1. Meet requirements for admission to the Graduate School.
2. Hold a Bachelor's degree in Nursing. If the Bachelor's degree is not in Nursing, the applicant must demonstrate successful completion of the equivalent of an upper division major in Nursing.
3. If the number of qualified applicants exceeds the number that can be accommodated, preference will be given to applicants:
   a. whose undergraduate GPA is 3.0 or higher;
   b. who have had at least two years of full-time clinical practice experience following completion of a baccalaureate nursing program;
   c. who are Tennessee residents;
   d. who are currently employed in underserved health service areas and who can demonstrate their commitment to return to those areas following completion of the program;
   e. who are currently employed as nurse educators in programs preparing registered nurses; or
   f. who are currently employed as directors of nursing service.
4. Ordinarily one year of full-time clinical practice experience should be completed prior to applying for admission to the program.

DEGREE REQUIREMENTS

1. Students must complete 60 quarter hours of graduate level course work with a cumulative GPA of 3.0 or better.
2. The 60 credit hours must include the following components:
   - Core requirement: 23 hrs
   - Clinical concentration option: 20 hrs
   - Functional concentration option: 11 hrs
   - Electives: 6 hrs.
   Total: 60 hrs
3. A Master's thesis is not required, but those students who wish to complete a thesis as a part of their program may substitute the thesis for the 9 elective hours.
4. Those students who do not choose the thesis option must successfully complete a comprehensive final examination.
5. Students may choose either primary care nursing, secondary/tertiary care nursing or community mental health nursing as their clinical concentration option. Students selecting the primary care nursing option must complete 5450, 5460, 5550. Students selecting the secondary/tertiary care nursing option must complete 5120-30 (or 5140-50) and 5310. Students selecting the community health nursing option must complete 5410, 5480, 5490, 5500 and 5510.

6. The core requirement that must be completed by all students regardless of clinical option includes the following courses: 5010, 5020, 5030, 5070, 5210, 5680 and a graduate level statistics course that must be approved in advance by the student's faculty advisor.

7. Students may select a functional concentration option in teaching, management or advanced clinical practice. Students selecting the teaching option must complete 6 hours of graduate level courses in education and 5630. Students selecting the management option must complete 6 hours of graduate level courses in administration and 5730. Students selecting the advanced clinical practice functional option must complete 5560 and 5660 if their clinical option is primary care, 5320 and 5340 if their clinical option is secondary care or 5520 and 5540 if their clinical option is community mental health. All courses taken in other colleges must be approved in advance by the student's faculty advisor.

REQUIREMENTS FOR SECOND MASTER'S DEGREE

1. Students must complete 60 hours at the graduate level (with a cumulative GPA of 3.0) unless they already have Master's or doctoral degrees. For the latter up to 15 hours may be applied to the second Master's degree, with approval of the student's committee, Dean of the College, Dean for Graduate Studies and/or Vice Chancellor for Graduate Studies and Research.

Any hours so applied would be from courses in the first degree program that are directly relevant to the second. Hours from the first program to be applied to the second shall have been earned within the time limits (six years) established for the second.

Reduction of hour requirements, when appropriate, will not be used to reduce the residency requirements of the second Master's degree.

2. The 45 to 60 hours must include the following components:
Core requirement: 17 hrs
Clinical concentration option: 20-30 hrs
Functional concentration option: 6-11 hrs
Electives: 2-9 hrs
Total: 45-50 hrs

Faculty
Professor: H. E. Hart (Dean), Ph.D., New York.
Associate Professors: D. H. Goodfellow, Ph.D., Peabody; M. E. Greiner, M.S.N., K. J. Kante, Ph.D., Illinois; B. M. Reid, M.N., Columbia.
Assistant Professors: K. P. Conlon, M.S.N., New York (Buffalo); P. G. Doppelman, Ph.D., Tennessee; M. M. Moline, M.S.N. Case Western.
Assistant Professors: M. Donnellen, M.S.N. New York (Buffalo); P. G. Doppelman, Ph.D. Tennessee; K. P. Conlon, M.S.N. New York (Buffalo); M. M. Moline, M.S.N. Case Western.

