History

(College of Liberal Arts)

MAJOR

DEGREES

History ........................................ M.A., Ph.D.

John Muldowny, Acting Head

Professors:

Bing, J. Daniel, Ph.D. ................. Indiana
Bohstedt, John, Ph.D. .............. Harvard
Farris, W. Wayne, Ph.D. .......... Harvard
Fleming, Cynthia G., Ph.D. .... Duke
Johnson, Charles W., Ph.D. ....... Michigan
Muldowly, John, Ph.D. ......... Yale
Pinckney, Paul J., Ph.D. ......... Vanderbilt
Trainor, Edwin H., Ph.D. .......... Emory
Utley, Jonathan G., Ph.D. ........ Illinois

Assistant Professors:

Brummett, Palmira R., Ph.D. .... Chicago
Lansing, Carol L., Ph.D. ....... Michigan
Matson, Cathy D., Ph.D. ......... Columbia

THE DOCTORAL PROGRAM

Admission Requirements

1. Acceptable scores on the Graduate Record Examination (general and subject history).
2. Successful completion of the M.A.

Residence and Coursework

Students are required to complete a minimum of 50 hours in coursework beyond the Bachelor's degree. Students must take 510 or its equivalent. Students transferring from another institution may count up to 24 hours of coursework toward the required 50 hours. All students pursuing the Ph.D. must take a minimum of 6 related hours outside the department. No fewer than 3 semesters of the 6 semesters of residence work (2 of which must be consecutive semesters) shall be under the supervision of the staff of UTK.

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 concentrating 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, the committee may accept in place of a language a B or better performance in an appropriate statistical course and History 526.

The foreign language requirements may be satisfied in one of two ways:

1. 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.
2. By coursework. Upon consultation with the advisor, a student may elect to complete an appropriate sequence in a language department (or an intermediate sequence in a language in which no appropriate sequence is available). Satisfactory completion requires that a student must have at least a B in the final semester.

Comprehensive Examination

The comprehensive examination which will be both written and oral must be taken after all coursework is completed, language requirements fulfilled, and at least nine months before the degree is expected. This exam should normally be taken before beginning the sixth semester of work toward the doctorate. The candidate must present two fields, one from group I and one from group II.

Group I

Preadvanced Modern

Modern Europe

Early American

Recent United States

Group II

Socio-economic

Military/Foreign Relation

Regional/Local (U.S.)

National/Regional (non-U.S.)

Dissertation and Defense

Original research forms the basis for the dissertation. After the dissertation has been constructed...
GRADUATE COURSES

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

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

510 Foundations to Graduate Study in History (3) Assumptions and methods of historians. Required of all candidates for advanced degrees. F.


532 Topics in Modern Europe (3) Reading seminar: secondary sources on modern trends that are multinational in focus. Focus varies. May be repeated. Maximum 15 hrs.

533 Topics in European National History (3) Reading seminar: secondary sources on intra-national topics, usually British, Russian, German or French. Focus varies. May be repeated. Maximum 15 hrs.

541 Topics in Early American History (3) Reading seminar: secondary sources on early North American history. Focus varies. May be repeated. Maximum 15 hrs.

542 Topics in 19th- and 20th-Century United States (3) Reading seminar: secondary sources on movements and trends that are multinational in focus. Focus varies. May be repeated. Maximum 15 hrs.

551 Topics in the History of Foreign Relations (3) Reading seminar: secondary sources on foreign relations. Focus varies. May be repeated. Maximum 15 hrs.

552 Topics in Military History (3) Reading seminar: secondary sources on military history; military operations, social impact of war and naval strategy in foreign policy. May be repeated. Maximum 15 hrs.

554 Topics in Comparative Social and Economic History (3) Reading seminar: secondary sources on multinational topics, comparatively structured. Focus varies. May be repeated. Maximum 15 hrs.

555 Topics in United States Social and Economic History (3) Reading seminar: secondary sources on U.S. social and economic history. Focus varies. May be repeated. Maximum 15 hrs.

556 Topics in European Social and Economic History (3) Reading seminar: secondary sources on social or economic history of European nations. Focus varies. May be repeated. Maximum 15 hrs.

557 Topics in Cultural and Intellectual History (3) Reading seminar: secondary sources on cultural and intellectual history. Focus varies. May be repeated. Maximum 15 hrs.

558 Topics in Latin American History (3) Reading seminar: secondary sources in Latin America. Focus varies. May be repeated. Maximum 15 hrs.

561 Topics in Asian History (3) Reading seminar: secondary sources on Asian history; East Asia and Middle East. Focus varies. May be repeated. Maximum 15 hrs.

562 Topics in U.S. Religious History (3) (Same as Religious Studies 566.)

563 Family Life Education Programs (3) (Same as Home Economics 530.)

567 Topics in U.S. Religious History (3) (Same as Religious Studies 566.)

571 Topics in Applied History (3) Seminar to develop practical skills applicable to museology, historical preservation, material culture, historical agencies, historical editing, and other areas of applied history. Focus varies. May be repeated. Maximum 15 hrs.


573 Seminar in Selected Topics in European Social and Economic History (3) Research seminar in primary sources culminating in scholarly paper in modern European history. Focus varies. May be repeated. Maximum 15 hrs.

574 Seminar in United States Social and Economic History (3) Research seminar in primary sources culminating in scholarly paper in United States social and economic history. Focus varies. May be repeated. Maximum 15 hrs.

575 Seminar in United States Regional and Local History (3) Research seminar in primary sources culminating in scholarly paper in local and regional history. Focus varies. May be repeated. Maximum 15 hrs.


580 Topics in History (3) Reading seminar: secondary sources for new topics. Focus varies. May be repeated. Maximum 15 hrs.

581 Foreign Study (1-15) See page 31.

582 Off-Campus Study (1-15) See page 31.

583 Independent Study (1-15) See page 31.

591 Seminar in United States Regional and Local History (3) Research seminar in primary sources culminating in scholarly paper in regional and local history. Focus varies. May be repeated. Maximum 15 hrs.

592 Seminar in Premodern European History (3) Research seminar in primary sources culminating in scholarly paper in Premodern European history. Focus varies. May be repeated. Maximum 15 hrs.

593 Seminar in Modern European History (3) Research seminar in primary sources culminating in scholarly paper in modern European history. Focus varies. May be repeated. Maximum 15 hrs.

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

621 Directed Readings (3) Directed readings to prepare candidate for doctoral comprehensive examination. May be repeated. Maximum 1 per doctoral field. S/NC only.


632 Seminar in Modern European History (3) Research seminar in primary sources culminating in scholarly paper in modern European history. Focus varies. May be repeated. Maximum 15 hrs.

641 Seminar in Early American History (3) Research seminar in primary sources culminating in scholarly paper in Early American history. Focus varies. May be repeated. Maximum 15 hrs.


651 Seminar in Military and Foreign Relations History (3) Research seminar in primary sources culminating in scholarly paper in military or foreign relations history. Focus varies. Not restricted by national grouping. May be repeated. Maximum 15 hrs.


653 Seminar in United States Regional and Local History (3) Research seminar in primary sources culminating in scholarly paper in regional and local history. Focus varies. May be repeated. Maximum 15 hrs.


660 Seminar in History (3) Research seminar in primary sources culminating in scholarly paper in aspect of history not covered in another 600-level research seminar. Focus varies. May be repeated. Maximum 15 hrs.

Home Economics
(College of Human Ecology)

MAJOR
Home Economics.......................... M.S.

Students pursuing graduate study in home economics education or extension are encouraged to enroll in the multidisciplinary Master's degree in Home Economics. Home Economics Education courses (HEED prefix) may be selected to meet requirements of that program. Graduate coursework in Home Economics Education may also be selected for development of a concentration or minor within other areas of specialization.

ADMISSION REQUIREMENTS

A completed file for review includes a College of Human Ecology application, Graduate Record Examination (GRE) scores for the general section, and completion of three Graduate School Rating Forms by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology. The M.S. in Home Economics requires an undergraduate degree in Home Economics.

THE MASTER'S PROGRAM

The M.S. in Home Economics is designed to meet graduate study needs of professionals who work in programs encompassing all areas of home economics. Home economics teachers may choose courses within this area for updating and professional renewal. Thesis (33 hours) and non-thesis (36 hours) options are offered. The program includes 3-6 hours in research methodology, 6-9 hours in program planning and implementation (agricultural extension, home economics education, other areas of education), 3 hours in the integrative nature of home economics, and 12-15 (thesis) to 15-18 (non-thesis) hours in home economics subject matter. At least one course is to be from each department in the college. The non-thesis option requires a practicum. An oral/written comprehensive examination will be administered at the end of the program.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UTK on an in-state tuition basis. The M.S. program in Home Economics is available to residents of the state of South Carolina. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE COURSES

510 Curriculum in Home Economics (3) Development of home economics educational materials and instruction. Prereq: 420 or equivalent or consent of instructor. F.A.

515 Evaluation in Home Economics Education (3) Assessment of programs and pupil progress; techniques, methods and purposes. Prereq: 420 or equivalent. F.Sp.A.

520 Supervision of Home Economics in the Public Schools (3) Program planning, organization and administration of vocational home economics education. Supervision of pre-service and in-service home economics professionals. Prereq: Classroom teaching experience. Su.A.


530 College Teaching in Home Economics (3) Instructional effectiveness, techniques, organization, and evaluation. Prereq: Consent of instructor. F.A.

563 Family Life Education Programs (3) (Same as Child & Family Studies 563.)
Human Ecology
(College of Human Ecology)

MAJOR  DEGREE
Human Ecology..............................Ph.D.

Graduate study leading to the Doctor of Philosophy with a major in Human Ecology is available in the Departments of Child and Family Studies, Nutrition and Food Sciences, and Textiles, Merchandising and Design. Concentrations areas are child development, family studies, food science, nutrition science, and textiles and apparel. A major challenge of the doctoral program in Human Ecology is to draw upon the basic research generated from the natural sciences, social sciences, humanities, and the arts, and to provide a holistic perspective that contributes to the improvement of individual and family well being. For example, the physiological chemist may study metabolic-dietary interrelationships and psychologists may study child behavior. But, it is within human ecology that the nutrient needs of the growing child are considered along with the factors that affect the child’s acceptance of different foods. Within the College of Human Ecology, research from one discipline is enhanced by encompassing and utilizing the findings of research from other disciplines.

ADMISSION REQUIREMENTS
A completed file for review includes a College of Human Ecology application, Graduate Record Examination (GRE) scores for the general section, and completion of three Graduate School Rating Forms by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean’s Office, College of Human Ecology.

THE DOCTORAL PROGRAM
The doctorate is a research degree granted only to individuals who demonstrate proficiency in conducting original research. Course requirements for the degree are determined by the student’s faculty committee, based upon college and departmental requirements and student needs and interests. The Graduate School sets minimum requirements for the doctoral degree. Additionally, the college has requirements that include:

1. Selection of a concentration and fulfillment of the requirements as directed by the major professor and approved committee.
2. Minimum of 78 semester hours in courses beyond the baccalaureate degree (exclusive of Master’s thesis).
4. Minimum of 9 semester hours of 600-level coursework (not including dissertation).
5. Successful completion of written/oral comprehensive examinations as provided by each department’s procedures and the student’s doctoral committee.

6. Original research project, which culminates in a dissertation; 24 semester hours of credit are required for dissertation.

The doctoral committee shall determine whether a reading knowledge of a foreign language is required.

More specific information about the course of study is given under the individual academic units that administer the Ph.D. concentrations.

ACADEMIC COMMON MARKET
The ACM is an interstate agreement among southern states for sharing academic programs. Residents of one of the participating states who qualify for admission may enroll in certain programs on an in-state tuition basis. Potential doctoral students in Human Ecology who are residents of Alabama, Arkansas, Kentucky, Louisiana, Mississippi, South Carolina, Virginia, or West Virginia are eligible.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
501 Microcomputer Research Applications in Human Ecology (3) Advanced microcomputer concepts and applications for research. Overview of statistical analysis software, computer graphics, computer-assisted design and national data base searches. S/NC only.
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
510 Integrative Nature of Home Economics (3) History and philosophy of home economics. Analysis of current programs and future directions in field. Examination of research and integrative framework. F.A.
515 Issues and Trends in Human Ecology (1-3) Research and theory related to current issues. Prereq: Consent of instructor. E
520 Directed Study in Human Ecology (1-3) Integrate topical topics. Prereq: At least 9 hrs of graduate study in course including courses from at least two departments or consent of instructor. May be repeated. Maximum 6 hrs. E
525 Practicum in Home Economics (1-6) Field based experiences. Prereq: Consent of instructor. E
565 Seminar in Gerontology (1) Scope of gerontology as discipline and as related to other academic and professional disciplines. Speakers both internal and external to UTK. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. (Same as Educational and Counseling Psychology 585, Nursing 585, Public Health 585, Physical Education 585, and Social Work 585). S/NC only.
610 Professional Seminar in Human Ecology (3) Review of various approaches taken by different disciplines to study of ecology; ecological applications in human ecology; temporal/spatial properties of human ecosystems; model building/systems thinking and futures thinking in human ecology. Sp

Industrial and Organizational Psychology
(College of Business Administration and College of Liberal Arts)

MAJOR
Industrial and Organizational Psychology............................M.S., Ph.D.

Michael Rush, Director
Committee:
Dewhirst, H. Dudley, Management
Dobbins, Gregory H., Management
Fowler, Oscar S., Management
Fowler, Raymond, Psychology
James, Lawrence R., Management
Jenkins, Roger L., Business Administration
Ladd, R. T., Management
Larsen, John M., Jr. (Emeritus), Management
Lounsbury, John W., Psychology
O’Rourke, Raymond G., Management
Russell, J. E. A., Management
Schumann, David W., Marketing
Sundstrom, Eric, Psychology
(For complete Faculty Listing, see Departments of Management and Psychology.)

The Master’s and doctoral programs are offered jointly by the Department of Psychology and the Department of Management. They are designed to prepare students for professional, managerial, and organizational research; for university teaching; and for consulting relationships with industry. The program emphasizes a scientist/practitioner model in applying and conducting research based on accepted theory, organizational behavior, psychology, management, and statistics. The programs are administered by a joint committee of the two departments, appointed by the Vice Provost and Dean of The Graduate School on recommendations from the two department heads.

It is intended that students entering the I/O Program will represent widely different undergraduate and graduate backgrounds including psychology, business administration, engineering, science, and liberal arts. The first-year program provides the opportunity to take courses that will assist the students in attaining a reasonable level of sophistication in areas of deficiency.

ADMISSION REQUIREMENTS
Applicants for admission should request information and application forms from both The Graduate School and the Director, Industrial and Organizational Psychology Program, 408 Stokely Management Center, The University of Tennessee, Knoxville, TN 37996-0545.

Two separate applications must be completed: one application for admission to The Graduate School (apply for major in "Industrial and Organizational Psychology") and one application for admission to the Industrial and Organizational Psychology program.

Deadline: New students are admitted in fall semester only, and applications must be received by the Graduate Admissions and Records Office by March 1.

General Requirements
At least one year of college mathematics and one course in statistics are required. Ordinarily, an undergraduate grade point average of 3.0 or above is required with no evidence of special weakness in mathematics and physical sciences.

Test scores on each section of the general portion (verbal and quantitative) of
THE MASTER’S PROGRAM

A thesis is required with a minimum of 6 semester hours of Management or Psychology 500.

The Master’s degree can be completed with a minimum of 33 semester hours in the major as follows:

Management 567, 568 or Psychology 517-18, Psychology 557; Statistics 537, 538.

Eleven hours of additional coursework to be selected primarily from the following with the approval of the student’s advisor: Management 511, 522, 610; Management/Psychology 625, 626, 627, 638; Psychology 5550, 5650, 6200.

Electives, as approved for an individual’s plan of study, may be selected from graduate courses in psychology, social work, sociology, management, education, planning, etc. Students who wish to pursue special research interests aside from those in their major may register for Management 525, 526 (maximum 6 hrs per term; courses may be repeated) or Management/Psychology 690.

An internship, practicum, or field experience is recommended. A student is expected to be in residence full time one year (two years recommended).

A Master’s candidate must pass a final oral examination.