Courses
4240 Nursing in Acute Care Settings (5) Theory and clinical practice related to care of hospitalized children and adults in acute care settings. Open only to MSN candidates lacking under-graduate major in nursing; others with consent of instructor. Prereq: All required 2000 and 3000 level nursing courses. 3 hrs and 2 labs. Su
4260 Community Mental Health Nursing (5) Theory and clinical practice related to care of clients whose primary actual or potential health problem is psycho-social or developmental; strong family and community orientation with emphasis on mental health needs of the family. Open only to MSN candidates lacking undergraduate major in nursing; others with consent of instructor. Prereq: All required 2000 and 3000 level nursing courses and 4200; Coreq: 4210. 3 hrs and 2 labs. Sp
4280 Nursing the Child Bearing Family (5) Theory and clinical practice related to care of clients and their families in varying stages of child bearing and child rearing, normal and abnormal states. Open only to MSN candidates lacking undergraduate major in nursing; others with consent of instructor. Prereq: All required 2000 and 3000 level nursing courses. 3 hrs and 2 labs. Sp
4330 Nursing in the Specialties (2-4) Application of principles from behavioral, physical, social and nursing sciences to solution of nursing problems. Exploration of nursing intervention needed to maintain and promote health in selected physiological and/or behavioral deviations. Specific topics to be determined by faculty and students, and approved by the instructor. Prereq: Be repeated with consent of instructor. Maximum 12 hrs.
4350 Oncology Nursing (3) In-depth exploration of the cancer problem, medical and nursing intervention. Relates cellular kinetics to theories of cancer and somatization and crisis states. Prereq: 16 hrs in undergraduate major in nursing; others with consent of instructor. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs. E
5130 Secondary/Tertiary Nursing of Adults I (6) Role of clinical nurse specialist in assisting adults and their families to optimal health; application of advanced nursing, physiological, developmental and psychosocial theories of health and health care. Prereq: 5120, 5300, 5070. 3 hrs and 3 labs. E
5130 Secondary/Tertiary Nursing of Adults II (6) Continuation of 5120 with further exploration of role of clinical nurse specialist; application of theories and concepts to community health needs of adults; emphasis on analysis and utilization of nursing and health related research findings in delivery of health and nursing care. Prereq: 5020, 5120. Prereq or coreq: 5210. 3 hrs and 3 labs. E
5140 Secondary/Tertiary Nursing of Children I (6) Exploration of role of pediatric clinical nurse specialist in assisting children and their families to optimal health; application of advanced nursing, physiological, developmental and psychosocial theories and techniques useful in assisting children and their families who are experiencing acute illness episodes and related crises. Prereq: 5010, 5030, 5070. 3 hrs and 3 labs. E
5140 Secondary/Tertiary Nursing of Children II (6) Continuation of 5140 with emphasis on role of pediatric clinical nurse specialist in group and community health assessment and in client-staff education programs; exploration and utilization of community resources available to children and their families; application of nursing theories and concepts to care of chronically or terminally ill children in various settings. Prereq: 5020, 5140. Prereq or coreq: 5210. 3 hrs and 3 labs. E
5170 Readings in Applied Physiology (3) Carefully planned library study of selected topics in physiology and pathophysiology related to various body systems. Prereq or coreq: 5140. 2 hrs and 1 lab.
5210 Applied Nursing Research (4) Utilization of research process to identify and investigate common nursing problems; critical assessment of nursing research methods and literature; development and critique of nursing research purposes. Prereq: 4440 or equivalent, graduate level statistics course.
5320 Secondary/Tertiary Nursing Field Work II (6) Continuation of 5310 with emphasis on role of advanced clinical nurse specialist in group and community health assessment and in client-staff education programs; development and utilization of theories and concepts included in 5680 as they affect role of nurse as secondary/tertiary clinical specialist. Coreq: 5320. E
5340 Secondary/Tertiary Nursing Seminar (2) Identification of issues and problems involved in delivery of comprehensive care in the selected area of specialization or concentration. Prereq: 5680. 2 hrs and 1 lab. E
5420 Clinical Nursing Practicum and Seminar (8) Advanced clinical nursing practice in acute care settings with opportunities to apply newly acquired nursing knowledge to more complex clinical nursing situations. Prereq: 5120 or 5140. 8 hrs. E
5430 Secondary/Tertiary Nursing Field Work II (6) Continuation of 5310 with emphasis on further acquisition and refinement of nursing skills needed to provide high quality nursing care to acutely ill patients. Prereq: 5310. F
5430 Secondary/Tertiary Nursing Seminar (2) Identification of issues and problems involved in delivery of comprehensive care in the selected area of specialization or concentration. Prereq: 5680. 2 hrs and 1 lab. F
5500 Thesis (1-15) E
5502 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
5510 Applied and Pathophysiology (5) Advanced physiological theories and principles related to normal and abnormal function with particular emphasis on those processes which, when altered, are most commonly encountered in acute and chronic disease states. Prereq: 3210-20 or 4010 or consent of instructor. Su, F, Sp
5530 Current Health Issues (2) Weekly seminar dealing with social, political, legal, religious, ethical, cultural, and community issues, concerns, and actions that have direct or indirect implications for nursing and health care. Prereq: Consent of instructor. Prereq: 5010, 5030, 5070. 4 hrs and 2 labs. E
5540 Family Centered Primary Care Nursing I (6) Primary care nursing and health care management of individuals and families across the life span; client caring stages of development; application of nursing process with emphasis on selected nursing, physiological and psychosocial theories. Prereq: 5010, 5030, 5070. E
5540 Family Centered Primary Care Nursing II (6) Primary care nursing and health care management of individuals and families across the life span, application of theories and concepts included in 5680 as they affect role of nurse as primary care provider. Coreq: 5560. F
5540 Principles of Community Mental Health Nursing (3) Application of nursing process within systems framework, to therapeutic intervention with individuals experiencing mental health problems; study of psychopathological issues; analysis of special clinical problems. Prereq: 5010, 5050, 5070, 2 hrs and 1 lab.
5550 Community Mental Health Nursing: Family (3) Application of nursing process, utilizing communication techniques and theories, to families dealing with problems of individuals experiencing mental health problems; current models of parent education. Prereq: 5200, 5480, Prereq or coreq: 5210. 2 hrs and 1 lab.
5550 Community Mental Health Nursing: Group (3) Study of group leadership as it relates to group processes, utilizing advanced nursing and theoretical knowledge; utilization of leadership strategies in both structured and unstructured group processes. Prereq: 2 hrs and 1 lab.
5560 Community Mental Health Nursing Field Work I (3) Clinical practicum in a community setting providing opportunities to apply mental health nursing knowledge in planned interactions with individuals and groups at primary, secondary and/or tertiary care levels. Community and mental health systems assessment. Prereq: 5550. 8 hrs.
5560 Community Mental Health Nursing Field Work II (3) Clinical practicum for graduate student choosing functional concentration of advanced clinical practice. Objectives identified by student with specific learning and practice needs. Prereq: 5510 and 5530. F
5570 Community Mental Health Nursing Seminar (2) Identification of issues and problems involved in delivery of comprehensive mental health nursing care; further analysis and exploration of theories and concepts included in 5680 as they affect role of nurse as community mental health specialist. Coreq: 5520. Prereq: 5560.
5580 Community Primary Care Nursing Field Work I (6) Placement in a selected off-campus primary health care delivery site for purposes of acquiring newly acquired knowledge and developing clinical skills necessary to function as a nurse practitioner. Prereq: 5050, 5240, 5260. Su
5580 Community Primary Care Nursing Field Work II (9) Continuation of 5580 with further emphasis on acquisition of nurse practitioner skills coupled with ability to function more autonomously. Prereq: 5550. F
5590 Community Health Nursing Seminar (2) Critical analysis of and exploration of theories and concepts included in 5680 as they affect role of nurse as community mental health specialist. Coreq: 5520. Prereq: 5560.
5590 Nursing the Child Bearing Family (5) Theory and practice applied to function more autonomously. Prereq: 6 hrs approved education courses or consent of instructor. 2 hrs and 3 labs. F, Sp
5590 Primary Care Nursing Seminar II (9) Continuation of 5590 with further emphasis on acquisition of nurse practitioner skills coupled with ability to function more autonomously. Prereq: 5550. F
5630 Teaching Strategies and Practicum (5) Analysis and application of curricular and teaching methodologies, case presentation and application of student opportunities to provide both classroom and clinical instruction to undergraduate nursing students. Prereq: 5050 approved education courses or consent of instructor. 2 hrs and 3 labs. F, Sp
5650 Primary Care Nursing Seminar I (6) Placement in selected off-campus primary health care delivery site for purposes of applying newly acquired knowledge and developing clinical skills necessary to function as a primary care provider. Prereq: 5050, 5240, 5260. Su
5650 Primary Care Nursing Seminar II (9) Continuation of 5650 with further emphasis on acquisition of nurse practitioner skills coupled with ability to function more autonomously. Prereq: 5550. F
5670 Teaching Strategies and Practicum (5) Analysis and application of curricular and teaching methodologies, case presentation and application of student opportunities to provide both classroom and clinical instruction to undergraduate nursing students. Prereq: 5050 approved education courses or consent of instructor. 2 hrs and 3 labs. F, Sp
5680 Advanced Nursing Seminar (3) Theories of leadership, motivation, power, conflict, authority, change and decision making and their application to advanced clinical nursing practice. Examination and analysis of role of nurse as health care provider
and client—family advocate. Prereq or coreq: 5310 or 5550 or 5510.

5730 Management Strategies and Practicum (5)
Analysis and application of managerial and supervisory theories and strategies; field placement in nursing service facility with supervised practice in nursing service administration. Prereq: 6 hrs approved management courses or consent of instructor. 2 hrs and 3 labs. Sp

5770 Special Topics (3) In-depth study of selected nursing topics, problems, or issues not covered in other courses. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
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 previous training in biology, calculus, physics, and organic and physical chemistry. However, a course in physical chemistry is offered by the School in order to meet this requirement. It is recommended that deficiencies in meeting entrance requirements should 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 Y, Oak Ridge, Tennessee 37830.

THE DOCTORAL PROGRAM

Requirements for the Ph.D. degree are:

1. Satisfactory (B grade or better) completion of the following core courses or their equivalent: Biochemistry (5110-20); Biophysics (5140); Genetics (5160); Molecular Genetics (5170); Cell Biology (5190-90); Mammalian Physiology (5200); and Statistics for Biologists (5740).

2. Three quarters of Biomedical Sciences Laboratory (5310-20-30-40).

3. Participation in at least one of the seminars during each quarter 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. Pass both written and oral comprehensive examinations.

6. A dissertation reporting the results of original and significant scientific research. A minimum of 36 quarter hours of course 6000 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.

Requirements for the M.S. degree are:

1. Graduate credit or a proficiency in the following core courses: Biochemistry (5110-20); Cell Biology I (5180); Cell Biology II (5180); plus any three of the following four courses: Biophysics (5140); Genetics (5160); Molecular Genetics (5170); and Mammalian Physiology (5200). Additional credits may be obtained (6 to 15 credit hours) with electives. The student will need previous training in biology, calculus, physics, organic and physical chemistry.

2. Forty-five credit hours of approved graduate courses including a minimum of 9 quarter hours for thesis (maximum 18 quarter hours of credit for course 5000).

3. For admission to candidacy: Completion of any required prerequisite courses and one quarter of graduate course work with a B average. Admission to candidacy forms must be filed at least one full quarter prior to receipt of degree.

4. A Master's Committee of three approved faculty members upon admission to candidacy.

5. A thesis reporting results of original and significant scientific research.

6. A final oral (or oral and written) examination as determined by the student’s committee.

Full-Time Faculty

Professors: D. Billen, Ph.D. Tennessee; D. E. Olins, Ph.D. Rockefeller.

Associate Professor: F. H. Gaertner, Ph.D. Purdue.

Assistant Professor: N. W. Revis, Ph.D. Glasgow (Scotland).
force, surface chemistry, electrolyte solutions, kinetics, conductance, viscosity, diffusion.


5140 Biophysics (3) Energy levels and excited states of large molecules; optical instrumentation; adaptations to system perturbations; properties of macromolecules and nuclei of biological systems; quantum mechanical principles of inter- and intramolecular forces; physical principles of microscopy. Prereq: 5070-80.

5150 General Genetics (3) Mendelian genetics, mitosis, and meiosis. Transmission genetics, mapping, and linkage.


5170 Molecular Genetics (3) Molecular biology of genetic processes. Gene regulation; coding; protein synthesis; suppression of missense and nonsense mutations; mutagen mechanisms; complementation; recombination. Coreq: 5180.

5180 Cell Biology I (3) Structure and composition of major nuclear and cytoplasmic organelles of eucaryotic cells. Pertinent instruments and techniques; chromosomes; cytoplasmic structure; nuclear genome; RNA metabolism; nucleus; ribosome biogenesis; survey of specialized cells. Structural, chemical, and genetic transcription and translation in bacteria. Coreq: 5110.


5200 Mammalian Physiology (4) Mammalian organ systems and their functions. Nervous, muscular, endocrine, digestive, respiratory, circulatory, reproducti, and excretory systems; interrelationships of these systems and fundamental importance of integration in contemporary physiological research. Prereq: 5190.

5230 Biochemical Concepts in Medical Sciences (3) Biochemical mechanisms involved in physiological conditions and pathological processes of human body; human functions of organ systems, biochemical pharmacology; hormone actions; neurobiochemistry. Current biochemical advances in basic and clinical medicine. Prereq: 5220, 5110-20.

5210-20 Medical Sciences Laboratory (3) To acquaint students with both approaches and technologies in various areas of modern biology. Students spend a quarter in each of three or four laboratories conducting research in different areas of biomedical science. Required of all first-year students.

5350-60 Biomedical Sciences Seminar (1, 1) Critical analyses of current journal publications in selected area of modern biology. Written evaluation of papers and weekly oral presentations by each student. Required of all first-year students.

5270 Biomedical Sciences Seminar (1) Basic principles of scientific methods, critical, objective thinking, and thesis proposals, abstracts, review articles, progress reports. Required of all first-year students.

5430-60 90 Graduate Research Participation (3, 8) 9 Special advanced research project covering area not related to dissertation research. Topics chosen with consent of instructor. May be repeated.

5410-30 40 Special Topics in Biomedical Sciences (4) 4 Specialized course, given during special seminar or workshop, with emphasis on subject not covered in regular curriculum. Prerequisite: Consent of instructor. May be repeated.

5450-60 90 Graduate Research Participation (3, 8) 9 Special advanced research project covering area not related to dissertation research. Topics chosen with consent of instructor. May be repeated.
and metabolism of chemical carcinogens. Radiation and site-specific carcinogenesis.
6300 Mutagenesis (3) Basic mechanisms in chemical and radiation mutagenesis and dosimetry in variety of systems including bacteria, fungi, Drosophila, and mice.
6400 Membrane Biology (3) Transport kinetics, membrane biogenesis and turnover, endocytosis and exocytosis, receptor regulation, hormone-membrane biogenesis interactions. Prereq: 5110-20 and 5180-90 or consent of instructor.
6410 Techniques in Cell Biology (3) Application to specific research problems, kind of data they yield, and cautions in data interpretation. Laboratory demonstrations may be arranged where appropriate. Prereq: 5180-90 or consent of instructor.
6450 Immunology (3) Structured lectures in modern immunology and emphasis on concepts and mechanisms at the cellular level. Topics: T-B cell interaction, soluble mediators, tolerance, surveillance, transportation genetics, immunoglobulin structure. Selected laboratory exercises. Prereq: 5180-90 or consent of instructor.
6510-20-30-40 Advanced Topics in Biomedical Sciences (3, 3, 3, 3) Current and future research developments. Topics listed under Special Topics Courses, can be taken either as tutorials or as literature survey courses requiring substantial student participation. May be repeated.
6600 Mammalian Genetics (3) Orderly presentation of known genetics variants affecting each organ system of experimental mammals, especially laboratory mouse. Prereq: 5160.
6610 Mammalian Biochemical Genetics (3) Combined biochemical and genetic approaches to problems of immunology, globin synthesis, and control of enzyme synthesis. Prereq: 5110-20 and 5160 or consent of instructor.
6650 Microbial Genetics (3) Basic phenomena in microbial genetics: transduction, transformation, conjugation, and mutation. Genetics of bacteriophage. Prereq: 5160 or consent of instructor.
6750 Regulation of Intermediary Metabolism (3) Pathways involved in intermediary metabolism. Steady-state processes, "nonequilibrium" reactions, first enzymes, feedback inhibition, isozymes, multienzyme systems and compartmentation, covalent modification, positive and negative control, catabolite, repression, autoregulation, stringent control, attenuation, hormonal control, other selected topics. Prereq: 5110-20 or consent of instructor.
Graduate School of Library and Information Science

Ann E. Prentice, Director

MAJOR DEGREE
Library Science M.S.L.S.

The Graduate School of Library and Information Science provides a library education program leading to the preparation of librarians for work in all types of libraries. The programs of study of this School include the graduate curriculum leading to the degree of Master of Science in Library Science.

MASTER OF SCIENCE IN LIBRARY SCIENCE

The goal of the program is to prepare graduates to function effectively in libraries and information centers. The program is designed to:

1. Enable students to examine critically the role and function of libraries and information centers in our society, and to define and redefine that role as the needs of society demand;
2. Enable students to understand and use the concepts and procedures related to the selection, acquisition, organization, and dissemination of knowledge;
3. Enable students to understand and apply the principles of management to the library and information center;
4. Enable students to assume individual and collective responsibility for the well-being and development of their profession and of professional service;
5. Enable students to make informed assessments and decisions regarding various career opportunities in libraries and information centers.

PROGRAMS OF INSTRUCTION

The program leading to the degree of Master of Science in Library Science involves a total of 51 quarter hours of graduate courses, 21 hours of which form a core curriculum required of all students. Either a thesis or a non-thesis program is available, with 9 hours allowed for thesis credit. At least 36 hours must be taken in the Graduate School of Library and Information Science, allowing up to 15 hours outside the School. Upon completion of the program, all students are subject to an 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. Programs are designed for persons interested in school libraries, public libraries, academic libraries, special libraries and information centers as well as a variety of library and information related activities.