In addition to course requirements, a Master’s student must complete a comprehensive examination in general psychology within two years by obtaining a score of 630 (or 85th percentile) on the Subject GRE (Psychology 81). An overall “B” average is required in the course sequence Management 567-68 or Psychology 517-18 to continue in the program beyond the first year.

THE DOCTORAL PROGRAM

(MAJOR: Industrial Engineering)

Major, as approved for an individual’s plan of study, may be selected from graduate courses in psychology, social work, sociology, management, education, planning, etc. Students who wish to pursue special research interests aside from their dissertation may register for Management 525, 526 (maximum 6 hrs per term; courses may be repeated) or Management/Psychology 690.

A dissertation is required with a minimum of 60 semester hours in the major as follows:

Management 567, 568 or Psychology 517-18, Psychology 557, Statistics 537-38.

A minimum of five doctoral seminars (15 hours) selected from: Management 610; Management/Psychology 625, 626, 627, 638; Psychology 625, 624. (Five doctoral seminars are viewed as the absolute minimum; more are recommended. Statistics 671 and Psychology 605 are also recommended.)

THE DOCTORAL PROGRAM

A dissertation is required with a minimum of 60 semester hours in the major as follows:

Management 567, 568 or Psychology 517-18, Psychology 557, Statistics 537-38.

A minimum of five doctoral seminars (15 hours) selected from: Management 610; Management/Psychology 625, 626, 627, 638; Psychology 625, 624. (Five doctoral seminars are viewed as the absolute minimum; more are recommended. Statistics 671 and Psychology 605 are also recommended.)

The doctoral degree can be completed with a minimum of 54 semester hours in the major as follows:

Management 567-68 or Psychology 517-18, Psychology 557, Statistics 537-38.

A minimum of five doctoral seminars (15 hours) selected from: Management 610; Management/Psychology 625, 626, 627, 638; Psychology 625, 624. (Five doctoral seminars are viewed as the absolute minimum; more are recommended. Statistics 671 and Psychology 605 are also recommended.)
ery, economic life of equipment, and rate of return on investment.


412 Quantitative Methods in Project Management (2) Project planning, scheduling, and control based on networking and precedence diagramming methods. Resource allocation and time-cost trade off algorithms, multi-project control, computer applications, and PERT methods of handling uncertainty in activity time estimates.

413 Research Methods in Industrial Engineering (3) Methods to collect and analyze data. Process control charts. Sampling techniques, hypothesis testing, behavior of sampling, single subject experimental designs, classical experimental design methods, and time series models. Fundamentals of reliability and risk concepts as related to measurement and collection of data. Strategies to control rational hypotheses: randomization, factorial designs, blocking, fractional replications, and building extraneous variables into experiments. Selection of appropriate experimental designs for given research situations and collection of data. Prereq: 300 and senior standing. Statistics 251.


422 Senior Industrial Engineering Problems Analysis (3) (3) Application of design aiding techniques in local organizations, problem definition, analysis and presentation. Prereq: 402, 403, and 405.


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

501 Design Project (1-3) Enrollment limited to industrial engineering students in non-thesis program. May be repeated. Maximum 6 hrs. S/N/C only.

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

510 Advanced Work Design and Measurement (3) Advanced design, design and improvement of work systems, human factors, use of learning curves, queueing theory and wage incentive sys-

416 Industrial Engineering 105

691-92-93 Advanced Topics in Industrial Engineering (3,3,3) Forum to study individually or in groups. Prereq: Graduate standing and consent of instructor. May be repeated with consent of instructor.

**Journalism**

(College of Communications)

**MAJOR DEGREE**

Communications.................................M.S.

James A. Crook, Director

Professors:

Adamson, June N., M.S.............Tennessee
Ashdown, Paul G., Ph.D.........Bowling Green
Crook, James A., Ph.D..............Iowa State
Everett, George A., Ph.D............Iowa
Leifer, B. Kelly, Ph.D..............Southern Illinois
Singletary, Michael W..............Southern Illinois

Ph.D..............................Southern Illinois

Associate Professors:

Bowles, Dorothy, Ph.D.............Wisconsin
Miller, Mark M., Ph.D..............Michigan State
Morrow, Jerry L., Ph.D..............Toledo
Puetz, Sammie Lynn, M.S........Tennessee

Assistant Professors:

Caudill, C. Edward, Ph.D........North Carolina
Heller, Robert B., M.A.........Syracuse

Adjunct Professor:

Haley, Alex

The School of Journalism offers a concentration area for the Master's with a major in Communications. See Communications for additional information.

**GRADUATE COURSES**

403 International Communications (3) Development and operations of world mass communications channels and agencies. Comparative analysis of media, media practices, and flow of news throughout world. Print and broadcast systems in terms of relevant social, political, economic, and cultural factors. Relation of communication practices to international affairs and understanding.

412 Opinion Writing (3) Analysis of editorial positions, practices, and pages. Writing of editorials and columns for newspapers, magazines, and company publications, rhetorical devices and use of logic. Prereq: Communications 200, or consent of instructor.

414 Magazine Article Writing (3) Techniques of writing in-depth articles of mass circulation and specialized magazines. On-reporting material, problems in specialized areas: business, science, agriculture, humanities. Prereq: Communications 200, or consent of instructor.

416 Issues in Journalism (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

420 Print Media Management (3) Current business practice among print news media, especially newspapers. Problems in management and production and outlook for new technologies. Prereq: 6 hrs mathematics and/or accounting and senior standing. Sp


433 Advanced Editing (3) Sensitivity to language and editing skills. Headline writing, layout, and production. Prereq: 203.

460 Mass Communications History (3) Development of press and role of mass communications in American history. Newspapers, radio, television, and magazines. F

470 Public Relations Campaigns (3) Preparation of communications materials to implement planned public relations programs. Preparation of news releases—written and video—and broadcasting copy. Research, planning, communication, and evaluation of major public relations projects and campaigns. Prereq: 203, 270, and senior standing. F,Sp

480 Journalism in the High School (3) Functions and methods of high school publications. Problems related to student selection, content of publications, copy, layout, typography, printing, advertising, and business. Planning course outlines and curricula for journalism/mass media studies. Su

490 Advanced Photographic Journalism (3) Advanced principles and methods of black-and-white photography. Introduction to color photography, news and feature photographs and photo essays. Prereq: 290 or consent of instructor.

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


525 Public Opinion (3) Role of press in developing and influencing public consensus. Social theories of public opinion and analysis of mass media's response. F

535 Publications Management (3) Problems in management, planning, market analysis, and design. Techniques of writing, editing, and presenting comprehensive articles and other material: regional and specialized magazines. Individual editorial projects. Prereq: 420 or consent of instructor.

540 Seminar in Newspaper Operations (3) On-site study of newspaper management operations. Positioning medium for its target audience and how this affects profitability. Prereq: 560 or consent of instructor.

550 Writing and Editing Projects (3) Specialized writing or editing interests: agriculture, politics, labor, finance, science; technical, general publications. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

571 Seminar in Public Relations (3) Analysis and management of problems in communication between institutions and organizations and their publics. Measurement and evaluation of effectiveness of communication programs. Prereq: 470 or consent of instructor. Sp

580 Seminar in Visual Communication (3) Behavioral aspects of communication with images. Theories of psychological effect in color, shape, texture, and other design elements. Prereq: 203 or Advertising 350 or Broadcasting 430 or equivalent.

590 Communications and International Development (3) Relationship between mass communications and development of nations. Role of communications media in development projects in Third World regions of globe. Communications as facilitator of international cooperation.

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

598 Internship (3) Professional work in journalism supervised by editor or manager with faculty supervision. No retroactive credit for previous work experience. Prereq: Completion of core curriculum.

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**Law**

(College of Law)

**MAJOR DEGREES**

Law............................................J.D., J.D.-MBA

Marilyn Yarbrough, Dean

Professors:

Cohen, Neil P., LL.M..............Harvard
Cook, Joseph G., LL.M..............Yale
Gobert, James J., J.D..............Duke
Gray, R. Macdonald
(Emeritus), LL.M..............George Washington
Hardin, Patrick, J.D..............Chicago
Jones, Durward S., J.D...........North Carolina
King, Joseph H.
(Distinguished Prof.), J.D.......Pennsylvania
Kirby, James C., LL.M.............New York
Lacey, Forrest W., J.D.
(Emeritus), S.J.D..............Michigan
Le Clercq, Frederick S., LL.B........Duke
Macy, Charles, J.D..............Michigan
Duke
OVERTON, Elvin E. (Emeritus), S.J.D........Harvard
Phillips, Jerry J., J.D..............Yale
Rivkin, Dean H., J.D..............Vanderbilt
Sebert, John A., J.D..............Michigan
Seybold, Toxie E., J.D.
(Emeritus), LL.M..............George Washington
Sobieski, John L., J.D..............Michigan
Wicker, William H., J.D.
(Emeritus), LL.D..............Newberry

Associate Professors:

Anderson, Gary L., LL.M.............Harvard
Bentema, William J., J.D..............Miami
Best, Reba, M.L.S..............Florida
Black, Jerry P., Jr., J.D..............Vanderbilt
Davies, Thomas Y., J.D..............Northwestern
Dessm, Lawrence, J.D..............Harvard
Eisele, Thomas D., J.D..............Harvard
Gray, Grayfred B., J.D..............Vanderbilt
Hess, Amy M., J.D.............Virginia
Jones, Jack D., J.D..............Wyoming
Kofele-Kale, Ndvia, J.D..............Northwestern
Kovac, Susan D., J.D..............Stanford
Lloyd, Robert M., J.D..............Michigan
Picquet, Cheryl, M.S.L.S.............Tennessee
Pierce, Carl A., J.D..............Yale
Russier, Nicole Q., J.D..............Harvard
Wirtz, Richard S., J.D..............Stanford

Instructor:

Hoover, Mary Jo, J.D..............Brooklyn

The College of Law offers the Doctor of Jurisprudence degree program and a dual program with the College of Business Administration leading to the J.D. and the Master of Business Administration degree. In addition graduate students may be eligible to take a limited number of law courses to count toward a graduate degree.

Current information regarding admission, financial aid, course requirements, academic policies, extracurricular activities, and student services is available in the College of Law Bulletin from the Admissions Office, The University of Tennessee, College of Law, 1505 West Cumberland Avenue, Knoxville, Tennessee 37996. Complied application should be received before February 1 of the year of requested admission.
DEGREE OF DOCTOR OF JURISPRUDENCE

The degree of Doctor of Jurisprudence will be conferred upon candidates who complete, with the required average, six semesters of resident law study and who have earned such credit, including all required courses. The required average is 2.0 and that average must be maintained on the work of all six semesters and also for the combined work of the grading periods in which the last 28 hours of credit were earned. Averages are computed on weighted grades. Grades are on a numerical basis from 0.0 to 4.0. A grade of 0.9 or below is a failure.

Eligible law students may receive credit towards the J.D. for acceptable performance in upper-level courses taken in other departments at The University of Tennessee. Course selection and registration are subject to guidelines approved by the law faculty which include the requirement that any such course be acceptable for credit toward a graduate degree in the department offering the course. Refer to the Law Bulletin for current degree requirements.

DUAL J.D.-MBA DEGREE PROGRAM

The College of Business Administration and the College of Law offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration degrees. A student pursuing the dual program is required to take fewer hours of coursework than would be required if the two degrees were to be earned separately.

Admissions

Applicants for the J.D.-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D. degree and The Graduate School and College of Business Administration for the MBA degree, and by the Dual Degree Committee. Students who have been accepted by both colleges may commence studies in the dual program at the beginning of any term subsequent to matriculation in both colleges provided, however, that dual program students must register for or enter into the last 28 hours required for the J.D. degree and the last 16 hours required for the MBA degree.

Curriculum

A dual degree candidate must satisfy the graduation requirements of each college. Dual degree students withdrawing from the dual degree program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual degree program. For students continuing in the dual degree program, the J.D. and MBA degrees will be awarded upon completion of requirements of the dual degree program. The College of Law will award credit toward the J.D. degree for acceptable performance in a maximum of 8 semester hours of approved graduate-level courses offered by the College of Business Administration. A student shall receive 2 semester hours of credit for each such course successfully completed unless the law faculty specifies otherwise. Two of the 8 semester hours must be earned in Accounting 501, 503, or a more advanced accounting course. If College of Law credit is given for such accounting course, the dual degree student may not receive College of Law credit for Accounting for Lawyers (Law College Course 837).

The College of Business Administration will award credit toward the MBA for acceptable performance in a maximum of 9 semester hours of approved courses offered by the College of Law. Except while completing the first year courses in the College of Law, students are encouraged to maximize the integrative facets of the dual program by taking courses in both colleges each year.

Awarding of Grades

For grade recording purposes in the College of Law for graduate business courses and in the College of Business Administration for law school courses, grades awarded will be converted to either Satisfactory or No Credit and will not be included in the computation of the student's grade average or of class standing in the college where such grades are so converted. The College of Law will award a grade of Satisfactory for a graduate business course in which the student has earned a B grade or higher and a No Credit for any lower grade. The College of Business Administration will award a grade of Satisfactory for a College of Law course in which the student has earned a 2.3 grade or higher and a No Credit for any lower grade. Grades earned in courses of either college may be used on a regular graded basis for any appropriate purpose in the college offering the course. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

Non-Law Elective Course Credit

Students enrolled in the J.D.-MBA degree program may not receive credit towards the J.D. degree for courses taken in other departments of the University except for those taken in conjunction with the dual program.

Note: Students are advised to consult the Graduate School's degree requirements as stated in the front section of this catalog as well as the requirements for this college.

POLICY FOR GRADUATE STUDENTS TAKING 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 receive credit toward a degree upon approval of the College of Law and the major chairperson. The graduate student must register for the law course during regular registration at the College of Law requesting an S/NC grade only. If a 2.0 or above is earned in a law course, an S will be recorded on the transcript. If a student earns below a 2.0, an NC will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative average.

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, e.g. numerical grades for law courses, letter grades for graduate courses. Refer to page 18 for the grading scale acceptable toward meeting degree requirements. Cumulative GPA for law courses only will be carried until graduation, at which time both the graduate and the law cumulative will be shown on the permanent record.

PROFESSIONAL COURSES

081 Civil Procedure (3) Binding effect of judgments, selecting proper court (jurisdiction and venue), ascertaining applicable law, and federal and state practice.


083 Contracts I (3) Basic agreement process and legal protections afforded contracts: offer and acceptance, consideration and other bases for enforcing promises; the Statute of Frauds, unenforceability and other controls of promissory liability. Introduction to relevant portions of Article 2 of the Uniform Commercial Code.

084 Contracts II (3) Continuation of Contracts I. Issues arising after contract formation: interpretation, duty of good faith; conditions, impracticability and frustration of purpose; remedies for breach; assignment and delegation. Considerable coverage of Article 2 of the Uniform Commercial Code with regards removed, anticipatory repudiation, impracticability and good faith.

085 Legal Process I (2) Lawyer-like use of cases and statutes in prediction and persuasion. Analysis and synthesis of common law decisions; statutory interpretation, fundamentals of expository legal writing and legal research.

086 Legal Process II (3) Continuation of Legal Process I. Formal legal writing, appellate procedure, and oral advocacy.

087 Torts I (3) Intentional torts, including battery, assault, false imprisonment, infliction of emotional distress, conversion and trespass; privileges and defenses to intentional torts; negligence, including standard of care and proof of negligence; immunity and limitations on duties; cause in fact; and proximate cause.

088 Torts II (3) Defenses, including contributory negligence, assumption of risk, comparative negligence, and statutes of limitations; vicarious liability; strict liability; products liability; settlement; problems of multiple defendants, non-tort alternatives for recovery for personal injury; law reform; defamation, invasion of privacy, and wrongful legal proceedings; misrepresentation, injurious falsehood, misappropriation of commercial values, and interference with contract; constitutional torts.

089 Criminal Law (3) Substantive aspects of criminal law; general principles applicable to all criminal conduct, specific analysis of particular crimes; defenses to crimes.

101 Property (3) Introductory course treating issues of ownership, possession, and title in the areas of: landlord-tenant relations; estates in land and future interests; co-ownership and marital property; real estate; sales agreements and conveyances; title assurance and recording statutes; servitudes; and selected aspects of nuisance law, eminent domain and zoning.

112 Constitutional Law I (3) Judicial review, limits on judicial power; national legislative power; regulation of commerce; power to tax and spend; other sources of national power; separation of powers; state taxation and regulation of commerce; intergovernmental immunities.

113 Evidence (4) Rules regulating introduction and exclusion of oral, written and demonstrative evidence at trials and otherwise, including relevance, competence, impeachment, hearsay, privilege, expert testimony, authentication, and judicial notice.
814 Legal Profession (3) Legal, professional and ethical standards applicable to lawyers.

816 Computer-Assisted Legal Research (6) Introduction to computerized research of legal materials. LEXIS and WESTLAW. Offered periodically throughout year. May be taken beginning spring of first year. Credit for first draft of appellate brief in Legal Process II. Must be completed satisfactorily prior to end of second year of law study. Prereq: Completion of first draft of appellate brief in 806. NC only.

818 Income Tax I (4) What is income; whose income is it; when is it income; how is it taxed (capital gains and losses, maximum and minimum tax); deductions and credits; rates (corporate, estate, and trust).

821 Administrative Law (3) Administrative agency decision-making processes and judicial review of administrative decisions: procedural standards for informal and formal administrative adjudication and rule-making (attention to federal Administrative Procedure Act); constitutional due process standards in administrative settings; and availability, scope and timing of judicial review of agency actions.

822 Legislation (3) Interpretation and drafting of statutes, legislative process, and legislative power; comparison of judicial views on legislative process with both realities of legislative process and applicable constitutional principles.

824 Local Government (3) Distribution of power between state and local governmental units; sources of authority for local government operations; creation of local governmental units; problems created by the fragmentation of local government units; financing of local services; influence of federal programs on local government finance and decision-making.

827 Business Associations (4) Legal problems associated with corporate and unincorporated business entities; liability and duties of officers, managers, partners and limited partners; and corporate shareholders, directors and officers, and others with whom these members interact in connection with firm's business.

828 Advanced Business Associations (2) Selected topics in business associations. Prereq: 827. May be repeated.

830 Securities Regulation (3) Basic structure of federal securities laws. Legal problems associated with raising capital by new and growing enterprises; securities transactions by promoters, officers, directors and others; regulation of public-wealth companies; securities transactions under Rule 10b-5 and other antifraud provisions; and provision of legal and other professional services in connection with securities transactions.

832 Business Planning Seminar (2) Selected topics in business planning and transactions. Prereq: 818, 827, and 970.

834 Antitrust (3) Federal antitrust laws; monopolization, price-fixing, group boycotts, and anticompetitive practices generally; government enforcement techniques and private treble damage suits.

835 Trade Regulation Seminar (2) Selected problems arising under laws regulating competition and conduct of business enterprise.

837 Accounting for Lawyers (2) Basic accounting documents, problems, and techniques to enable law students to use and understand essential accounting information.

840 Commercial Law (4) Basic coverage of most significant provisions of Uniform Commercial Code: security interests in personal property (Art. 9 of U.C.C. and relevant Bankruptcy Code provisions); commercial paper, including checks, notes and other negotiable instruments (Arts. 3 and 4 of U.C.C.); sales of goods, including coverage of portions of Art. 2 of U.C.C. not covered in Contracts.


846 Constitutional Law II (3) First Amendment rights of freedom of religion, expression, association and press; Fourteenth Amendment rights against discrimination as to race, sex, etc.; rights to franchise and apportionment; substantive due process; civil rights under federal laws enforcing post-Civil War Amendments to Constitution.

848 Civil Rights Actions (3) Litigation to vindicate constitutional rights in jury trials; due process; denials of the right to a jury trial; issues in Federal and state courts in civil rights actions; and remedies for violations of constitutional and other civil rights.

849 Discrimination and the Law (3) Comparison of sex, race and other invidious discriminatory practices as they affect political participation, education, employment, housing and other social and economic activities; legislative enforcement of post-Civil War Amendments to Constitution.

851 Constitutional Law Seminar (2) Current constitutional law problems.

854 Criminal Procedure I (3) Police practices and constitutional rights of persons charged with crimes: arrest; search and seizure; identification; interrogation and confessions; electronic eavesdropping; and right to counsel.

855 Criminal Procedure II (3) Pre- and post-trial procedures in a criminal case: bail; preliminary hearing; grand jury; prosecutorial discretion; discovery; speedy trial; plea bargaining; post-conviction relief; Federal Rules of Criminal Procedure.

857 Criminal Law Theory (3) Theoretical foundations of criminal law. Prereq: 809.

859 Criminal Law Seminar (3) Advanced problems in criminal law and administration of justice. Prereq: 809.

862 Family Law (3) Survey of laws affecting formal and informal family relationships: premarital disputes; ante nuptial contracts; creation of common law and formal marriage; legal effects of marriage; support obligations; child support; divorce; alimony, and property settlements; child custody and child support; adoption; illegitimacy.

863 Children and the Law (2) Legal relationships between children and their parents and the state: parental prerogatives and children's rights; illegitimates; adoption; temporary and permanent removal of children from their parents by the state: juvenile court procedures.

866 Environmental Law and Policy (2) Study, through methods of public policy analysis, of responses of legal system to environmental problems: environmental litigation; Clean Air Act; Clean Water Act; National Environmental Policy Act; other regulatory issues.

867 Environmental Law Seminar (2) Selected topics in environmental law.

869 Natural Resources Law (3) Nature of interests; conveyancing; royalties, grants and reservations, leases, and taxation of natural resources.

873 American Legal History (3) Selected topics in American legal history.

875 Empirical Studies of Legal Institutions (3) Social, economic and organizational factors that affect behavior of clients, lawyers, judges and other actors in legal institutions. Empirical studies of subjects: social structure and organization of bar; factors that affect filing, processing and disposition of claims in civil justice system; and factors that affect process of case dispositions in criminal prosecutions: plea bargaining process, factors that "cause delays" or "causal factors" to operate differently than "law on the books."

877 Jurisprudence (3) Critical or comparative examination of legal theories, concepts, and problems: legal positivism; natural law theory; legal realism; idealism; determinism; and Marxism. Kantianism; sociological jurisprudence; policy science; and critical studies.

879 Law and Economics (3) Relationship between legal and economic thought, use of economics in legal decision making and legal criticism.

881 Law and Literature (3) Systematic study of literature and its applications to legal theory and accurate, fluent, and creative legal composition.

882 Law, Language, and Reality (3) Intermediate level jurisprudence course. Law as the mind's attempt to defend, direct, and administer human activity: exploration, through methods of epistemology, of ethical values underlying formal legal reasoning and legal concepts.

886 Public International Law (3) Law-creating processes and doctrines, principles and rules of law that regulate mutual behavior of states and other entities in international system.

887 International Business Transactions (3) Legal status of persons abroad; acquisition and use of property within a foreign country; doing business abroad as a foreign corporation; engaging in business within a foreign country; expropriation or annulment of contracts or concessions.

889 International Law Seminar (2) Current international law problems. Prereq: 886 or 887.

891 Comparative Law (3) Introduction to civil law systems of France and Germany, focusing on legal institutions, methodology, and aspects of law of obligations and commercial law.

895 Labor Relations Law (3) Political, social and economic influences in development of federal labor relations laws; employee rights of self-organization; union and employer unfair labor practices; strikes, lockouts, boycotts, and collective bargaining processes; enforcement of collective agreements; individual rights of employees; federal preemption and state regulation.

896 Employment Law (3) Legal regulation of employment relationship: legal, social and economic influences in employee-employer relationship; employment discrimination; legally prescribed minimum standards of compensation and security; enforcement of collective bargaining agreements; individual rights of employees; federal preemption and state regulation.

899 Arbitration Seminar (2) Arbitration of labor agreements: judicial and legislative developments; nature of process; relationship to collective bargaining; selected arbitration problems on various topics under collective agreements; and role of lawyers and arbitrators. Prereq: 895.

899 Labor Relations Seminar (2) Selected labor relations law problems. Prereq. 895.

904 Civil Advocacy (6) Supervised fieldwork, requiring students to assume primary responsibility for representing clients with various civil legal problems. Exploration of theory, practice and ethics of interviewing, counseling, planning, investigation, discovery, drafting, negotiation, litigation, and other professional tasks necessary to provide competent representation for clients. Hearings in state and federal courts, or before state and federal administrative officers or judges. Prereq: $20 and third-year standing.

906 Criminal Advocacy (6) Supervised fieldwork, requiring students to assume primary responsibility for defending clients accused of crime in Knox County. Exploration of theory, practice and ethics of interviewing, counseling, planning, investigation, discovery, drafting, negotiation, litigation, and other professional tasks necessary to provide competent representation for clients. Hearings in state and federal courts, or before state and federal administrative officers or judges. Prereq: $20 and third-year standing. Recommended passing grade coreq: 859.

915 Conflict of Laws (3) Jurisdiction, foreign judgments, and conflict of laws.
916 Federal Courts (3) Jurisdiction of federal courts; conflicts between federal and state judicial systems.

918 Remedies (4) Judicial remedies: damages, restitution, and equitable relief; availability, limitations and measurement; judicial remedies; constitutional contract, tort and property-related remedies.

920 Trial Practice (3) Litigation through simulation, trial problems and preparation: basic trial strategy; preparation and presentation of evidence; selection and instruction of jurors; opening and closing of argument; pleading motions, interrogatories or memoranda. Prereq: 813.

921 Pre-Trial Litigation (3) Civil pre-trial procedures. Drafting of actual pre-trial documents in civil cases: complaint, motions for preliminary injunction, class certification papers, motions for summary judgment, and various discovery papers.

923 Complex Litigation (2) Advanced civil procedure course dealing with special problems that arise in litigation involving multiple claims and parties; and, compulsory joinder; intervention; disposition of duplicative or related litigation; class actions; discovery in large cases; judicial control of pre-trial litigation; res judicata and collateral estoppel problems.

925 Appellate Practice Seminar (2) Federal and Tennessee Rules of Appellate Procedure, local rules of federal circuits; review of complete records of several cases; preparation and presentation of an appellate brief based on record of actual case.

927 Interviewing, Counseling and Negotiation (3) Development of conceptual and practical frameworks for understanding interviewing, counseling and negotiation, and lawyer's role in tasks. Readings of different methods, strategies and perspectives from recent literature. Simulations and videotape critiques, drafting of documents. Relevant ethical issues and techniques of dispute resolution.

929 Teaching Clients the Law (3) Communication of law as basis for decision by persons other than lawyers. Development of skills by team-teaching a practical legal course to high school or adult students and by writing research papers that synthesize Tennessee or federal law in plain language.

935 Gratuitous Transfers (4) Nature, creation, termination, and modification of trusts; fiduciary administration; interstate succession; executors, revocation, probate and contest of wills; creation and construction of various types of future interests; construction of limitations; application of the rule against perpetuities.

937 Estate Planning Seminar (2) Problems of estate planning, the drafting, planning, administration and practice of fiduciary administration, insurance, property, wills, future interests, trusts, corporations, partnerships, and gifts; drafting of estate plans and implementing documents for hypothetical clients. Prereq: 973. Prereq or coreq: 818 and 935.

940 Land Finance Law (3) Financing devices: mortgages, deeds of trust and land contracts; problems of priorities; transfer of secured interests when debt assumed or taken subject to security interest; default, exercise of right of redemption and/or statutory right of redemption; mechanics and materialmen's lien; contemporary developments in areas as condominiums, cooperatives, housing subdivisions, and shopping centers.

941 Land Acquisition and Development Seminar (2) Alternative business forms and major documents (notes, deeds, prospectus, etc.) necessary to accomplish acquisition or development of large tracts of land prepared and presented for seminar discussion. Prereq: 940.

943 Land Use Law (3) Land use planning; nuisance and zoning and eminent domain.

950 Computers and Law Seminar (2) Impact of computers on law and practice of law: expert systems; legal database design; computer-aided research; preparation of lawsuits; use of computers. Prior computer experience not necessary.

953 Education Law (3) Compulsory attendance laws; governmental control over curriculum and extracurricular activities; school official's freedom; privacy and due process rights of students and teachers; religion in public schools; public aid to parochial schools; equalization of educational opportunity.

956 Entertainment Law (3) Role of law and lawyer in entertainment industry. Course content varies. Music industry: copyright laws, artists/manager relationships, contract negotiations, industry labor unions, and performing right organizations.

959 Intellectual Property (3) Intellectual property and related interests under federal and state law: patents; trademarks; trade secrets; copyright; right of publicity; unfair competition.

962 Law and Medicine Seminar (2) Effects of legal rules on delivery and quality of medical care: nature of physician-patient relationship; unauthorized practice of medicine; medical education, licensing and specialization; hospital staff privileges; medical malpractice liability: standard of care, proof, causation, defenses, and damages; protection of patient autonomy: consent, informed consent, consent and abortion, choice of treatment, and death and dying; control of communicable diseases; organ transplanation and medical resource allocation.

965 Law and Mentally Disabled Seminar (2) Psychological/psychiatric principles and relationship to law; voluntary admission and civil commitment; rights of mentally disabled persons; involuntary institutionalization; and mental health professional-patient relationship.

970 Income Tax II (3) Corporate reorganizations and distributions; transactions among corporations and shareholders. Prereq: 818.

971 Income Taxation of Entities (2) Federal income taxation of partners and partnerships, Subchapter S corporations and shareholders, and related topics. Prereq: 818. Recommended prereq or coreq: 970.

973 Wealth Transfer Taxation (5) Transfers of wealth at death (estate tax) and during life (gift tax), and of income. Readings of different methods, strategies and perspectives from recent literature. Simulation and videotape critiques, drafting of documents. Relevant ethical issues and techniques of dispute resolution.

975 Tax Theory (3) Comparative study of methods and purposes of governmental revenue collection through examination of economic theory and various actual and proposed schemes of taxation. Prereq: 818.

980 Insurance (3) Types of insurance: life, property, health, accident and liability insurance; regulation of insurance industry; interpretation of insurance contracts; insurable interest requirement; conditions, warranties and representations; coverage and exclusions; duties of insurer; excess liability: subrogation, and bad faith actions against insurers. Liability insurance defense problems: duty to defend, notice and cooperation issues, and conflicts of interest.

983 Products Liability (3) Scope of doctrine and theories of recovery: potential plaintiffs and defendants; statutory and contractual limitations on recovery; damages; causation; and defenses.

985 Social Legislation (3) Systems other than traditional social security remedies for compensating disabled persons and victims of accidents. Workers' Compensation: requirements for covered employer-employee relationship; injuries or occupational diseases arising out of and in the course of employment; nature of disability; medical and death benefits; and exclusiveness of compensation remedy against employer and co-employees. Social Security disability benefits: prerequisites for disability benefits; administrative process; rights to fair hearing; counseling and appeals.

990 Issues in the Law (2) Selected topics. May be repeated.

991 Issues in the Law Seminar (2) Selected topics. May be repeated.

994 Independent Study (1-4) Independent study under direct supervision of faculty member. Proposals must be approved by supervising faculty member and by the Academic Standards and Curriculum Committee. Maximum of one each semester during last three semesters of study.

996 Law Review (1) Completion of a potentially publishable case note, comment, or other article for the Tennessee Law Review. May be repeated. S/NC only. (Will not count toward total number of elective upper division courses taken S/NC.)

997 Moot Court (1) Participation as member of faculty-supervised interscholastic moot court competition. May be repeated. S/NC only. (Will not count toward total number of elective upper division courses taken S/NC.)

998 Planning and Drafting Project (1-4) Preparation and completion of planning and drafting project under faculty supervision in conjunction with substantive courses when such planning and drafting option is provided by course instructor. May be repeated.

Library and Information Science

(Office of the Provost)

MAJOR DEGREE

Library Science .......................................................... M.S.L.S.

Gary R. Purcell, Director

Professors:


Associate Professors:


The Graduate School of Library and Information Science provides a program leading to the preparation of librarians and information professionals for work in all types of libraries and information centers. The program of study includes a graduate curriculum leading to the Master of Science in Library Science. The program is accredited by the American Library Association.