The SREB Academic Common Market applies to applicants from Arkansas, Georgia, West Virginia, and Virginia.

ADMISSION REQUIREMENTS

The minimum grade point average for admission to the Graduate School is 2.5. Candidates who have at least a 3.0 average in the junior and senior years will receive first consideration. Applicants are required to take the aptitude test of the Graduate Record Examination. The test should be taken at least one quarter in advance of application for admission to the Graduate School.

Foreign applicants are required to take the Test of English as a Foreign Language.

APPLICATION PROCEDURE

Admission to the programs in the Graduate School of Library and Information Science should be made in advance of the quarter for which admission is requested. Applicants should submit the "Application for Admission" form (printed as the first page of the Graduate School Catalog) and should request the registrars of all colleges and universities attended to send two official transcripts to the Graduate School. In addition, each applicant should make arrangements to take the GRE and TOEFL exams, if applicable. 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.

FINANCIAL ASSISTANCE OPPORTUNITIES

Employment with the University of Tennessee Libraries may provide a work-study opportunity for selected students who wish to obtain experience in academic librarianship while pursuing the degree. Such students usually work at least 20 hours each week and thus extend the period required for the degree up to two years.

Similar opportunities exist with some other libraries in the Knoxville area. A limited number of graduate assistantships are available through the School for the degree. 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.

Information on financial assistance is available from the Director of the Graduate School of Library and Information Science.

Faculty

J. W. Wilcox, Ph.D. Michigan.
Assistant Professors: J. M. Pemberton, Ph.D. Tennessee; G. M. Slinkanks, Ph.D. Pittsburgh; M. S. Stephenson, M.L.S. North Texas State.

Courses

4140 Libraries and Librarianship (3) Librarianship as an occupation: its organization, responsibilities, problems and prospects.
4150 School Library Administration (3) Objectives, functions, and place of school library; relationship to local and state services; cooperative planning for quarters and materials; evaluation. (Same as Curriculum and Instruction 4150.)
4270 Organization of Library Collections (6) Acquisitions, cataloging and maintenance of library collections.
4330 Introduction to Reference Materials (3) Basic information sources and services for all libraries.
4750 Utilization of Instructional Media (3) (Same as Curriculum and Instruction 4750 and Vocational-Technical Education 4750.)
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student
5119-20-30 Problems in Library Science (3, 3, 3) May be repeated with consent of school.
5140 Research Methods in Library Science (3) Research methods applicable to librarianship. Process and conduct of research; analysis of published research.
5200 Subject Reference and Bibliography (3) General patterns of bibliographical organization and basic information sources in subject fields including non-English materials; experiences in bibliographic methods and search techniques. Prereq: 4330.
5210 Sources and Services for the Social Sciences (3) English and non-English literature and bibliographical sources in education, economics, political science, history, geography, anthropology, psychology, and sociology; organization of collections for optimum use. Prereq: 5200.
5220 Sources and Services for the Natural Sciences (3) English and non-English literature and bibliographical sources in mathematics, physics, astronomy, chemistry, geology, biology and medicine; organization of collections for optimum use. Prereq: 5200.
5230 Sources and Services for the Humanities (3) English and non-English literature and bibliographical sources in literature and language, fine arts, music, philosophy and religion; organization of collections for optimum use. Prereq: 5200.
5240 Organization of Library Collections II (3) Construction and maintenance of library catalog as retrieval instrument; indexing and subject analysis theory, comparative classification with emphasis on Library of Congress system, and problems in reclassification. Prereq: 4270.
5260 Government Publications II (3) Acquisition, organization and utilization of publications of foreign governments and international organizations such as United Nations, UNESCO, and others.
5270 Legal Bibliography (3) Introduction to literature of Anglo-American jurisprudence. Use of reports, statutes, administrative regulations and decisions, treatises, periodicals, and indexes as bibliographic tools.
5300 Library Management (3) Management and organization concepts applicable to libraries and librarians.
5310 Multitype Systems and Networks (3) Organization, structure, governance, planning, evaluation, and services in state, regional, national, and international networking of information.
5330 Academic Libraries (3) Persistent and current problems. Topics vary depending upon needs and interests of group.
5350 School Libraries (3) Persistent and current problems. Topics vary depending upon needs and interests of group. Prereq: 4150 or consent of instructor.
5360 Special Libraries and Information Centers (3) Development and present status, scope and objectives, administration and organizational problems, acquisition, organization, and use of information.
5370 The Library in the Community (3) Public library as social agency; role in education and communication systems of community.
5380 Seminar in Library and Information Science (3) Advanced study of varying topics. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
5400 Library Facilities (3) Problems inherent in planning and construction of library quarters; inter-relationship of staff, materials, and user space requirements.
5510 Multimedia Resources of Libraries (3) Selection, acquisition, processing, storing, and servicing non-book materials, with special attention to films, recordings, microforms, photo-copying.
5520 History of Books and Printing (3) Development of alphabet and writing; early writing materials; book in manuscript; history and technique of printing; book illustration and binding; standards of modern fine printing.
5530 Contemporary Publishing (3) Creation, production, marketing, and distribution of materials acquired by libraries, with special attention to various types of publishers.
5540 Special Collections—Archives and Rare Books (3) Problems involved in acquisition, organization, housing, preservation and utilization of rare books and archival materials.
5550 Records Management for Information Professionals (3) Functional elements and objectives of records management within organizations, emphasizing control of creation, distribution, retention, storage, retrieval, protection, and disposition regardless of medium. Prereq: 4330, 4270 or consent of instructor.
5600 Reading Guidance for Children and Young People (3) Organization to meet needs, interests, abilities of different age and socioeconomic groups. Prereq: 5640 or consent of instructor.
5610 Mass Communications and the Library (3) Mass media of communication in terms of their relation to modern library service, considered as forces that influence what people read, see, and hear.
5620 Traditional Literature and Oral Narration (3) Fundamental principles of art storytelling; techniques of adaptation and presentation for various age groups; instruction and practice in oral techniques.
5630 Critical History of Children's Literature I (3) Development of literature for children noting influence of changing social and cultural factors; attention to emerging genres through primary sources. Fifteenth century to 1920.
5640 Critical History of Children's Literature II (3) Development of literature for children noting influence of changing social and cultural factors; attention to emerging genres through primary sources. 1920 to present.
5691 Advanced Production of Audiovisual Software (3) (Same as Curriculum and Instruction 5691.)
5700 Automation of Library Processes (3) Analysis of application of data processing methods to basic library operations such as bibliographic control, technical processes, circulation control, and management functions.
5710 Introduction to Information Science (3) Content and method of information science; application of research findings to general library practice.
5720 Information Systems Analysis and Design (3) Elements in design and operation of information retrieval systems, including acquisition, indexing vocabularies, information representation, file organization, search procedures, and system evaluation.
5730 Information Retrieval Systems Laboratory (3) Comparative capabilities of various types of information retrieval systems; analyzing performance of systems to arrive at generalizations with respect to theory, design and operation of information retrieval systems.
5999 Practicum (6 or 9 or 12) Opportunity to translate library theory into practice under guidance of qualified librarians. Prereq: Completion of 21-hr core curriculum plus approval of director.
The Graduate School of Planning offers a two-year graduate course leading to a degree of Master of Science in Planning with concentrations in land use, transportation, environmental, regional, administrative, health, and historic preservation planning.