The mission of the school is to provide excellence in teaching, research, and public service in library and information science. The goals and objectives of the school are: A. To prepare students to understand the nature of information and the role of the library and other information agencies in the management of information resources, and the facilitation of information transfer. Students will demonstrate:

1. Knowledge of the historical role of libraries and other information agencies in society.

2. A knowledge of how information flows through contemporary society.

3. An understanding of the role of the librarian and/or information specialist as a mediator between information and the user with an emphasis on the improvement of the quality of information services in response to the needs of society.

The Graduate School of Library and Information Science 109
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 up to 20 hours each week and thus may extend the period required for the degree. Similar opportunities exist with some other libraries and information agencies in the Knoxville area.

Work opportunities in a scientific-technical environment are available through subcontracts with Oak Ridge National Laboratory and the Department of Energy. A limited number of graduate assistantships are available through the school. Assistantships of this type carry a waiver of tuition and fees as well as a stipend and require that recipients work 10 hours per week in the school.

The program is listed in the Academic Common Market of the Southern Regional Education Board. Students residing in Arkansas, Georgia, West Virginia, or Virginia can normally qualify for in-state fee status by applying to the Academic Common Market coordinators in their state capitals.

For application forms and information about financial aid and other information about the MSLS in Library and Information Science, write to:

Gary R. Purcell, Director
Graduate School of Library and Information Science
University of Tennessee
804 Volunteer Blvd.
Knoxville, TN 37996-4330

GRADUATE COURSES

430 History of the Book (3) History of writing and various methods of bookmaking from earliest times through 19th century. Sp

475 Utilization of Instructional Media (3) (Same as Curriculum and Instruction 475.)

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

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

510 Information Professionals and Their Organizations (3) Variety and prospects of information professionals; professional organizations; achievements, responsibilities, goals, and issues. E,Su,A

520 Technical Services (1) Technical services principles and techniques: acquisitions, cataloging, and automated cataloging, structure and use of library catalogs, subject organization and indexing. E,Su,A

521 Technical Services II (3) Library of Congress subject organization and description, automated cataloging and cataloging, cataloging of serials and more difficult materials. Prereq: 520. Sp

530 Information Sources and Services (3) Basic bibliographic and information sources, online databases, interview and search techniques, selection and evaluation of information collections and development and evaluation of services. E,Su,A

531 Sources and Services for the Social Sciences (3) Information sources in social sciences: political science, sociology, psychology, geography, history, anthropology, social welfare, business, education, and law. Prereq: 530. Sp

532 Sources and Services in Science and Technology (3) Information sources in engineering, physical and life sciences. Prereq: 530. Sp

533 Sources and Services for the Humanities (3) Information sources in philosophy, religion, fine arts, performing arts, literature and language, and history. Organization of collections for optimum use. Prereq: 530. Su


540 Research Methods in Library and Information Science (3) Research methods applicable to librarianship and information management. Process and conduct of empirical research; analysis of published research. Prereq: Admission to program or consent of instructor. E,Su,A

550 Library and Information Agency Management (3) Management and organizational concepts applicable to libraries and other information agencies. Prereq: Admission to program or consent of instructor. E,Su,A

551 School Libraries and Media Centers (3) Planning, implementing and evaluating school library programs. Curricular involvement, role of technology, relationships with district and state services. F,Su

552 Academic Libraries (3) Development and present status, mission and objectives with higher education institutions, trends, problems, recurring issues. F

553 Special Libraries and Information Agencies (2) Development and present status, scope and objectives, administrative and organizational problems and techniques. F

554 The Library in the Community (3) Application of marketing analysis for planning and policy formulation. Public library focus. Sp

560 Development and Management of Collections (3) Philosophy and processes of building and managing collections in libraries and information media; envionment; community analysis; policy statements; collection evaluation; and preparation of buying lists. Prereq: 550. E,Su,A

561 Contemporary Book Publishing (3) Creation, design, production, marketing, and distribution of materials acquired by libraries; various types of publishers. F

562 Serials (3) Serials collections: selection, acquisition, bibliographic control, storage, maintenance, and public service. Prereq: 560 or consent of instructor. Sp

565 Nonbook Materials (3) Selection, acquisition, descriptive, and functional elements of records management and archives programs within various types of organizations, management of creation, distribution, retention, storage, retrieval, protection, and disposition of organizational records regardless of information medium. Sp

565 Records Management and Archives (3) Objectives and functional elements of records management and archives programs within various types of organizations, management of creation, distribution, retention, storage, retrieval, protection, and disposition of organizational records regardless of information medium. Sp

569 Advanced Production of Audiovisual Software (3) (Same as Curriculum and Instruction 589.)


572 Resources for Young Adults (3) Critical survey of books and materials for young adults; personal, vocational and recreational needs and interests. Evaluation, selection, and utilization for school and public libraries. Sp

573 Services for Children and Young Adults (3) Philosophy and objectives of public and school library services for children and young adults. Reading, listening, and viewing guidance for individuals and groups. Program planning, implementation, and evaluation. Prereq: 571 or 572 or consent of instructor. Su
574 Adult Materials and Services (3) Fiction and subject categories, popular and standard; reading, listening, and viewing guidance to meet adult interests; development of specialized collections; services for adults. F

580 Foundations of Information Science (3) Identifies attributes of information; information theory, reliance, usage and use studies, bibliometrics, and major components of information retrieval system design. Relevant prerequisites: findings to library and information system practice. F.S.P

581 Information in Society (3) Characteristics of an information society, knowledge and information, effect of technological innovation, use and effect of media. F

582 Automation (3) Computer concepts and their applications to basic library and information center operations. E.S.U.A

583 Information Systems Analysis and Design (3) Tools and methodologies in library/information agency systems planning and implementation. Role and training of systems analyst; systems studies from planning through implementation and evaluation, and related topics. Sp

584 Bibliographic Database Design (3) Design and construction of bibliographic databases, record and database structure, document representation, indexing, abstracting, thesaurus construction and maintenance, and information retrieval. Sp

585 Information Technologies (3) Computer-based and non-computer related media and methods for information storage, retrieval, and transfer within and external to library/information center environment; existing and prototype systems and interfacing of technologies. Prereq: 582 or consent or instructor. Sp

590 Problems in Library and Information Science (3-6) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

591 Supervised Readings in Library and Information Science (3-6) Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs.

592 Seminar in Library and Information Science (3) Prereq: Consent of instructor. May be repeated with consent of advisor. Maximum 6 hrs. E

593 Independent Study (3) Prereq: Consent of advisor. Maximum 6 hrs. E

599 Practicum (3) Opportunity to translate theory into practice under guidance of qualified information professionals. Prereq: Completion of core courses relevant to student's practicum design. Written consent of advisor and approval of practicum coordinator. May be repeated with consent of advisor and practicum coordinator. E

Life Sciences

(Office of the Provost)

MAJOR

DEGREES

Life Sciences.......................... M.S., Ph.D.

Howard I. Adler, Chair

Coordinating Council:

Becker, Jeff M., Cellular, Molecular and Developmental Biology
Bright, Janice M., Veterinary Medicine
Burghardt, Gordon M., Ethology
Duggal, D. K., Biotechnology
Farkas, W. R., Environmental Toxicology
Hickok, L. G., Plant Physiology and Genetics
Vaughan, Gerald, Physiology

The programs leading to the M.S. and Ph.D. degrees in Life Sciences are interdepartmental and intercollegiate programs which augment the programs of individual departments.

The Life Sciences Council supports studies and research in the following concentrations: physiology; biotechnology (M.S. only); cellular, molecular and developmental biology; environmental toxicology; ethology; and plant physiology and genetics. Students interested in any of these areas should contact either the chair of Life Sciences or the director of the area of interest. Each program is overseen by a committee and may have unique admission and graduation requirements.

ADMISSION REQUIREMENTS

1. A Bachelor’s degree with a major in a biological, behavioral, or physical science.
2. GRE (verbal, quantitative, analytical).
3. Three letters of recommendation.
4. Coursework including a year of calculus (differential and integral), one year of chemistry, and a year of physics. Specific courses and minimum grades may be required. Sp

DEGREE REQUIREMENTS

The Master’s degree requires a minimum of 30 semester hours of study approved by the student’s committee, a thesis, and an oral examination. Within the biotechnology program only, a non-thesis M.S. option is available. Students choosing this option are expected to accumulate (1) two summers’ co-op experience in an appropriate industry. An evaluation by supervisor and a written report are required (529, Biotechnology Practicum Cooperative Experience, maximum 4 hrs.); (2) A written report in the form of a scientific paper in an area of specialization chosen by the student and advisor. The minimum requirements for the doctoral degree include at least 6 hours above the 600 level, 24 semester hours of course 600, a pattern of courses approved by the student’s committee, a comprehensive examination, a doctoral dissertation, and a defense of dissertation. Individuals may have additional requirements.

CONCENTRATIONS

Biotechnology

The biotechnology program will prepare students to participate in the wide variety of opportunities presented by the use of living cells and their components for the production of useful materials. This will be achieved at the M.S. level by a prescribed course of study of the biology and biochemistry of cells and molecules; by formal study of cells and of engineering aspects of biotechnology; and by the development of special expertise in areas such as animal embryo manipulation, automated chemical synthesis of macromolecules, bioprocess engineering, bioproducts and biotransformations, liposomes, monoclonal antibodies and image processing, monoclonal antibodies and hybridoma technology, plant tissue culture, recombinant DNA technology and risk assessment, and modeling. The production of a research thesis or an industrial co-op experience plus an area of specialization will also be an important part of the training experience. Required courses are Life Sciences 509, 511, 512, 531, 532; Biochemistry 511; Microbiology 410; Botany 451; Chemical Engineering 475; and Zoology 507.

Cellular, Molecular and Developmental Biology

The interdepartmental program in cellular, molecular and developmental biology includes research in structural or functional aspects of cells or subcellular components, or the interactions between cells. Required courses are Life Sciences 511, 512, 531, and 532.

Environmental Toxicology

The toxicology program provides intensive training in basic toxicological principles and techniques. Courses and research expose trainees to mechanisms of intended and unintended interactions between living systems and potentially toxic agents from the point of view of biochemistry, physiology, ecology, public health, environmental law and regulation, pest management, pollution control and repair, and testing and residue analysis of toxicants. Required courses are Biochemistry 561, 562, 604; and Life Sciences 510.

Ethology

Ethology is the naturalist study of normally occurring animal and human behavior. The program provides intensive training in basic ethology with specialized studies available in the development, evolution, and physiology of behavior; comparative psychology; human ethology; and behavioral ecology and sociobiology. Required courses for the Master’s are Psychology/Zoology 450, 458; Zoology 524, 583; Statistics 531-32; and Zoology/Psychology 516. The Ph.D. requirements are the same as for the Master’s with the additional requirements of one additional statistics course and six semester hours of courses numbered above 600 approved by student’s committee.

Physiology

The interdepartmental program in physiology includes research in the areas of cellular, comparative, developmental, exercise, muscle, neurophysiology, regulatory, or reproductive. Required courses are Zoology 520, 521, 240, 350, 420; Biochemistry 410; four 600-level semesters; and a statistics sequence.

Plant Physiology and Genetics

This program provides the opportunity for intensive training and research experience in areas transcending the usual boundaries of botany, biochemistry, and agricultural plant sciences. It devotes itself to seeking solutions of problems concerning the interactions of physiology and genetics in applied and fundamental aspects of plant science. Required courses are Life Sciences 510; Botany 521, 522; Biochemistry 511, 512; Plant and Soil Science 471 or Zoology 560; Plant and Soil Science 551; Microbiology 410.

GRADUATE COURSES

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

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

509 Biotechnology Seminar (1-2) Topics of importance to biotechnology. May be repeated. Maximum 6 hrs.
510 Special Topics in Life Sciences (1-3) Specializations in biotechnology, cellular, molecular, and developmental biology; environmental toxicology; ethology; plant, physiology and genetics; and physiology. May be repeated. Maximum 9 hrs.

511 Advanced Cellular Biology (3) Cell structures and functions at molecular and supramolecular level. Membrane structure, function, and biogenesis; cellular communication; receptors and membrane flow; growth regulation and oncogenes; plant cell structure and function; contractility and motility; mitosis and meiosis; blood and immune cells.

512 Advanced Molecular Biology (4) (Same as Biochemistry 512.)

525 Research Practicum in Life Sciences (1-3) Individual sections for each of biotechnology, cellular, molecular and developmental biology; environmental toxicology; ethology; plant physiology and genetics; and physiology. May be repeated. Maximum 9 hrs.

529 Biotechnology Practicum Co-operative Experience (2) Work experience in commercial organization for students undertaking non-thesis option of biotechnology concentration. Evaluation by supervisor and written report by student. May be repeated. Maximum 4 hrs.

531 Biotechnology Laboratory (3) Growth of microorganisms, analysis of extracellular and intracellular components.

532 Biotechnology Laboratory (3) Pilot scale yeast cultivation, enzyme isolation, purification and characterization. Application of purified enzymes to food production fermentations and fermentation process control.

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

610 Advanced Topics in Life Sciences (1-3) Topics vary. May be repeated. Maximum 6 hrs.

**Logistics**

*See Marketing, Logistics and Transportation*

**Management**

(College of Business Administration)

**MAJOR DEGREES**

MBA, Ph.D.

Oscar Fowler, Chair

Professors:

Boling, Ronald W. (Emeritus), Ph.D., Stanford
Dewhirst, H. Dudley, Ph.D., Pennsylvania
Ho, J. C., Ph.D., Stanford
James, Lawrence R., Ph.D., Utah
Liliban, John M., Jr. (Emeritus), Ph.D., Purdue
Neel, C. Warren, Ph.D., Alabama
Reed, S. Kyle (Emeritus), Ph.D., Edinburgh
Reese, Don (Emeritus), Ph.D., Iowa
Vanegroth, S. C. (Emeritus), Ph.D., Pennsylvania
Wagoner, George A. (Emeritus), M.S., Indiana
Whitlock, G. H. (Emeritus) (Distinguished Prof.), Ph.D., Pennsylvania

Associate Professors:

Dobbins, Gregory H., Ph.D., VPI
Fowler, Oscar S., Ph.D., Georgia
Gilbert, Kenneth C., Ph.D., Tennessee
Ladd, Robert T., Ph.D., Georgia
Maddox, Robert C., Ph.D., Texas

Rush, Michael C., Ph.D., Akron
Russell, J. E. A., Ph.D., Akron

Assistant Professors:

Bowers, Melissa R., Ph.D., Clemson
Campbell, P. G., M.S., Austin Peay
Fox, Dale R., Ph.D., Purdue
Fryxell, Gerald E., Ph.D., Indiana
Hudson, Robert, Ph.D., Minnesota
Kaplan, Lori A., Ph.D., Michigan
Miller, Alex, Ph.D., Washington
Noon, Charles E., Ph.D., Michigan
Patei, Minnie H., Ph.D., Georgia

**BUSINESS ADMINISTRATION CONCENTRATIONS**

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

**MBA Concentrations:** Management, Forest Industries Management.

Minimum course requirements for management—Three courses from the following: 510, 531, 521, 522, 541, 542, 551, 571, 593. Selection must be approved by the Management Department MBA advisor. For forest industries management — 511, 513; Forestry 560, 565.

**Ph.D. Concentration:** Management.

Minimum course requirements are for operations management — 541 and 542; two semesters of 640 (may be repeated for credit); one additional semester of approved doctoral seminar work. For strategic management — 513, 510, 511, 512.

**GRADUATE COURSES**

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

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

504 Management of Organizational Behavior (3) Integration of individual and group differences, organization theory and design, motivation, human resource planning, and career implications with strategy, planning, and decision making.

505 Operations and Logistics Management (3) Concepts and techniques for managing operations and distribution systems. (Same as Transportation 506.)

511 Organizational Theory: Integrated Structure and Behavior (3) Cases, group projects, discussion; organizational theories, organizational effectiveness; contextual factors of organizations; environment, size, technology, organizational structure configurations, organization design; social influences on organization effectiveness; motivation, leadership, group behavior, intergroup relations, organization change and development.

513 Strategic Planning (3) Theoretical and applied literature, successful strategic positioning of business in various environments. Analysis of industry notes and case histories. Coreq Business Administration 509.

521 Personnel Administration (3) Personnel functions and human resources management. Community relations, recruiting, selection, training, performance evaluation, wage and salary administration, legal framework as it affects personnel.

522 Labor Relations and Collective Bargaining (3) American labor history, structure and philosophy of bargaining, dispute settlement, and contract administration. (Same as Economics 562.)

525-26 Industrial and Organizational Psychology (1-3) Readings in industrial and organizational psychology. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.

531 Management of Technology-Based Organizations (3) Role of technology and innovation in formulation and implementation of strategic management, and research and development function and coordination with other functions. Management of scientists and engineers.

541 Operations Management I (3) Techniques applicable to design of systems in operations function.

542 Operations Management II (3) Operations planning and control function. Application of models to real-world systems.

551 Management of New Ventures (3) Integration of various functional disciplines and their application to general management of ventures formed both within larger corporations and independently. Preparation of a venture plan, case analysis.

567-68 Proseminar in Industrial/Organizational Psychology (3) Basic thought, concepts, and issues required for advanced graduate study in industrial and organizational psychology. Must be taken in sequence during student's first year of study in industrial and organizational psychology program. Consent of instructor required for all non-industrial/organizational psychology program students. (Same as Psychology 517-18.)

571 International Management (3) Analysis of environment of international business firms and impact of international and external factors on managerial decisions.

593 Directed Independent Study (1-3) Topic of mutual interest. Available only by prearrangement with supervising faculty member. May be repeated. Maximum 6 hrs. S/NC or letter grade.

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

601 Research Methods (3) Seminar covering broad range of issues: research process as applied to study of strategic management. Literature and examples of research. Research proposal.

610 Seminar in Advanced Organization Theory (3) Analysis of functioning of complex organizations. Classical and open systems models, organization growth and change, organizational effectiveness and design of complex organizations.

611 Seminar in Strategic Management I (3) Analysis of concepts and research in strategic management.

612 Seminar in Strategic Management II (3) Analysis of concepts and research in strategic management.

625 Seminar in Organizational Psychology (3) In-depth analysis of current theories, concepts, and issues associated with psychology of organizational leadership and work motivation. Prereq 567, 568, consent of instructor. May be repeated. (Same as Psychology 625.)

626 Seminar in Industrial Psychology (3) In-depth analysis of current issues and problems: performance appraisal/criterion development, and training and development. Prereq 567, 568, consent of instructor. May be repeated. (Same as Psychology 626.)

627 Seminar in Applied Industrial Psychology (3) In-depth analysis of the current issues, concerns, and methods: advanced quantitative psychometrics and employee selection. Prereq 567, 568, consent of instructor. May be repeated. (Same as Psychology 627.)

638 Current Topics in Industrial/Organizational Psychology (3) In-depth analysis of various topics: organizational structure, function and development, psychology and problems of interviewing, consumer behavior. Prereq 567, 568, consent of instructor. May be repeated. (Same as Psychology 638.)

640 Seminar in Operations Management (3) Research and concepts. Application of quantitative methods to operations management problems. May be repeated.

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**MADDOW, Robert C., Ph.D.**  Texas

**GILBERT, Kenneth C., Ph.D.**  Tennessee

**FOWLER, Oscar S., Ph.D.**  Georgia

**WHITLOCK, G. H. (Emeritus)**

**WAGONER, George A. (Emeritus), M.S.**  Indiana

**VANCE, S. C. (Emeritus)**

**REES, Don (Emeritus), Ph.D.**  Iowa

**LEEN, John M., Jr.**  Pennsylvania

**NUN, Charles E., Ph.D.**  Michigan

**PATEI, Minnie H., Ph.D.**  Georgia

**WAGNER, George A. (Emeritus), M.S.**  Indiana

**WHITELOCK, G. H. (Emeritus)**

**THOLOP, Distinguished Prof., Ph.D.**  Pennsylvania

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**EUFKUS, David E., Ph.D.**  Texas

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Management Science

(College of Business Administration and Intercollegiate Program)

MAJORS
Majors
Management Science................. M.S., Ph.D.
Business Administration ............... MBA

Kenneth C. Gilbert, Chair

Professor:
Ho, James K., Ph.D...................... Stanford
Associate Professor:
Gilbert, Kenneth C., Ph.D.............. Tennessee
Assistant Professors:
Bowers, Melissa R., Ph.D.............. Clemson
Fox, Dale R., Ph.D...................... Purdue
Kaplan, Lori A., Ph.D................. Michigan
Noon, Charles E., Ph.D................. Michigan
Patel, Minnie H., Ph.D................. Georgia Tech

Additional Committee Members:
Hilliard, Jimmy E., Finance
Leitnaker, Mary G., Statistics
Ralston, Bruce A., Geography
Sullivan, William G., Industrial Engineering

THE MASTER'S PROGRAM

The M.S. program in Management Science is an intercollegiate program and is designed as preparation for a career in the application of quantitative techniques for the solution of complex problems. The program's flexibility also makes it appropriate as preparation for doctoral study in Management Science.

Management Science coursework will expose students to both the theoretical development of quantitative techniques and their application to managerial decision making. In addition to the development of sufficient mathematical maturity for creative use of quantitative skills, the program requires concentrated study in a supporting area. Supporting areas are available in other departments of the College of Business Administration (excluding statistics) as well as in computer science, public administration, ecology, and other areas, subject to approval by the Management Science Committee.

Admissions Requirements
The Master's program requires three Graduate School Rating Forms and the GRE or GMAT. Applications are encouraged from all majors, but mathematics background equivalent of the completion of at least two years of college calculus and proficiency in a computer language is required. The program is designed to be completed in three semesters by full-time students. However, students may start the program in any semester and may pursue an M.S. degree in Management Science on a part-time basis.

Course Requirements Hours
Core Requirements
Management Science 531, 532, 533, 534 9
Statistics 563
Applied specialization area (approved by advisor) 3
Statistics elective—500 level or above (approved by advisor) 6
Mathematics 400 level or above (approved by advisor) 9
Electives selected from mathematics, statistics, computer science, and/or management science area
Total 38

A thesis option is available to qualified students who substitute 6 hours of thesis credit for the following 8 hours of coursework: Management Science 534, 3 hours in the applied area, and 3 hours of electives in any area. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The student must approve a tentative overall program during the student's first semester and must approve all courses on a semester-by-semester basis.

Recognizing the diverse backgrounds and needs of Management Science M.S. students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. For example, an undergraduate mathematics major with a strong background may be allowed to take 6 additional hours of electives in place of the mathematics requirements. On the other hand, a student lacking experience in rigorous senior-level mathematics courses will be expected to take such courses to fulfill the 6-hour mathematics requirement. The total course load will remain 38 hours for all non-thesis students and 36 hours for all thesis students; however, the number of hours of electives can be reasonably expected to vary between 6 and 12 as a function of prior background.

THE DOCTORAL PROGRAM

The Ph.D. program in Management Science under the College of Business Administration is designed to prepare students for research related to the application of mathematical tools to complex decision making. Three primary objectives of the program are:

1. to provide, through management science coursework, a thorough knowledge of common Management Science/Operations Research mathematical models and their uses;
2. to provide sufficient advanced study in a supporting area to qualify the graduate for a joint faculty position in the supporting area and management science. The candidate may choose from the business functional areas (accounting, finance, marketing, management, and transportation and logistics) or other disciplines, (e.g., computer science, forestry, ecology, and public administration);
3. to develop in the student, through coursework in mathematics, statistics and computer science, a high degree of mathematical maturity to enhance a potential career in management, research, or teaching.

Admission Requirements
The doctoral program requires three Graduate School Rating Forms and the GRE or GMAT, in addition to The Graduate School's requirements.

Coursework
A minimum of 48 semester hours of coursework taken for graduate credit (exclusive of thesis or dissertation) is required. Some of this may be the coursework from a Master's program although a Master's is not a prerequisite for the doctorate. The candidate must complete a minimum of 24 semester hours at The University of Tennessee, Knoxville, at least 6 of which must be at the 690 level. Both of these requirements are also exclusive of thesis or dissertation credits. Entering students who have completed graduate studies in applicable fields will be granted course credits for work which is equivalent to required courses in the program.

The program includes approximately 16 to 20 semester hours of coursework in the applied area.

Qualifying Examinations
The student must demonstrate mastery of probability theory and statistical inference, Statistics 563, 564, by passing a written qualifying examination. Masters of 12 to 14 semester hours in mathematics coursework must be demonstrated by passing a written qualifying examination. Topics normally include numerical analysis, either Mathematics 471, 472, 453, 571, or 571-572, and real analysis, Mathematics 445-446. Other options may be approved. In exceptional circumstances, the faculty will consider waiving the mathematics and/or statistics qualifying examinations. These requirements generally are completed by the end of the first year of the program.

There is no foreign language requirement.

Comprehensive Examination
Prior to admission to candidacy for the degree, and normally after completion of the second year of the program, the student must pass a written comprehensive examination covering the theory of deterministic and stochastic management science models. Topics included in this examination are determined on an individual basis. Students will be expected to demonstrate an integrative ability that goes beyond simple mastery of course content.

Research and Dissertation
The student must complete 24 semester hours of Management Science 600: Doctoral Research and Dissertation, through which he/she is expected to make a significant contribution to the science. A final oral examination is conducted over the dissertation and such other segments of the program that the faculty committee deems appropriate. This effort, which is beyond the minimum 48 hours of coursework, normally is completed in the third year of the program.
ACADEMIC STANDARDS
A graduate student in the College of Business Administration whose grade-point average falls below 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative graduate grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next semester’s coursework as established by the degree program for full-time students and the next two semester’s coursework as established by the degree program for part-time students.

PREREQUISITES FOR MANAGEMENT SCIENCE COURSES
The Management Science Program is interdisciplinary and students in other degree programs are encouraged to enroll in management science courses. Course prerequisites are designed to indicate the level at which courses are taught. Interested students whose prior coursework does not match the prerequisites are encouraged to seek the instructor’s guidance and consent to enroll.

BUSINESS ADMINISTRATION CONCENTRATION
For complete listing of MBA program requirements, see Business Administration. MBA Concentration: Management Science
Minimum course requirements are 532 and 534. The MBA Core is revised as follows: substitute Management Science 531 for 501, Statistics 563 for 501, and with approval of student’s advisor, substitute Statistics 564 for 501.

GRADUATE COURSES
500 Thesis (1-18) P/NP only. E
501 Quantitative Analysis for Management Decisions (3) Assignment, transportation and general linear programming problems, designed to indicate the level at which courses are taught. Interested students whose prior coursework does not match the prerequisites are encouraged to seek the instructor’s guidance and consent to enroll.
502 Registration for Use of Facilities (3-15) Required of student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E

Graduate Courses

MAJOR DEGREES
Business Administration ................. MBA, Ph.D.
David J. Barnaby, Chair

Marketing
Professors:
Barnaby, David J., Ph.D......................... Purdue
Cadotte, E. R., Ph.D......................... Ohio State
Jenkins, Roger L., Ph.D......................... Ohio State
Locander, W. B., Ph.D......................... Illinois
Woodruff, R. B., DBA......................... Indiana

Associate Professors:
McMillan, J. R., Ph.D......................... Ohio State
Reizenstein, Richard C., Ph.D.................... Cornell
Rentz, J. O., Ph.D......................... Georgia

Assistant Professors:
Faulds, D. J., Ph.D......................... Iowa
Gardial, S. F., Ph.D......................... Houston
Schumann, D. W., Ph.D......................... Missouri

Speck, P. S., Ph.D......................... Texas Tech

BUSINESS ADMINISTRATION CONCENTRATIONS
For complete listing of MBA and Ph.D. program requirements, see Business Administration.

MBA Concentration: Marketing.
Minimum course requirements are three courses from the following: 503, 504, 505, 506, 550, 593, 599, Transportation 507, Business Administration 599, Ph.D. Concentration: Marketing.
Minimum course requirements are 12 hours from among the following courses: 601, 602, 603, 604, 605, 606.

GRADUATE COURSES
501 Marketing Management (3) Marketing viewed as total system designed to plan, promote, and distribute goods and services to household consumers and industrial users. Demand analysis as basis for marketing decisions.
502 Registration for Use of Facilities (3-15) Required of student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N only. E
503 Buyer Behavior—Analysis for Marketing (3) Consumer behavior concepts and processes developed and applied to market analysis and design, and control of marketing programs. Social psychology and demographic factors that affect consumer product, brand and patronage decisions. Prereq: 501.
505 Marketing Research and Information Planning (3) Design of a rigorous marketing study from inception to implementation of results by recognizing key decision points and critically evaluating merit of research project. Prereq: 501.
506 Marketing Strategy (3) Integration of concepts and analytical skills from each component area of marketing to formulate cohesive, well-organized marketing program. Prereq: 501.
550 Market Opportunity Analysis for New Ventures (3) Concepts for understanding coverage of new ventures, MOA and various information sources and procedures; identify and analyze sales opportunities in markets for new product or service. Prereq: Consent of instructor.
593 Independent Study (3) Directed research and study. Prereq: MBA Core and consent of instructor. May be repeated. Maximum 6 hrs.
599 Special Topics Seminar (3) Topics vary: nonbusiness marketing applications, macroenvironmental issues, market segmentation, international marketing, services marketing, marketing channels, and related issues. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Marketing Theory (3) Nature and scope of marketing, role of theory development and theory testing important to marketing research.
603 Marketing Thought (3) Marketing literature across number of research areas. Evaluate individual works, determine state of research in each area, and identify areas that merit further study.
Logistics and Transportation

Professors:
Davies, F. W., Jr., Ph.D. .......... Michigan State
Dicar, Gary N., DBA .............. Indiana
Frye, J. L. (Emeritus), Ph.D. ........ Florida
Hendrix, F. L. (Emeritus).
Ph.D. ............................... North Carolina
Langley, C. J., Jr., Ph.D. .......... Penn State
Mundy, Ray A., Ph.D. ............ Penn State
Patton, E. P., Ph.D. ................ North Carolina

Associate Professor:
Foggia, J. H., DBA ................. Indiana

BUSINESS ADMINISTRATION CONCENTRATIONS
For complete listing of MBA and Ph.D. program requirements, see Business Administration.
MBA Concentration: Logistics and Transportation.
Minimum course requirements are 501, 508, and one course from the following: 503, 504, 506, 507, 593, and 599.
Ph.D. Concentration: Logistics and Transportation.
Minimum course requirements are 12 hours to include 601, 602, 603.

GRADUATE COURSES
501 Survey of Logistics and Transportation (3) U.S. logistics and transportation: physical, economic, social, and political environment; financing, managing, maintaining, and enhancing U.S. transport infrastructure.
502 Registration for Use of Facilities (3-15) P/NP only. E
503 Logistics and Transportation Economics and Policy (3) Economics and legal principles which shape the formation and administration of logistics and transportation policy in U.S.
504 Freight Carrier Systems and Management (3) Analysis of freight carrier management's efforts to reduce, maintain, and enhance U.S. transport infrastructure.
505 Operations and Logistics Management (3) Same as Management 505.
506 Logistics Systems Management (3) Development of strategy for management of logistics systems. Executive level integration of logistics operations with marketing, production, and other decision areas. Practical applications through case approach and simulation game.
507 International Logistics and Transportation (3) Logistics strategy in the multi-national firm: materials management, international sources and distribution, and importing/exporting. Issues: international carrier management and operations and comparative national transport systems analysis.
508 Executive-In-Residence Seminar in Logistics and Transportation (3) Capstone, integrative case course in logistics and transportation strategy; participation in Executive-In-Residence program that provides student interaction with top-level logistics and transportation executives.
593 Independent Study (3-6) Directed research and study. Prereq: Consent of instructor. May be repeated.
599 Special Topics in Logistics and Transportation (3-6) Seminar designed to study specific current problem areas in logistics and transportation. Topic announced prior to offering. Prereq: Consent of instructor. May be repeated.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Seminar in Logistics and Transportation Models (3) Analysis of contemporary models and methodologies in logistics and transportation research, topical coverage at discretion of instructor.
602 Seminar in Macrotransportation Systems (3) Contemporaneous national logistics and transportation systems, governmental policies in logistics and transportation sector, and current literature and research in field.
603 Research Methodology in Logistics and Transportation (3) Fundamental research process in areas of logistics and transportation, history and development of body of knowledge, and contemporary research methodology to develop student dissertation topics.

Materials Science and Engineering

(College of Engineering)

MAJORS DEGREES
Metallurgical Engineering M.S., Ph.D.
Polymer Engineering M.S., Ph.D.