The purpose of study is the education of professional planners, competent to handle positions of increasing technical and administrative responsibility. Graduates are candidates for professional service in regional, city, county, and metropolitan area planning agencies; in local, state, and federal agencies concerned with physical, economic and administrative planning; in private businesses and organizations dealing with urban problems; and in private consulting practices.

The curriculum is organized on a basis of six quarters, or 72 credit hours, and provides the student with core courses in planning theory, methods and techniques, and also takes advantage of offerings at The University of Tennessee in related fields such as government, economics, geography, civil engineering, and sociology.

The course of study ordinarily requires two years with an optional work internship during the summer between the two years. Planning courses as well as related courses will be offered during the summer period. This is to serve the needs of those planners now in the field who wish to acquire their professional degree but who can spare only the minimum amount of time from their jobs because of financial or family considerations.

Entering students follow a program of courses which provides education in the basic elements of planning. These include studies in theory, history, analytical methods, and legislation, as well as related courses in government, geography, sociology, and economics. Students are permitted to pursue particular interests through the choice of electives approved by the Graduate School Planning.

Core planning courses are taught by the faculty of the Graduate School of Planning. Related courses are taught by other specialists drawn from the University faculty. In addition, the services of experienced professional planners in TVA and other public and private organizations are called upon to broaden the scope of the students' understanding. A variety of outside speakers and seminar leaders provide insight into particular problems of significance to planners.

ADMISSION PROCEDURES

All applicants should submit two letters of recommendation with their applications. Both letters should be from teachers familiar with the applicant's undergraduate or, where applicable, graduate academic record. In the event the applicant has had planning experience, a third letter is required from a supervisor or other person familiar with the planning work of the applicant. All applicants who wish to be considered for financial assistance from the University or the Graduate School of Planning should also submit recent Graduate Record Examination scores for the Aptitude (verbal, quantitative and analytical) portion of that test. All applicants are also requested to submit a statement of career goals.

The M.S.P. degree is approved for SREB Academic Common Market participation in Arkansas, Georgia, Kentucky, and West Virginia.

All inquiries concerning admission should be addressed to: Director, Graduate School of Planning, The University of Tennessee, Knoxville, Tennessee 37916.

DEGREE REQUIREMENTS

Each student will be required to complete a minimum of 72 hours credit.

The following courses are the required core curriculum for the M.S.P. degree: 5040, 5045, 5100, 5110, 5130, 5180, 5230, 5270, 5280, 5340, 5435, 5440, 5465, 5500, Sociology 5320 or Statistics 5211. Waivers can be made by the faculty where competence is demonstrated. Each student will be required to demonstrate competence in individual research. This may take either of two forms.

Plan I—Complete a thesis for 9 hours credit.

Plan II—Complete a major study with acceptable documentation. In order to be eligible for the major study the student must have earned a grade of B+ or higher in Research Methods II, have a 3.5 cumulative grade point at the time of approval of the major study proposal, and have completed at least 24 hours of graduate study. The student meeting these criteria may present a proposal for a major study which will include at least 9 hours of elective course work in an area of concentration. The proposal shall justify the area of study, the approach to the study, and the method of final documentation. Approval of the documentation, which must include written documentation, is a prerequisite for graduation.

Students in the Graduate School of Planning are given a comprehensive written examination after approximately four quarters of course work. In addition to testing the knowledge of the student, the information thus obtained is taken into account in advising students concerning the study program they should undertake during the balance of their academic program to remove any indicated deficiencies.

Each student will be encouraged, but not required, to complete a work internship equivalent to at least two and one-half months of full-time work in a planning agency at approximately the mid-point in course work.

Faculty


Associate Professor: G. E. Bowen, M.A. George Washington.

Assistant Professors: E. Cole, M.S.P. Tennessee; P. Fisher, Ph.D. Florida State; M. Kersey, B.L.A. Georgia; A. Loebl, Ph.D. Missouri; J. G. Stoloff, M.S.P. Hunter.
Courses

5100 Survey of Planning (3) History of city development and of planning with special attention to the U.S. experience in urban and other levels of planning. State of the art, the process, the comprehensive plan, implementation devices. Planning issues in society. Not for credit for M.S.P. degree. F

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

5005 The Planning Process (3) Identification and examination of generic aspects of planning process and planning techniques applied in variety of settings. Not for credit for M.S.P. degree. F, Su

5040 Communications for Planners I (1) Introduction to basic communications, interpersonal and oral communications, graphic presentations, audiovisual equipment. F, Su

5045 Communications for Planners II (1) Graphic communications in planning. Map and computer graphics, models and presentation graphics. Prereq: 5040. W

5050 Communication for Planners III (1) Audio-visual equipment, programmed communication and photography used in planning. Prereq: 5045. Sp

5100 Theory of Planning (3) Analysis of nature and objectives of planning process; role of planner and planning function in public decision-making. Prereq: 5110. W

5110 Introduction to Planning (3) History of planning, familiarization with operations of contemporary planning, concept of systems, current trends and issues. Relationship between planning and society in which it occurs. Designed for GSP students. F, Su

5130 Planning Research Methods I (2) Research techniques in subject areas associated with city and regional planning. Research tools, data collection and analysis as basis for planning and decision-making, F, Su

5135 Planning Research Methods II (3) Application of rigorous investigation techniques in solving planning problems, including statistical analysis and mathematical models. Urban and regional information systems as resource and tool in problem identification and solution. Prereq: 5130. W

5145 Library Research for Planning (1) Survey of publications of interest to planners, including sources and research techniques. Use of facilities and collections of UTK library. F, W

5160 Planning Capstone (3) (Same as Environmental Engineering 5160). W

5170 Planning for Historic Preservation (3) Planning for preservation, restoration and conservation of historic buildings, areas and sites as related to comprehensive planning process. National, state, and local government role in preservation, designation of sites, legislative needs, financing and administrative organization. W

5180 Planning Analysis and Forecasting (3) Methods of quantitative analysis and modeling in urban and regional studies. Population, employment, and economic base studies with emphasis on forecasting techniques. Prereq: 5130. W

5230 Urban and Site Design (3) Principles of design of residential subdivisions and some components of physical community such as shopping centers, institutional complexes, central business districts. Problems of reviewing alternative designs against each other or written regulations. Extensive laboratory experience. E

5235 Urban and Site Design II (3-6) Prereq: 5230. W

5270 Planning and Transportation (3) (Same as Civil Engineering 5270.) W

5390 Planning Methods (5) Tooling up studies; methods for preparation of land use and public facility elements of comprehensive development plans, including visual aspects. Prereq: 5180. Sp

5390 Regional Planning (3) Making planning process operative in intergovernmental context. Theories of regions and analysis of metro planning, area planning, regional planning by states, single-purpose agency planning, and TVA. Prereq: 5100

5310 State Planning (3) Evolution of planning function in state government, with emphasis on institutional environment in which planning occurs. Context and scope of state planning, and relationships with other branches of state government. Prereq: 5100.

5340 Implementation (3) Policy formulation, information systems, taxation, capital improvement programming, and other aspects of plan implementation. Programming public actions to affect development. Prereq: 5440. Su, F

5360 New Towns (2) Historical development of planned new towns and implications for national urbanization policy in United States; process by which new towns are created, from establishment of objectives to administration of development process and provision of public services; organizational alternatives for new town planning, development and management in context of past experience and future objectives. Prereq: 5110 and consent of instructor.

5370 Housing (3) Nature and demand for housing in U.S. and abroad with emphasis on U.S. experience. Private market processes and public influences. Problems of change in housing supply, impact of new technology, and governmental programs to improve supply and quality of housing. Coreq: 5110 or consent of instructor.

5390 Futures (3) Alternative futures and their implications for future living patterns and community planning. Techniques of futures research.

5410-20-30 Special Topics in Planning (1-3, 1-3, 1-3) Lecture, group discussion, and individual research and study on specialized topics in planning not covered in depth in other courses. May be repeated. Prereq: Consent of instructor. E

5435 Planning and Government (3) Governmental context within which planning occurs. Policy making as public process. Planning structures, powers, and policies. F

5440 Planning and Land Use Controls (4) Legal basis for planning and guiding community development. Exercise of police power and eminent domain. Development and administration of zoning, subdivision controls, and related devices. Prereq: 5435. Sp

5455 Urban Revitalization (3) Goals, principles and strategies for restoring and revitalizing cities. Review and analysis of historic, current, and proposed public and private programs aimed at urban revitalization. Physical building and restoration activities as related to financial and administrative requirements. Relationship between construction oriented activities and economic and social development programs is emphasized. Prereq: 5110 or consent of instructor.

5460 Planning Administration (2) Planning agency management, program development, and agency finance. Prereq: 5455.

5465 Planning and Property Development (3) Process of urban physical growth and change with emphasis on functioning of private sector real estate development and its relationship to planning. Partnership roles of public and private sectors in urban development and redevelopment. Prereq: 5440.

5500 Synthesis (9) Problem-oriented experience to integrate knowledge from previous courses. Interrelationships stressed; student required to use judgment in evaluation and creation of plans and policies addressed to real world situations. Extensive laboratory experience. Prereq: Required planning courses or consent of faculty. F, W

5670 Social Planning (2-3) Theory, philosophy and implications of programs for planned social change. Consideration of major social planning issues in diverse fields of service; aging, corrections, education, health, social services. Prereq: Consent of instructor. (Same as Social Work 5670.)
The University of Tennessee School of Social Work is a fully accredited two-year graduate professional school, with a program (thesis or non-thesis option) leading to the degree of Master of Science in Social Work. The full two-year curriculum is offered in all three branch locations.

**GRADUATE PROFESSIONAL EDUCATION**

The School of Social Work has as its primary objective the education and training of persons for leadership in the social welfare profession and the social work practice community. Leadership roles include positions in social welfare administration, social planning and policy development, and positions as treatment team leaders, supervisors, consultants, and expert practitioners.

Central to professional leadership are a commitment to the values and goals of the profession and a developed capacity for self-awareness and self-discipline. The experience of a graduate professional education builds commitment, and the School's program guides students into independent, analytical thought and prepares them to use their skills and knowledge to effective purpose.

The School of Social Work recognizes and enjoys the challenge of cultural pluralism in society and encourages applications for admission from minority group members. Through the planned inclusion of significant and pertinent racial and ethnic content in the curriculum, the School provides students with the educational background needed to take creative roles in the social work profession's efforts toward the elimination of racism and such other social ills as poverty, crime, neglect, and social injustice.

A special bulletin describing the facilities, admission, fees, and degree requirements is obtainable from The School of Social Work, 2014 Lake Avenue, Knoxville, Tennessee 37916.

**AREAS OF PROFESSIONAL PRACTICE**

Specializations within the School's curriculum prepare students for social work careers in such practice fields as criminal and juvenile justice systems; family and child welfare services in public and voluntary agencies; group services in neighborhood and community centers; health services; mental retardation; public welfare services; mental health services; manpower training programs; governmental and voluntary human services planning agencies; rehabilitation services; school social work; and social gerontology.

**THE PROFESSIONAL CURRICULUM**

The School of Social Work's curriculum is designed to provide the student with the basic components of professional competence through a progression of course work and supervised practice experience. Students may elect a thesis or non-thesis option. The two-year, six-quarter program includes a core curriculum, a specialization in one of two areas—social work treatment or social welfare administration and planning—and concurrent field practice.

**The Core Curriculum**

The core curriculum is offered during the first two quarters of the first year and is required of all students. It is a 30-quarter-hour sequence of five basic courses. As the initial phase of the School's educational program, the core curriculum contributes to the process of socialization and professional identification, and presents students with a comprehensive and broad knowledge base from which to operate in the future as practitioners and administrators.

**Fall Quarter, First Year**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
<td>5070 Social Work Research I</td>
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**Winter Quarter, First Year**

<table>
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<th>Course Title</th>
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<tr>
<td>5910 Field Practice</td>
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<tr>
<td>5110 Social Welfare Policy and Services I</td>
<td>3</td>
</tr>
<tr>
<td>5210 Human Behavior and Social Environment I</td>
<td>3</td>
</tr>
<tr>
<td>5410 Social Work Practice I</td>
<td>3</td>
</tr>
<tr>
<td>5910 Field Practice</td>
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**Spring Quarter, First Year**

<table>
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<tr>
<th>Course Title</th>
<th>Credit Hours</th>
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<td>5420 Social Work Practice II</td>
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<td>5220 Human Behavior and Social Environment II</td>
<td>3</td>
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<tr>
<td>5420 Social Work Practice II</td>
<td>3</td>
</tr>
<tr>
<td>5940 Field Practice</td>
<td>4</td>
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</tbody>
</table>

**The Specialization**

The curriculum outlined below for the spring quarter, first year, and for the second year shows typical programs for students after they have completed the core curriculum. A student may earn 9 hours of elective credit through completion of a Master's thesis.

**Spring Quarter, First Year**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
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<tr>
<td>5920 Field Practice</td>
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<tr>
<td>5420 Social Work Practice II</td>
<td>3</td>
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<tr>
<td>Specialization Courses and Electives</td>
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<td>TOTAL QUARTER HOURS</td>
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**Fall Quarter, Second Year**

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<thead>
<tr>
<th>Course Title</th>
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<tr>
<td>5940 Field Practice</td>
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<tr>
<td>Specialization Courses and Electives</td>
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<tr>
<td>TOTAL QUARTER HOURS</td>
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**Winter Quarter, Second Year**

<table>
<thead>
<tr>
<th>Course Title</th>
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<tbody>
<tr>
<td>5950 Field Practice</td>
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<tr>
<td>Specialization Courses and Electives</td>
<td>2 or 3</td>
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<tr>
<td>TOTAL QUARTER HOURS</td>
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**Spring Quarter, Second Year**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>5950 Field Practice</td>
<td>8</td>
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<tr>
<td>One Elective</td>
<td>2 or 3</td>
</tr>
<tr>
<td>TOTAL QUARTER HOURS</td>
<td>12 or 13</td>
</tr>
</tbody>
</table>

**AREAS OF SPECIALIZATION**

**Social Work Treatment**

Social work treatment deals with those individual, family, and group methods utilized to enhance the social functioning of individuals and effectively ameliorate problems of social dysfunction. The specialization attempts to develop a thorough
knowledge of the theory and methodology basic to varied individual, family, and group methods applicable in the treatment of diverse client problems.

Social Welfare Administration and Planning

Social welfare administration and planning deals with the design, implementation, and continued operation of effective programs for client service. Specifically, the method deals with assessment of client characteristics, development of environmental resources, design of effective organizational structures, management, staff development, program evaluation, social planning, neighborhood and community development, financing, and coordination of services.

Field Practice

Field practice is a critical component of the student’s first- and second-year program. Because the School of Social Work cooperates with a wide range of social agencies, the application of knowledge gained in the classroom courses is a primary concern. In the first semester, students are introduced to the school's social work program and the field practice component, or have two years' work which included a supervised field work component, or have two years full-time practice in the field of social work.