Joseph E. Spriuell, Head

Professors:
Ashbee, K. H. G., Ph.D. ........ Birmingham
Bogue, Donald C., Ph.D. ........ Delaware
Borie, Bernard S., Ph.D. ........ MIT
Brooks, C. R., Ph.D. .............. Tennessee
Buchanan, Raymond A., Ph.D. .... Vanderbelt
Clark, Edward S., Ph.D. ........ California
Canonic, D. A., Ph.D. ............. Lehigh
Fellers, J. F., Ph.D. .............. Akron
Liu, J. S., Ph.D. .................. Kansas
Lowdnes, Douglas H., Ph.D. ...... Colorado
Lundin, Carl D., Ph.D. .......... Rensselear
McHargue, C. J., Ph.D. ............ Kentucky
Oliver, Ben F., Ph.D. ............ Penn State
Phillips, Paul J., Ph.D. ........... Liverpool
Spruell, Joseph E., Ph.D. ......... Cincinnati
Stansbury, E. E. (Emeritus), Ph.D.

Associate Professors:
Becker, William T., Ph.D. ........ Illinois
Liu, C. T., Ph.D. .................. Brown
Meek, Thomas T., Ph.D. ........ Ohio State
Pedraza, A. J., Ph.D. ............ National

Benson, R. S., Ph.D. ............ Florida State

Graduate programs are offered leading to the degrees of Master of Science and Doctor of Philosophy in Metallurgical Engineering or Polymer Engineering. Both the metallurgical and polymer engineering programs are flexible and interdisciplinary in nature. Students may be admitted from a wide range of disciplines; these include physics, chemistry, chemical engineering, mechanical engineering, electrical engineering, materials engineering, and engineering science programs. Prospective students should consult materials science and engineering faculty concerning development of individual concentrations or special programs compatible with their backgrounds and goals.

Areas of concentration within the metallurgical engineering program include physical metallurgy; materials processing; welding metallurgy and materials joining; corrosion behavior; failure analysis; and mechanical and physical behavior of materials. Specializations in electronic and ceramic materials are available.

Areas of concentration within the polymer engineering program include rheology and polymer processing; polymer morphology; mechanical, physical and chemical behavior of polymers; and composite materials.

THE MASTER'S PROGRAM

Option 1
Departamental requirements include the satisfactory completion of:
1. A major consisting of 12 to 18 semester hours of graduate courses in metallurgical engineering or polymer engineering. The Polymer Engineering major must include 540, 541, 543, 546, and 572. (Substitutions may be acceptable for students with significant experience in polymer chemistry, physics or engineering.)
2. One or two minors or cognate work, 6 to 12 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 503 or 504 every semester offered.

Non-Thesis Option
Under certain conditions, a candidate may apply for a non-thesis option. To be eligible, the candidate must show evidence of significant professional experience after the baccalaureate degree; at least five years of industrial experience or research publications would be examples of such evidence. A departmental faculty meeting will consider each application individually. Upon acceptance, a supervisory committee of three will be appointed, at least two being from the Department of Materials Science and Engineering. The requirements for completion of the non-thesis option are as follows:
1. A total of at least 33 hours in graduate courses in metallurgical engineering, polymer engineering and related areas. The minimum requirements are 21 hours in the Department of Materials Science and Engineering and up to 12 hours in other engineering or science courses. The candidate's degree program must be approved by the faculty committee.

Materials Science and Engineering

422 Metallurgical Fabrication (3) Principles and processes of forming; formability testing. Prereq: 302 or 201 and 320. 3 hrs or 2 hrs and 1 lab. F

424 Metallurgical Process Design (3) Property control through composition, thermal and mechanical processing; material and property selection; steels and non-ferrous alloys. Prereq: Materials Science and Engineering 201 or equivalent. F

425 Metallurgical Applications in Manufacturing and Processing (3) Fabrication methods, standards and specifications, principles of thermomechanical processing for finished and semi-finished products; casting, forming, joining, heat treatment, powder metallurgy, corrosion control. Prereq: 201. F


443 Polymer Processing (3) Rheological measurements; flow through tubes and slits, and effects and extrudate swell; selected application, screw extrusion, injection molding; synthesis, testing methods, structure development, properties. F

444 Plastics Fabrication and Design (3) Lectures, laboratories and field trips; unit operations of plastics fabrication; plastics classification; design and selection criteria; processing techniques; characterization laboratory. Sp

470 Corrosion Science and Engineering (3) Mechanisms and control of corrosion and degradation processes; thermodynamics and electrode kinetics of corrosion reactions; electrochemical measurement techniques; applications to design. Prereq: 201 or equivalent. F

471 Semiconductor Materials (3) Theory, properties and processing of semiconductors: applications to solid-state devices; basic physics of semiconductor materials; crystal growth, films, doping, annealing, etching; property and performance evaluation. Prereq: 310. F

472 Fundamental Principles of Composite Materials (3) Establishment of physical principles basic to design, manufacture and application of fiber reinforced polymers, metals and ceramics. Prereq: 302 or equivalent. F

474 Biomaterials (3) Metals, polymers and ceramics used in cardiovascular, and dental surgical implant devices; corrosion and degradation problems; material properties of primary importance; tissue response to synthetic materials. Prereq: 201. Recommended for engineering science and mechanics majors. F

475 Fracture-Safe Design (3) (Same as Engineering Science and Mechanics 423.)

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

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

503 Graduate Seminar in Metallurgical Engineering (1) Prereq: Approval of graduate program. May be repeated. S/NC only. E

504 Graduate Seminar in Polymer Engineering (1) Prereq: Approval of graduate program. May be repeated. S/NC only. E

505 Engineering Analysis (3) (Same as Chemical Engineering 505.)

522 Defects in Crystals (3) Analytical and experimental analysis of defect interactions in solids. Prereq: 421 or consent of instructor.

523 Plastic Deformation of Metals (3) Geometry and mechanisms of single crystal plastic deformation; slip, twinning, dislocation dynamics, anisotropic hardness, effect of temperature, loading rate effects; effect of ordering and solid solution alloying; polymeric behavior in terms of single crystal deformation mechanisms. Prereq: 301, 320 or consent of instructor.

524 Metallurgical Thermodynamics (3) Applications of chemical thermodynamics to metallurgical problems: refining, oxidation, surface treatments, alloy systems. Prereq: 570 or equivalent.

525-26 Welding Metallurgy (3) Welding processes; physical metallurgy of welding; phase transformation processes; heat flow; residual stresses; theories of hot cracking, cold cracking and porosity formation; applications to process utilization.

529 Diffusion in Solids (3) Phenomenology and atomic mechanisms of diffusion and solid state chemistry. Prereq: Applications of diffusion equations; random walk problems and mechanisms of diffusion; dilution in and concentration alloys; Kirkendall effect; high diffusivity paths.

530 Phase Transformations in Metallic Materials (3) Thermodynamics of phase equilibrium, theory of nucleation in solids; kinetics and morphology of diffusion controlled growth; kinetics of interface controlled phase transformations; crystallography and kinetics of martensitic transformations.

531 Advanced Corrosion (3) Analyses of corrosion processes in terms of polarization measurements and Pourbaix diagram. Influence of environmental and mechanical factors contributing to pitting, crevice, fretting, wear, fatigue and stress corrosion. Prereq: 470 or consent of instructor.


540 Basic Polymer Chemistry (3) Synthesis, reactions and degradation of polymers. Molecular characterization, solution methods and solid state analysis. Prereq: Semester of organic chemistry and thermodynamics or equivalent.

541 Fluid Mechanics and Polymer Processing (3) Navier-Stokes equations and illustrative problems; applications in chemical engineering and polymer engineering; packed and fluidized beds, multiphase systems. Basic concepts in rheology; applications in polymer processing: screw extrusion, fiber spinning, injection molding. (Same as Chemical Engineering 541.)

542 Further Topics in Polymer Processing (3) Description and analysis of selected polymer processing operations. Prereq: 541.


544 Polymer Solution Thermodynamics and Characterization (3) Theories of solutions, statistical thermodynamics. Characterization, treatment of chromatography, viscosity, light scattering and osmotic pressure. Prereq: Undergraduate physical chemistry.

545 Physical Characterization of Polymers (3) Birefringence theory; small angle x-ray and light scattering; x-ray crystallography and fibrous structures; introduction to electron microscopy.

546 Mechanical Properties of Solids (3) Types of mechanical behavior; Hookean and rubber elasticity; plastic deformation; fracture; linear viscoelasticity; dynamic mechanical behavior; and testing; loss tangent; experimental methods. Introduction to mechanical properties of polymeric composites.
above 400 are required. Of the 30 hours, 9 in courses approved
by the complete history of his/her
students may choose only three from
the following list:

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**GRADUATE COURSES**

* 400 History of Mathematics (3) Survey of development of mathematics from ancient to modern times. Does not satisfy major requirements for B.S. or M.S. in mathematics. Term paper required. Prereq: 1 yr calculus, 141-42, or equivalent.

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**401 Mathematics and Microcomputers (3)** Primarily for students seeking certification as mathematics teachers at secondary level. Use of microcomputers to study concepts and problems in mathematics. Does not satisfy major requirements for B.S. or M.S. in mathematics. Prereq: 141 plus 1 semester of discrete mathematics, 221 or 584.

**404 Applied Vector Calculus (3) Topic** from multivariable and vector calculus; line and surface integrals, divergence and theorems of Gauss and Stokes. Prereq: 241.

**405 Models in Biology (3)** Difference and differential equation models of biological systems. Prereq: 141-42 or 151-52.

**411 Mathematical Modeling (3)** Construction and anal-

**421 Combinatorics (3)** Introduction to problems of construction and enumeration for discrete structures: sequences, partitions, graphs, finite fields and geomet-
ries, or experimental designs. Prereq: 323 or consent of instructor.

**423 Probability II (3)** Law of large numbers and cen-
tral limit theorems for discrete and continuous random variables; Poisson processes; discrete and continu-
ous parameter Markov chains and their applications, Kolmogorov differential equations; Brownian motion process as limit of random walks. Prereq: 323.

**425 Statistics (3)** Derivation of standard statistical distributions: t, F, and \( \chi^2 \); independence of sample mean and variance; basic limit theorems, point and interval estimation, Bayesian estimates; statistical hypoth-
eses, Neyman-Pearson theorem; likelihood ratio and other parametric and non-parametric tests; sufficient statistics. Prereq: 323.

**431 Differential Equations II (3)** Second course in ordinary differential equations. Linear systems of differen-
tial equations, Frobenius method, Sturm-Liouville eigenvalue problems, phase plane analysis. Prereq: 200 or 251, and 331.


**439 Complex Variables I (3)** Theory of functions of complex variable: residue theory and contour integ-
als. Prereq: 241. Recommended prereq: 300- or 400-level mathematics course.

**440 Complex Variables II (1)** Applications of complex variables to steady-state temperatures, electrostatis-
cal, and fluid flow. Prereq: 443.

**445-46 Advanced Calculus I, II (3,3)** Theory of sequences, series, differentiation, and Riemann integra-
tion of functions of one variable. Prereq: 341 or consent of instructor.

**447-48 Honors: Advanced Calculus I, II (3,3)** Honors version of 445-46. Prereq: 341 or consent of instruc-
tor.

**451 Topics in Algebra (3)** Number theory and theory of polynomial equations such as quadratic reciprocity law and Sturm separation. Prereq: 351.


**455-56 Abstract Algebra I, II (3,3)** Algebraic struc-
tures: groups, rings, fields, vector spaces and linear transformations. Prereq: 351 or consent of instructor.

**457-58 Honors: Abstract Algebra I, II (3,3)** Honors version of 455-56. Prereq: 341 or consent of instruc-
tor.

**460 Geometry (3)** Axiomatic and historical development of neutral, Euclidean, and hyperbolic geometry stressing proof technique and critical reasoning. Models of Non-Euclidean geometries. Text paper. Prereq: 141-42 and 221, or consent of instructor.

**461 Topology (3)** Topology of line and plane, separa-
tion properties, compactness, connectedness, continuous functions, homeomorphisms, continua and topological invariants. Prereq: 341 or consent of instruc-
tor.
471 Numerical Analysis (3) Computation, instabilities, and error. Approximation by polynomials, orthogonal polynomials, and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems for single and systems of ordinary differential equations and stiff systems. Prereq: 371 (Same as Computer Science 471.)


490 Readings in Mathematics (1-3) Open to superior students with consent of department head. Independent study with faculty guidance. Prereq: Consent of faculty mentor to supervise independent work. May be repeated. Maximum 9 hrs.

489 Seminar in Mathematics (1-3) Students must register for number of credits suitable for participation in seminar. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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

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

503 MBA Calculus (3) Review of derivatives and antiderivatives. Functions, limits, continuity, extrema, and areas under curves. Credit available only to satisfy MBA core requirements. Prereq: 121.

504 Discrete Mathematics for Teachers (3) Mathe- matical logic and methods of argument, sets, functions and relations, combinatorics. Formally first graduate course for students seeking M.M. degree. For students of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: 1 yr calculus, 141-42, or equivalent.

505 Analysis for Teachers (3) Development of differential and integral calculus, sequences and series, exponential, logarithmic and hyperbolic functions, and applications. For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: 1 yr calculus, 141-42, or equivalent, and 504.

506 Algebra for Teachers (3) Algebraic structures: integral domains and fields and their applications to algebra of integers and polynomials. For students in Master of Mathematics program and for students in graduate programs in College of Education. May not apply toward M.S. degree in mathematics. Prereq: 1 yr calculus, 141-42, or equivalent, and 504.


525-26 Statistics (3,3) Pertinent facts from measure theory; formulation of statistical models; sufficiency, Fisher-Neyman factorization theorem, exponential families, Bayesian models; methods of estimation and optimality theory; uniform minimum variance unbiased estimates, asymptotic efficiency and optimality; the confidence procedures and hypothesis testing; optimal tests and confidence intervals; the Neyman-Pearson lemma, uniformly most powerful tests; general linear models, estimation and tests in linear models; non-parametric models, rank methods for comparison, linear regression and independence, robust tests; topics from decision theory. Prereq: 445-46. Recommended prereq: 425.

527 Stochastic Modeling (3) Models in probability applied to real-world situations; queuing theory; branching processes; Monte Carlo simulation. Prereq: 445-46 or consent of instructor.


534 Calculus of Variations (3) Necessary conditions for extrema, Euler's equation, broken extremals, Weierstrass-Erdmann conditions. Sufficient conditions for extrema, Legendre's and Jacobi's conditions, conjugate points. Multiple integrals. Prereq: 431.

536 Partial Differential Equations (3,3) First order equations, classification of equations and properties of elliptic, hyperbolic, and parabolic equations in several variables. Prereq: 445-46 and 231 or consent of instructor.

539 Seminar in Differential Equations (1-3) Consent of instructor. May be repeated. Maximum 12 hrs.


549 Seminar in Analysis (1-3) May be repeated. Maximum 12 hrs.

550 Matrix Algebra (3) Advanced topics in matrix theory: decomposition theorems and applications to matrices with special structure. Prereq: 453 or consent of instructor.

551-52 Modern Algebra (3,3) Groups, rings, modules and linear algebra; fields and Galois theory. Must be taken in sequence. Prereq: 455-56 or consent of instructor.

553 Linear Programming (3) Theory and applications. Prereq: Consent of instructor or 453 and programming ability.


555-58 Number Theory (3,3) Introduction to algebraic number theory. Prereq: 455-56 or consent of instructor.

559 Seminar in Algebra (1-3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

561-82 Topology (3,3) Topological spaces; metrizability; homeomorphic invariants of point sets. Mappings and homotopy. Covering spaces and fundamental group.

569 Seminar in Topology (1-3) May be repeated. Maximum 12 hrs.


574 Matrix Theory and Techniques in Numerical Analysis (3) Advanced topics in study of iterative and direct methods for large systems of linear equations: sparse matrix analysis, relationship to modern computer architectures. Prereqs: 453, 471-72, or consent of instructor. May be repeated. Maximum 9 hrs. (Same as Computer Science 574.)