ADMISSION REQUIREMENTS

Admission to the professional curriculum is based on the following requirements:

1. A Bachelor's degree from an accredited college or university with a major in social work or related field.

2. A grade point average of 2.5 on a 4.0 scale in undergraduate work.

3. Completion of required courses in psychology, sociology, and economics.

4. A demonstrated understanding of social work values and practice methods.

5. Evidence of maturity, motivation, and commitment to the field of social work.

6. Evidence of the ability to work well with others.

7. Evidence of participation in extracurricular activities.

8. Evidence of leadership ability.


The completed University of Tennessee Graduate School and Admissions Office immediately after filing the Graduate School Application.

The completed University of Tennessee School of Social Work Application for admission should be sent to the Graduate School Office immediately after filing the Graduate School Application.

The completed University of Tennessee School of Social Work Application for admission should be sent to the Admissions Office of the School of Social Work.

If a personal interview is required by the School, the applicant will be contacted by a representative of the School and arrangements will be made concerning a time and place. Applicants who wish to may also request a personal interview with a faculty member.

ACCELERATED PROGRAM

The University of Tennessee School of Social Work has a special accelerated program which enables eligible candidates to complete the M.S.S.W. degree in four quarters. This Accelerated Program is approved by the Council on Social Work Education.

Students who qualify for the Accelerated Program must:

1. Have maintained a 3.0 or above grade point average (on a 4.0 scale) in undergraduate work.

2. Have an undergraduate major in social work included a supervised field practice component, or have two years full-time practice in the field of social work.

3. Pass a qualifying examination administered by the School of Social Work faculty in early spring.

The accelerated programs begin either in the Memphis Branch in March or in the Nashville Branch in June with an intensive ten-week term from which students proceed in the fall into the regular second-year curriculum. Application for admission to the accelerated program is through the regular admission process. Applications should be filed not later than December 31 for the Memphis program and not later than January 31 for the Nashville program.

PART-TIME STUDENTS

Courses in the regular curriculum of the School are open to persons who meet the admission requirements for full-time study and who are planning to complete the work for the degree within the next two or three years. Application should be made to the School in the regular way, but the applicant should inform the Director of Admissions of the wish to begin part-time study on a planned basis.

TRANSFER CREDITS

Courses completed in another accredited school of social work are usually accepted for The University of Tennessee School of Social Work degree requirement providing the applicants meet the admission requirements of the Graduate School and The University of Tennessee School of Social Work, and if previous courses are equivalent to required or elective courses offered here. The University of Tennessee School of Social Work allows a maximum of 30 credit hours of graduate course work taken at another accredited institution to be transferred into the student's Master's program. Such work must have been taken for graduate resident credit and passed with a grade of 'B' or better. In addition, it must be part of an otherwise
satisfactory graduate program (B average) and be approved by the branch director and the dean. This course work must be completed within the six-year period prior to the receipt of the degree. In addition, S/NC credit earned for the field practicum is also acceptable.

Graduate students majoring in fields other than social work are admitted to certain social work courses with the approval of the School of Social Work and the student's major professor.

Faculty


Important information on students majoring in fields other than social work are admitted to certain social work courses with the approval of the School of Social Work and the student's major professor.

Courses

5000 Thesis (1-16) E

5002 Non-Thesis Graduation Completion 3-15 E

5003 Non-Thesis Graduation Completion 3-15 E

5070 Social Work Research I (2) Research methodology as applied to social work in assessing social problems. Independent work in assessing mental health. Prereq: Completion of core or consent of instructor.

5082 Practicum in Social Work Research (3-9) Supervised practice in application of research methods and tools to social welfare program. Prereq: Completion of core or consent of instructor. May be repeated. F, W, Sp

5110 Social Welfare Policy and Services I (3)Examination of theories pertaining to social work function and their relationship to social welfare function and their relationship to social work. Prereq: Completion of core or consent of instructor.

5120 Social Welfare Policy and Services II (3) Examination of theories of complex organizations applied to social services delivery setting. Prereq: Completion of core or consent of instructor. May be repeated. F, W, Sp

5130 Social Policy Analysis (2-3) "Policy science" techniques are considered for appropriateness in assessing social, political, and economic implications of social policy proposals. Prereq: Completion of core or consent of instructor.

5140 Social Welfare Research Seminar (2-3) Problem area or field of practice seminar focusing on substantive knowledge about social problem or condition and interrelationships among problem definition, social policy, and research design and methodology. Prereq: Completion of core or consent of instructor. May be repeated. F, W, Sp

5160 Human Behavior and Social Environment I and II (3, 3) Examination of theories pertaining to individual, family, and small group within context of functions and processes. Behavior of systems conceptualized along functional-functional and non-functional-organizational continua. Organization in context of development and maturation, adaptive and defensive mechanisms. Open system approach used to understand interactional behavior between individuals and groups. Prereq: Completion of core or consent of instructor.

5210-20 Human Behavior and Social Environment I and II (3, 3) Examination of theories pertaining to individual, family, and small group within context of functions and processes. Behavior of systems conceptualized along functional-functional and non-functional-organizational continua. Organization in context of development and maturation, adaptive and defensive mechanisms. Open system approach used to understand interactional behavior between individuals and groups. Prereq: Completion of core or consent of instructor.

5250 Special Acceleration Program in Social Work (3) Prereq: Completion of core or consent of instructor.

5300 Social Work Research II (2) Continuation of Social Work Research I. W

5301 Advanced Research Course Topics include sociopolitical and organizational context of evaluative research, research design and methodology appropriate to evaluative research, and utilization of research findings. Prereq: Completion of core or consent of instructor.

5308 Practicum in Social Work Research (3-9) Supervised practice in application of research methods and tools to social welfare program. Prereq: Completion of core or consent of instructor. May be repeated. F, W, Sp

5575 Comparative Methods of Group Treatment (2-3) Approaches to social work skill in teaching of interpersonal communication and group theory. Prereq: Completion of core or consent of instructor.

5580 Special Topics in Social Work (2-3) Advanced topics in social work practice. Prereq: Completion of core or consent of instructor.

5590 Special Topics in Social Work (2-3) Advanced topics in social work practice. Prereq: Completion of core or consent of instructor.

5680 Social Work Treatment with Individuals and Families (3) Social work practice as method of social work practice and as form of interpersonal treatment. Prereq: Completion of core or consent of instructor.

5712 Psychopathology and Social Deviance I (3) Theories of and current research in etiology of personality dysfunction and social variance. Categorical approach to psychopathology examined and differentiated from other approaches to human behavior. Prereq: Completion of core or consent of instructor.

5713 Deviant Behavior of Children and Youth (3-3) Deviant behavior and conduct disorders in children and youth, etiology, symptomatology, and rate of social services interventions. Prereq: Completion of core or consent of instructor.

5714 Comparative Theories of Personality (2-3) Those personality theories with most relevance for social work practice with individuals, groups, or families. Prereq: Completion of core or consent of instructor.

5715 Human Sexual Problems (3) Desensitization and resensitization of personal and social attitudes toward human sexuality, clinical problems and approaches to make social workers better able to deal with clients sexual problems. Prereq: Completion of core or consent of instructor.

5731 Mental Health and Education (3) Work as major life task and value, attitudes toward work, patterns of employment, social support systems, teaching technologies on individual and community, interdisciplinary of individual and organization, meaning of work in assessment of students. Prereq: Completion of core or consent of instructor.