575 Seminar in Numerical Mathematics (1-3) May be repeated. Maximum 12 hrs.

581-82 Mathematical Ecology (3,3) Deterministic and stochastic models of populations, communities, and ecosystems. Prereq: 431, 453 or consent of instructor.

583 Mathematical Evolutionary Theory (3) Population genetics and evolutionary ecology. Prereq: 431, 453 or consent of instructor.

584 Mathematical Systems Theory (3) Analytic approach to discrete and continuous dynamical control systems; optimal control. Applications to ecology. Prereq: 431, 453, 445-46 or consent of instructor.

585 Optimal Control Theory (3) Deterministic optimal control. Examples involving calculus of variations, optimal trajectories, and engineering control problems. Introduction to stochastic control. Prereq: 431, 445-46 or consent of instructor.

589 Seminar in Mathematical Ecology (1-3) May be repeated. Maximum 12 hrs.

593 Independent Study (1-15) See page 31.

598 Graduate Reading in Mathematics (1-3) Independent study with faculty guidance. Prereq: Graduate standing and consent of instructor. May be repeated. Maximum 6 hrs.

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

617-18 Lie Algebras in Mathematics and Physics (3,3) Analytical tools of mechanics and physics arising from differential and integral equations, Lie groups, differential forms, Lie algebras, applications to Hamiltonian mechanics, adiabatic and barotropic fluids and plasmas, numerical methods in continuum mechanics. Prereq: 431, 435, 457, 571-72. (Same as Physics 617-18.)
Mechanical and Aerospace Engineering

(College of Engineering)

MAJORS

Aerospace Engineering ............. M.S., Ph.D.
Mechanical Engineering .......... M.S., Ph.D.

Donald R. Pitts, Head
Associate Head

Professors:

Arimilli, R. V., Ph.D. .......... VPI
Bailey, Joel F. (Emeritus), PE, Ph.D. .... Lehigh
Braun, G. W. (Emeritus) (UTSI),
Ph.D. ............... Gottingen
Collins, Frank G. (UTSI), PE,
Ph.D. ............... California
Edmondson, A. J., PE, Ph.D. .... Texas A&M
Euler, J. A., PE, Ph.D. .......... Purdue
Frost, W. (UTSI), Ph.D. ........ Washington
Garrison, G. W. (UTSI), Ph.D. ... Cal Tech
Harwell, Kenneth E. (UTSI), Ph.D. .... Cal Tech
Holland, R. W. (Emeritus),
PE, M.S. ................. Tennessee
Johnson, W. S., PE, Ph.D. ....... Clemson
Keshock, Edward G.,
PE, Ph.D. .......... Oklahoma State
Kraner, R. J., Ph.D. .......... Oklahoma
Liston, Hardy, Jr.,
M.E. .......... George Washington
Lo, C. F. (UTSI), Ph.D. ........ Cornell
Maxwell, R. L. (Emeritus),
PE, M.S. ............... Case Western
Milligan, Manolo W., PE, Ph.D. ....... Tennessee
Newman, M. K. (Emeritus)
(UTSI), PE, Ph.D. .......... Columbia
Parang, M., PE, Ph.D. .......... Oklahoma
Peters, C. D. (UTSI), D.A.S. ......... Brussels
Pitts, Donald R. Ph.D. .......... Georgia Tech
Shahroki, F. (UTSI), Ph.D. ......... Oklahoma
Smith, G. V., PE, Ph.D. .......... Penn State
Speckhart, Frank H. (IBM Prof.),
PE, Ph.D. .............. Georgia Tech
Stair, W. Kenneth (Emeritus),
M.S. .......... Tennessee
Tucker, J. M. (Emeritus), M.S. .......... Illinois
Wilkinson, R. A. (UTSI), Ph.D. .... Tennessee
Wilson, C. C., Ph.D. .......... Purdue
Wu, J. M. (B. H. Goerhardt Prof.)
(UTSI), Ph.D. .............. Cal Tech
Young, R. L. (UTSI), PE, Ph.D. .... Northwestern

Associate Professors:

Becker, S. E., PE, Ph.D. .......... NC State
Crawford, R. A. (UTSI), Ph.D. .... Tennessee
Moulden, T. H. (UTSI), Ph.D. .... Tennessee
Schulz, R. J. (UTSI), Ph.D. ....... Tennessee
Vakili, A. D. (UTSI), Ph.D. .... Pennsylvania

Assistant Professors:

Dubey, R. V., Ph.D. .......... Clemson
Jeng, S. M. (UTSI), Ph.D. .......... Penn State
Keyhani, M., Ph.D. .......... Ohio State
Nguyen, K., Ph.D. .......... Colorado

Graduate programs in Mechanical Engineering or Aerospace Engineering are available that lead to the Master of Science and Doctor of Philosophy with concentrations in energy conversion and utilization, propulsion, heat transfer and fluid mechanics, and thermodynamics. In addition, Mechanical Engineering offers concentrations in gasdynamics, machine design and dynamics, power generation, and stress analysis; Aerospace Engineering offers structures and stress analysis, aerodynamics and gasdynamics, flight mechanics, and astroacoustics. Each student must satisfactorily complete a program of study that has been approved by the student’s committee. Specific program requirements are given below.

THE MASTER'S PROGRAM

Entrance into the Master of Science program is available to qualified graduates of recognized undergraduate curricula in mechanical or aerospace engineering and to qualified graduates of other curricula who satisfy the necessary prerequisites. Three program options are available.

Thesis Option

The requirements of this option are that the student must satisfactorily complete a program of study that includes:

1. A minimum of 24 semester hours of coursework that includes at least 12 semester hours of graduate (500-level or above) courses in mechanical and/or aerospace engineering and normally 6 semester hours of coursework (400-level or above) in mathematics.

2. A minimum of 6 semester hours of thesis.

3. Participation in the departmental seminar program.

4. Submission and defense of a written thesis that demonstrates the ability to conduct and report on an independent investigation.

5. Passing a final examination on all work submitted for the degree.

Course Option

This option is restricted to those students who have had the equivalent of a thesis experience. The evaluation of the work experience and the final selection of the student's program of study are left to the student's committee. The requirements of this option are that the student must satisfactorily complete a program of study that includes:

1. A minimum of 30 semester hours of coursework that includes at least 18 semester hours of graduate (500-level or above) courses in mechanical and/or aerospace engineering and normally 6 semester hours of coursework (400-level or above) in mathematics. No more than 3 semester hours of engineering coursework may be below the 500 level.

2. Participation in the departmental seminar program.

3. Passing a comprehensive written and oral final examination on all coursework submitted for the degree. The student's committee will be of sufficient size to include all of the study areas reflected in the course program.

Problems Option

The requirements of this option are that the student must satisfactorily complete a program of study that includes:

1. A minimum of 30 semester hours of coursework that includes at least 18 semester hours of graduate (500-level or above) courses in mechanical and/or aerospace engineering and normally 6 semester hours of coursework (400-level or above) in mathematics. No more than 3 semester hours of engineering coursework may be below the 500 level.

2. Participation in the departmental seminar program.

3. Passing a comprehensive written and oral final examination on all coursework submitted for the degree. The student's committee will be of sufficient size to include all of the study areas reflected in the course program.
1. A minimum of 24 semester hours of coursework that includes at least 12 semester hours of graduate (500-level or above) courses in mechanical and/or aerospace engineering and normally 6 semester hours of coursework (400-level or above) in mathematics.

2. A minimum of 6 semester hours in 590 Selected Engineering Problems. A written report must be presented for each problem investigated.

3. Participation in the departmental seminar program.

4. Passing a comprehensive written final examination on all coursework submitted for the degree and an oral examination on all work (including problems).

THE DOCTORAL PROGRAM

Admission into the doctoral program will be granted to those applicants who have demonstrated superior achievement in their engineering backgrounds.

The student must satisfactorily complete an approved program of study that includes a minimum of 72 semester hours credit beyond the Bachelor's degree, exclusive of credit for the M.S. thesis or problems, including:

1. A minimum of 24 semester hours in doctoral dissertation.

2. A minimum of 12 semester hours in mathematics in courses numbered 400 or above.

3. A minimum of 24 semester hours in mechanical and/or aerospace engineering courses numbered 500 and above, with at least 9 semester hours of 600-level courses. These are exclusive of thesis, problems, or dissertation credit.

4. Participation in the departmental seminar program.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UTK on an in-state tuition basis. The Ph.D. program in Aerospace Engineering is available to residents of the states of Arkansas, Kentucky, or South Carolina. The M.S. in Aerospace Engineering is also available to residents of Kentucky. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

Senior (400-level) mechanical and aerospace engineering courses may be taken for graduate credit by non-mechanical or non-aerospace engineering majors, if approved by the student's major department. Mechanical or aerospace engineering majors may not normally use more than one 400-level engineering course to meet their advanced degree requirements. Non-mechanical or non-aerospace engineering graduate students should consult with instructors regarding prerequisites for undergraduate courses.
541-42 Research in Mechanical Engineering I and II (3,3) Design of experiments; data analysis; experimental investigation. Prereq: Consent of instructor.

551-52 Mechanical Engineering Design (3,3) Design of mechanical engineering devices and systems. Prereq: Consent of instructor.


560 Computer Aided Mechanical Design (3) Application of computer aided design (CAD) and computer assisted manufacturing (CAM) tools to mechanical design problems. Prereq: 141, 331, 351 or equivalent.

561 Experimental Stress Analysis (3) Experiments in stress analysis, photoelasticity, strain gauges. Prereq: Consent of instructor.

567-68 Dynamics of Machinery (3,3) Kinematics and kinetics; fixed, moving and rotating co-ordinate systems; linear and angular momentum; energy methods; computational techniques derived from Lagrangian mechanics; variable mass; rigid body dynamics. Prereq: 389 or consent of instructor.

569 Vibrations (3) Forced and forced vibration of single and multiple degree of freedom systems linear and nonlinear. Prereq: Undergraduate vibrations course.


581 Rocket Propulsion I (3) Rocket propulsion fundamentals; thermodynamics of nonreacting and chemically reacting ideal gases; rocket nozzle design; ideal rocket performance parameters; rocket heat transfer; chemistry of propellants; liquid rocket engine systems; ground testing; introduction to solid propellant rockets. Prereq: Consent of instructor.

582 Rocket Propulsion II (3) Solid propellant rocket performance, homogeneous and heterogeneous propellant chemistry and combustion system performance, thermal decomposition and gas phase reaction models; effect of chamber pressure and additives on propellant burn rates, erosive burning; analysis of two-phase solid rocket exhaust flow. Introduction to nozzle and initial performance; propellant: electrical resistance and electric field (ion) engine performance, magnetohydrodynamic thrusters, traveling wave thrusters; electric propulsion systems. Prereq: Consent of instructor.

584-85 Turbomachinery Systems I, II (3,3) Ideal cycle analysis of turbine engines, real cycle analysis, component performance analysis, component interactions and systems integration (inlets, nozzles, combustors, compressors, turbines), flowthrough theory, turbine engine component matching, transient operation, surge and rotating stall, engine control systems, structural considerations. Prereq: First year graduate standing and consent of instructor.


588 Measurement Science II (3) Same as Nuclear Engineering 589, Chemical Engineering 589, Civil Engineering 589, Electrical and Computer Engineering 589, Engineering Science and Mechanics 586, and Aerospace Engineering 589.

590 Selected Engineering Problems (2-6) Enrollment limited to students in problems program. Prereq: Consent of advisor. May be repeated. S/NC only.

595 Seminar (1) All phases of mechanical engineering, reports on current research at UTK. May be repeated. S/NC only.

599 Special Topics in Mechanical Engineering (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. Prereq: Consent of instructor.

601 Advanced Convection Heat Transfer, Fluid Mechanics and Mass Transfer (3) Stagnation point and high speed viscous boundary layer flows; problems in heat transfer at high supersonic and hypersonic speeds; laminar and turbulent boundary layer heat transfer with surface melting, ablation, sublimation; effects of gas species recombination; stagnation point heat transfer, Lee’s integral solution for high speed boundary layers; heat flux scaling rules; mass transfer and radiation cooling techniques. Prereq: 512 and consent of instructor.

611 Advanced Convection Heat Transfer, Fluid Mechanics and Mass Transfer (3) Stagnation point and high speed viscous boundary layer flows; problems in heat transfer at high supersonic and hypersonic speeds; laminar and turbulent boundary layer heat transfer with surface melting, ablation, sublimation; effects of gas species recombination; stagnation point heat transfer, Lee’s integral solution for high speed boundary layers; heat flux scaling rules; mass transfer and radiation cooling techniques. Prereq: 512 and consent of instructor.


642 Advanced Topics in Thermodynamics (3) Comparison of macroscopic and microscopic approach; equilibrium of pure substances, metastable states. Non-equilibrium thermodynamics. Prereq: Consent of instructor.


Aerospace Engineering

GRADUATE COURSES

422 Aerodynamics (3) Theory and design of aerodynamic bodies for desired characteristics. Potential flow theory, viscous effects, compressibility effects. Sub-sonic, transonic, and supersonic aerology. Prereq: 370, F.

423 Viscous Flow (3) Boundary layer theory; laminar and turbulent flow; compressibility effects; numerical solution methods. Prereq: 351, Mechanical Engineering 391. F.


425 Propulsion (3) Principles of propulsion devices; turbo-jet, ram jet and rocket engines. Prereq: 351. F.

426 Introduction to Aerospace Design (2) Design process, synthesis, safety, reliability, patents, product liability, computational fluid dynamics, optimization, design standards, design studies. Individual design project reports. Prereq: 351, 370, 383. Coreq: Mechanical Engineering 344. F.


449 Aerospace Engineering Laboratory (3) Designing, constructing, and reporting results of experimental preliminary test standards and specifications. Analysis of data and formation of conclusions. Prereq: 345, 351. 3 labs. F.

494-95 Selected Topics in Aerospace Science (1-4, 1-4) Current problems and topics in aerospace science. Prereq: Consent of instructor.

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

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

511 Inviscid Flow (3) Kinematics and dynamics of inviscid fluids; potential flow about body, conformal mapping. Prereq: 422 or Mechanical Engineering 551, Mathematics 425 or equivalent.

512 Viscous Flow (3) Equations of viscous fluid flow; laminar and turbulent flow; transition; separation; bound- ary layer theories; exact and approximate solutions. Prereq: Mechanical Engineering 531 or equivalent.

513 Experimental Methods in Fluid Mechanics (3) Experimental techniques with laboratory experiments; representative experiments: hot wire anemometry and correlations; pressure measurement; sting and cascade wind tunnel tests, water table experiments, supersonic flow experiments, boundary layer measurements, laser- optical measurement techniques. Prereq: 423 or Mechanical Engineer- ing 531.

515-16 Air Vehicle Aerodynamics and Performance (3,3) Application of aerodynamics principles to air vehi- cles to provide estimates of performance, stability, and control characteristics; subsonic to hypersonic flow. Relations among thrust, drag, lift and attitude, stability, control characteristics, trajectory optimization. Prereq: 422: 515 for 516.

521-22 Aerodynamics of Compressible Fluids (3,3) One-dimensional internal and external flow; waves; small perturbation theory; slender body theory; simi- larity rules; method of characteristics. Prereq: 422 for 521, 521 for 522.

525 Hypersonic Flow (3) slender body flow; simi- larity theory; supersonic and hypersonic flow; viscous interactions, free molecule and rarefied gas flow. Prereq: 512.

527-28 Aerospace Ground Test Facilities (3,3) Atmos-pheric models and similarity considerations; atmospheric test facilities; continuous and intermittent wind tunnels and ballistic ranges; propulsion test facilities or air breathing and rocket engines: space environment and space vehicle test facilities. Prereq: 512 and 521, Mechanical Engineering 513 and 522.

531 Magnetohydrodynamics (3) Electromagnetic field theory; chemical kinetics; thermodynamic and thermophysical properties of gas plasmas; governing equations and applications. Prereq: 422 and Mathemat- ics 471.

532 Introduction to Turbulence (3) Macroscopic effects, analogies, statistical treatment, correlation functions, mean flows, analysis; turbulence in shear flows and pipe flow. Prereq: 511-12.

534 Atmospheric Entry (3) Reentry trajectories; lift and drag during reentry; vehicle motion and stability during reentry; aerodynamic heating and heat protec- tion systems. Prereq: 522. Recommended prerequisite: 512.