5740 Social Work Practice I (3) Basic theory, values and beginning skills development generic to social work interventions. Prereq: Completion of core or consent of instructor.

5741 Social Work Practice II (3) Assessment, planning, methodology and skills development fundamental to social work intervention. Prereq: Completion of core or consent of instructor.

5820 Human Behavior and Social Environment I and II (3, 3) Examination of theories pertaining to individual, family, and small group within context of functions and processes. Behavior of systems conceptualized along functional-functional and non-functional-organizational continua. Organization in context of development and maturation, adaptive and defensive mechanisms. Open system approach used to understand interactional behavior between individuals and groups. Prereq: Completion of core or consent of instructor.

5840 Social Work Practice I (3) Basic theory, values and beginning skills development generic to social work interventions. Prereq: Completion of core or consent of instructor.

5841 Social Work Practice II (3) Assessment, planning, methodology and skills development fundamental to social work intervention. Prereq: Completion of core or consent of instructor.

5851 Interpersonal Skill Development (3-3) Training group employed to enhance interpersonal competence in application of human relations skills in social work practice. Prereq: Completion of core or consent of instructor.

5852 Comparative Methods of Group Treatment (2-3) Comparative and critical review of methods and approaches for interpersonal group treatment. Prereq: Completion of core or consent of instructor.
5601 Social Work in Rural Communities (2-3) Characteristics of rural populations and rural community organizations. History of rural social services and delivery systems. Development of social work generalist concept and occupational function in rural areas. Prereq: Completion of core or consent of instructor. W

5681 Community Organization (2-3) Using behavioral and social science knowledge about communities and organizations to assist in development of resources to meet human needs. Prereq: Completion of core or consent of instructor. W

5670 Social Planning (2-3) Same as Planning 5670. F

5671 Planning and Management of Change in Social Welfare (2-3) Theories and models of change such as planned change, conflict, and evolutionary change in relation to organizational change, community improvement, locality development, and economic development related to social welfare services. Prereq: Completion of core or consent of instructor. W

5701 Administration in Social Work (2-3) Introduction to administrative practice as it relates to social work purpose and values and development of administrative principles that make possible effective provision of welfare services.

5702 Organizational Design of Social Welfare Agencies (2-3) Critical problems of adapting organizational structure and operational patterns to new tasks, objectives, and mandates. Planning and design techniques for new programs and for modification of existing programs for appropriate deployment of resources and personnel for maximum effectiveness and efficiency. Integration of theory and experience for development of skills for coping with variety of situations. Prereq: Second-year administration or community organization students, or consent of instructor; 5761 or equivalent. Sp

5741 Supervision in Social Work (2-3) Dual roles of supervisor in various settings, and supervision distinguishing from direct practice. Responsibility and accountability to client system, supervisee, and executive, problems of middle management position of supervisor. Differences and similarities in supervision of varying levels of personnel. Goals, tasks, techniques, and processes in relation to individual and group supervision and field instruction. Prereq: Second-year status or consent of instructor. A

5742 Consultation in Social Work (2-3) Constellation roles, relationships, and behaviors required of consultant. Consultation as distinguished from supervision, administration, and direct practice. Types of consultation in relation to various settings and levels of responsibility. Processes and practices of consultation and dilemmas and pitfalls of consultant's position. Prereq: Second-year status or consent of instructor. W

5743 Management of Human Resources in Social Welfare (2-3) Personnel function in administration of human services programs and agencies. Personnel recruitment, selection, appointment, and supervision; staff development, training, and evaluation; salary and benefit systems; employer-employee relations; and fair employment practices. Prereq: Completion of core or consent of instructor. W

5744 Education and Training in Social Welfare (2-3) Philosophies and practices of teaching and learning related to adults in social work and social welfare. Distinctions between teaching and learning, training and education; unique aspects of adult learning. Measurement issues; models and styles of education. Prereq: Completion of core or consent of instructor. W

5745 Professional Leadership in Social Work (2-3) Leadership in social welfare. Theories of leadership; complexity of leadership; function, effectiveness, and satisfactions of leaders; leadership styles, values, motivation and morale; and leadership development. Prereq: Outline of analysis of rural social services and delivery systems, preparation of core or consent of instructor. W

5761 Social Welfare Administration and Planning (3) Topics significant to managerial-planner role such as decision making, budgeting, planning, and programming. Prereq: Completion of core or consent of instructor. Sp

5762 Seminar in Social Welfare Administration and Planning (3) To assist students in acquiring specific administrative and planning techniques appropriate for social welfare delivery systems. Prereq: Completion of core or consent of instructor. F

5771 Information Systems and Decision Making (2-3) Survey of organizational information systems, utilization of information in policy formulation, delivery of services and evaluation of organizational performance. Information generation, collection, processing, storage, retrieval, and utilization in relation to management control, evaluation and forecasting. Prereq: Completion of core or consent of instructor. F

5772 Financial Management for Social Welfare Administration (2-3) Centralized decision making related to allocation of scarce resources in social services organizations. Technical aids to budgetary choice and other aspects of financial management examined for utility, paramony, and feasibility. Prereq: Completion of core or consent of instructor. F

5800 Management of Residential Settings (2-3) Issues and trends in management and programming in residential institutions for children, aged, mentally ill, mentally retarded, juvenile and adult offenders, and other groups. Prereq: Completion of core or consent of instructor. W

5812 Organizational Perspectives in Juvenile Justice (2-3) Aspects of juvenile justice system: overview of juvenile delinquency, introduction to theories of causation, role of police in detecting delinquency and apprehension of delinquent offenders, police procedures, role of juvenile court, alternatives to institutions, correctional institutions, aftercare programs, and preventive strategies. Prereq: Second-year standing.

5820 Social Aspects of Illness (2-3) Social, economic, and emotional problems arising from or related to illness and disability as they affect individuals, family, and community. Services needed to obtain optimum results from medical care. Lectures, discussion, illustrative case material. Sp

5825 Drugs: Use and Abuse (2-3) Survey and analysis of social, cultural, medical, and psychological factors underlying alcoholism and drug abuse, recent research and treatment innovations, social work with user and family. Prereq: Completion of core or consent of instructor. Sp

5826 Social Work Treatment for Marital Adjustment (2-3) Theories regarding social and cultural values and personality characteristics which gain expression in marriage, concepts regarding contemporary marriage styles, problem areas in marriages, and appropriate treatment approaches. Prereq: Completion of core or consent of instructor. Sp

5830 Law and Social Work (2-3) Basic principles of law which relate to social work practice; organization of courts; legal aid societies; and other problems of legal nature that affect social work. Sp

5860 Social Gerontology (2-3) Physical, psychological, and social aspects of aging; economic and health status of aging; older person and family; community programs for aging; retirement—phenomenon of modern society. Sp

5865 The Roles of Women (2-3) Roles and statuses of women; emphasis on contemporary American scene. Empirical research as well as popular literature. Ascribed and achieved facets of women's statuses. A

5910-20 Field Practice (3, 4) Instruction and supervision of students in the practice of social work with user and family. Prereq: Admission to the School; 5140 concurrently or prior to 5140; 5425 concurrently or prior to 5425. Must be taken in sequence. Required course. S/NC only. F, W

5930-40-50 Field Practice (4, 8, 8) Specialized instruction and supervised practice in methods of social work practice and planning in community health and welfare programs and agencies. Prereq: Admission to the School. Must be taken in sequence. S/NC only. Sp, W, Sp

5951 Integrative Seminar (2) Required seminar facilitates integration of two-year M.S.S.W. pro-
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