544 Transonic Flow (3) Nature of flow at transonic speeds; small disturbance theory; shock wave properties; shock-free flows; strong shock, compression and expansion phenomena. Prereq: 522.

Advanced Viscous Flow Theory (3)
Stability, control, longitudinal directional and lateral stability and control. Coupled modes. Motion with free and fixed flight control surfaces. Automatic control systems. Prereq: 423, 551.

556 Vertical or Short Take Off and Landing Aircraft (3)

557 Aerospace Vehicle Flutter and Vibration (3)

558 Aeroelasticity (3)

561 Fundamentals of Aeroacoustics (3)
Generation, propagation and absorption of sound in static and moving media. Prereq: Consent of instructor.

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

589 Measurement Science II (3)
Same as Nuclear Engineering 589, Chemical Engineering 589, Civil Engineering 589, Electrical and Computer Engineering 589, Engineering Science and Mechanics 589, and Mechanical Engineering 589.

590 Selected Engineering Problems (2-6)
Enrollment limited to students in problems program. Prereq: Consent of advisor.

595 Seminar (1)
All phases of aerospace engineering reports on current research at UTK. May be repeated. S/NC only.

599 Special Topics in Aerospace Engineering (1-3)
May be repeated. Maximum 6 hrs.

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

631 Magnetohydrodynamics I (3)
Electromagnetic field equations. Motion of a charged particle, statistical description of plasma, Boltzmann equation, conduction and diffusion in ionized gases, continuum magnetohydrodynamic equations. Prereq or coreq: 512. Prereq: Mathematics 561 or equivalent.

632 Magnetohydrodynamics II (3)
Alfvén and shock waves, exact solution for magnetohydrodynamic channel flow, one-dimensional model of channel flow, engineering applications of magnetohydrodynamics, propulsion and power generation. Prereq: 631 and Mathematics 562.

641-42 Physical Gas Dynamics (3,3) High speed, high temperature gas flow from molecular point of view. Kinetic theory, statistical mechanics, equilibrium flow, vibrational and chemical rate processes, non-equilibrium vibrational and chemical flow, non-equilibrium kinetic theory, flow with translational non-equilibrium. Prereq: 522, Mechanical Engineering 522.

645 Theory of Turbulence (3)
Same as Engineering Science and Mechanics 645.

651-52 Advanced Aerodynamics (3,3) Subsonic, transonic, and supersonic flows treated in generalized and unified manner with combined viscous/viscous effects. Relationships among various regimes of fluid flow. Fundamental assumptions, limitations of approximations and consequences. Foundations of gas dynamics, applications to airfoil or jet propulsion, rocket, ground testing and jet propulsion. Discussion of special topics according to interest of students. Prereq: 511, 522.

681 Advanced Viscous Flow Theory (3)

680 Advanced Topics in Aerospace Engineering (3)
Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

Medical Biology

(College of Medicine-Knoxville Unit)

Carmen B. Loizzo, Acting Chair

Professors:
Chen, J. P., Ph. D. ........................................ Penn State
Farkas, W., Ph. D. ........................................ Duke
Fuhr, J. E., Ph. D. ........................................... St. John's

Associate Professors:

Wust, Carl J., Ph. D. ....................................... Indiana

Matthewson, K., Ph. D. ................................... Washington Switzer, R. C. III, Ph. D. ......................... Michigan State Tyler, J., Ph. D. .......................................... SUNY Buffalo Worthington, R. E., Ph. D. ............ Washington (St. Louis)

The Department of Medical Biology of the College of Medicine-Knoxville Unit was formed from the faculty of The University Memorial Research Center and Hospital in 1978. The Research Center was established in 1956. The faculty has research, education, and service interests in cancer, blood diseases, metabolism, toxicology, neurosciences, birth defects, cytogenetics, and clinical genetics. Courses in these areas are offered to students at the graduate and undergraduate levels. Elective courses are also available to students in the College of Medicine.

The faculty with the College of Veterinary Medicine participates in the graduate program leading to M.S. and Ph. D. in Comparative and Experimental Medicine. Other advanced degree candidates may do thesis research in the department by arrangement with other life science departments at the University.

GRADUATE COURSES

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

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

508 Graduate Research Participation (3) Advanced research techniques while conducting individual biomedical research projects under supervision of faculty. Open to all graduate students. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 9 hrs. S/NC only. E

521 Principles of Oncology (3) Lectures, classroom discussion, and case reports reviewing major topics of oncology. Prereq: Biology 220-30 or consent of instructor.

522 Special Topics in Cancer (1-3) Prereq: 521 and consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

531 Principles of Hematology (3) Pathophysiology of blood and blood forming systems. Lectures, class discussions and demonstrations. Prereq: Upper division histology and/or cell biology, Zoology 410 and 420.

532 Special Topics in Hematology (1-3) Prereq: 531 and consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

533 Biochemistry of Coagulation, Fibronolysis and Hemostasis (2) Biochemical mechanisms underlying processes of coagulation and fibrinolysis and involvement of platelets in hemostasis. Hemostatic dysfunction arising from deficiency, thrombosis, and clotting factor deficiencies. Prereq: Biochemistry 410-19 or equivalent. S/A

541 Molecular Basis for Metabolic Disease (4) Metabolic diseases of humans and animals. Molecular mechanisms in inborn errors of metabolism, toxic reactions and deficiency states. Clinical and pathologic correlations. Prereq: Biochemistry 410-19 or equivalent. F,Sp

542 Special Topics in Metabolic Disease (1-3) Biochemical and physiological basis of selected diseases of humans and animals. Clinical-pathologic correlations. Prereq: 541 and consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

543 Metabolism of Drugs (1) Drug mechanisms of action: membrane transport, enzyme reactions, ionization, stereochemistry and metabolic pathways. For students interested in biochemical pharmacology. Prereq: Biochemistry 350. Sp

545 Clinical Genetics (3) Human genetic disorders; new developments in cytogenetics, molecular genetics, clinical diagnosis and prevention. Prereq: Biology and genetics background or consent of instructor.

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

610 Medical Biology Seminar (1) Invited speakers. Topics posted in advance. May be repeated. S/NC only. F,Sp

611 Advanced Topics in Medical Biology (1-3) New developments in biological research applicable to clinical medicine. Prereq: Upper division for doctoral candidates in Comparative and Experimental Medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

652 Special Topics in Pathology (1-3) Pathologic anatomy, biochemical pathology, and related areas. Primarily for doctoral candidates in Comparative and Experimental Medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

Metallurgical Engineering

See Materials Science and Engineering

Microbiology

(College of Liberal Arts and College of Veterinary Medicine)

MAJOR DEGREES

Microbiology .............................................. M.S., Ph. D.
Veterinary Medicine ................................. D.V.M.
Microbiology

The Department of Microbiology offers both the M.S. and Ph.D. Students have the option of selecting from a variety of graduate research programs. For a departmental brochure, contact the department head.

ADMISSION REQUIREMENTS

Students are expected to have completed an undergraduate program with a 3.0 or better GPA on a 4.0 system. Included in the undergraduate course credits should be (1) a full year of general biological science, (2) one year of calculus, (3) two years of chemistry, including one year of organic, (4) one year of physics, and (5) an introductory course in microbiology. In many cases, deficiencies in requirements may be removed by taking appropriate courses during the first year of graduate study. The department also requires the general portion of the Graduate Record Examination. A satisfactory score on each part is 550 or higher with rare exceptions. Three letters of recommendation should be submitted by current or former faculty members.

Each new graduate student meets with an advisory committee chaired by the departmental Director of Graduate Studies to plan a program of study for the first one or two semesters until a research advisor is selected. All first-year students participate in a laboratory rotation program during the first semester of study. This program allows the student to adjust smoothly to the research programs of the department, to develop a background of research procedures and concepts, and to facilitate the selection of a research professor. Usually the student selects a research professor toward the end of the laboratory rotation period. The major professor assists in the selection of and carrying out of a suitable research program and in the naming of a thesis or dissertation committee.

THE MASTER'S PROGRAM

The program leading to the M.S. is designed to provide the student with broad basic knowledge, to permit the acquisition of technical competence in the fundamentals of research, and to develop creative and independent thinking. Two to three calendar years are usually needed for the course of study that has the following requirements: (1) 30 hours including thesis credits; (2) a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F system; (3) a 3.0 GPA in courses taken in the department; (4) a complete course sequence in biochemistry; (5) coursework in at least five of the subdisciplines recognized by the department: microbial physiology, pathogenic bacteriology, virology, mycology, immunology, microbial genetics, microbial ecology, molecular biology, and applied microbiology; and (6) presentation of a research proposal and its oral defense.

THE DOCTORAL PROGRAM

The program leading to the Ph.D. is designed to develop the student's ability to pursue independent and original research in microbiology and allied fields, to teach both oral and written communication of the results of research to the scientific community, and to train effective teachers. Students may enter the program after receiving either a Bachelor's or Master's degree. Students who enter with a Bachelor's degree usually receive the Ph.D. after four or five years; those with the Master's degree usually take three or four years to complete the degree. Departmental requirements are: (1) a 3.0 GPA in all courses taken for graduate credit after 12 hours of credit have been earned in courses graded on the A-F scale; (2) a 3.0 GPA in courses taken in the department; (3) satisfactory performance in at least one semester as a teaching assistant; (4) one semester of physical chemistry; (5) one course in statistics; (6) courses in at least five of the subdisciplines listed in the Master's program; (7) satisfactory performance in a comprehensive examination that must be passed before admission to candidacy; and (8) the presentation of a written research proposal and its oral defense.

GRADUATE COURSES

410 Physiology and Genetics of Bacteria (3) Modern concepts of structure and function of bacterial cell: metabolism, energy flow, and transmission and expression of genetic information. Prereq: 310.
419 Bacterial Physiology and Genetics Laboratory (1) Laboratory exercises designed to accompany 410. Coreq: 410.
420 Pathogenic Bacteriology (2) Disease-producing microorganisms: bacteria, rickettsia, and chlamydia. Prereq: 310.
430 Immunology (2) Principles of inflammation and immunity; immunoglobulin structure and theories of formation and diversity; complement, hypersensitivities, cell cooperation and recognition in immune mechanisms; soluble factors. Prereq: Biology 220. (Same as Zoology 430.)
439 Immunology Laboratory (1) Laboratory exercises designed to accompany 430. Coreq: 430. (Same as Zoology 439.)
489 Mycology Laboratory (1) Laboratory exercises designed to accompany 480. Coreq: 480.
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
510 Microbial Physiology (3) Topics in microbial physiology and metabolism. Prereq: 410, Biochemistry 410, or consent of instructor. May be repeated. Maximum 12 hrs.
520 Pathogenesis of Infectious Disease (3) Topics in pathogenesis: microbial factors and host responses. Prereq: 420, 430, or consent of instructor. May be repeated. Maximum 12 hrs.
530 Immunology and Immunochemistry (3) Topics in molecular and genetic aspects of immune response. Immunology, and immunopathology. Prereq: 420, 430, or consent of instructor. May be repeated. Maximum 12 hrs.
540 Molecular Virology (3) Topics in replication, assembly, and expression of viruses. Prereq: 440 or consent of instructor. May be repeated. Maximum 12 hrs.
550 Microbial and Molecular Genetics (3) Topics in transmission and expression of genetic information at the molecular level. Prereq: 410, Biochemistry 410, or consent of instructor. May be repeated. Maximum 12 hrs.
560 Recombinant DNA (3) Plasmid and bacteriophage molecular biology applied to development of recombinant DNA techniques. Prereq: 410 or consent of instructor.
569 Recombinant DNA Laboratory (3) Practical details and procedures applicable to recombinant DNA methodology and techniques. Prereq or coreq; 560 or consent of instructor.
570 Applied and Environmental Microbiology (3) Topics in applied and environmental microbiology that treat physiology, metabolism, and genetics of microorganisms: fermentations and natural and simulated ecosystems. Prereq: 470 or consent of instructor.
575 Applied Microbiology and Bioengineering (3) Same as Chemical Engineering 575 and Environmental Engineering 575.
590 Laboratory Problems (2-6) Laboratory methods for development and interpretation of microbiological research. Prereq: Graduate standing. May be repeated. Maximum 6 hrs. S/NC only.
591 Foreign Study (1-15) See page 31.
592 Off-Campus Study (1-15) See page 31.
593 Independent Study (1-15) See page 31.
594 Selected Topics in Microbiological Research (2-4) Literature surveys and discussions of selected topics. Prereq: Graduate standing. May be repeated. Maximum 8 hrs. S/NC only.

Dwayne Savage, Head

Professors:
Beck, Raymond W., Ph.D.................Wisconsin
Becker, Jeffrey M., Ph.D..............Cincinnati
Brian, D. A., D.V.M., Ph.D........Michigan State
Brown, Arthur (Emeritus), Ph.D......Chicago
Montie, T. C., Ph.D.................Maryland
Rigdon, W. Stuart, Ph.D..............Yale
Rouse, B. T., Ph.D.................Yale
Savage, Dwayne C., Ph.D............California
Tayler, Gary S., Ph.D..............Idaho
White, D. C. (Distinguished Scientist), Ph.D........Indiana

Associate Professors:
Bemis, D. A., Ph.D..............Cornell
Moore, R. N., Ph.D..............Texas
Stacey, G., Ph.D..............Texas

Assistant Professor:
Weir, Jerry P., Ph.D..............Vanderbilt

Professors:
Bemis, D. A., Ph.D..............Cornell
Moore, R. N., Ph.D..............Texas
Stacey, G., Ph.D..............Texas

Assistant Professor:
Weir, Jerry P., Ph.D..............Vanderbilt
596 Laboratory Rotation (1) Familiarization with research areas in department through series of rotations in laboratories of individual faculty members. May be repeated. Maximum 3 hrs. S/NC only.

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

601 Journal Club in Microbial Physiology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only.

602 Journal Club in Microbial Pathogenesis (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only.

603 Journal Club in Immunology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only.

604 Journal Club in Virology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only.

605 Journal Club in Microbial Genetics (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only.

606 Current Topics in Biological Membrane Research (1) (Same as Biochemistry 606.)

610 Advanced Topics in Microbial Physiology (3) Prereq: 510 or consent of instructor. May be repeated. Maximum 12 hrs.

620 Advanced Topics in Microbial Pathogenesis (3) Prereq: 520, 530 or consent of instructor. May be repeated. Maximum 12 hrs.

630 Advanced Topics in Immunology (3) Prereq: 530 or consent of instructor. May be repeated. Maximum 12 hrs.

640 Advanced Topics in Virology (3) Prereq: 440, 540, or consent of instructor. Maximum 12 hrs.

650 Advanced Topics in Microbial and Molecular Genetics (3) Prereq: 520 or consent of instructor. May be repeated. Maximum 12 hrs.

670 Advanced Topics in Environmental Microbiology (3) Prereq: 570 or consent of instructor. May be repeated. Maximum 12 hrs.

Microbiology - Veterinary Medicine

See Veterinary Medicine for program description.

Music

(College of Liberal Arts)

MAJOR DEGREES
Music........................................ M.M., M.A.

John J. Meacham, Head

Professors:

Bitzas, George C., M.M....................................Converse
Brock, John P., M.M....................................Alaska
Carter, W. J. (Emeritus), D.M.A.................Eastman
Coker, J., M.A.........................................Sam Houston
Combs, F. M., M.A......................................Missouri
DeVine, George F........................................Schurz
Dorn, W., M.A.........................................Columbia
Fred, Herbert W., Ph.D............................North Carolina
Hoford, A. G. (Emeritus), M.M.......................Northwestern
Huber, Calvin R., Ph.D...............................North Carolina
Lennon, J. A., D.M.A................................Michigan
Meacham, John J., M.M..............................Northwestern
Northington, D. B., D.M.A.........................Iowa
Pederson, D. M., Ph.D.........................Eastman
Stutschenberger, D. R., D.M.A.............Maryland
VanVleto, D. (Emeritus), M.M.......................Northwestern

Associate Professors:

Adams, Faye, M.M.....................................Tennessee
Bommele, W., M.M....................................Tula
Carter, P. S., M.M......................................Colorado
Frale, Y., B.M.........................................Oberlin
Horodysky, P. M., M.M.........................Manhattan
Hough, Don, M.M......................................Tennessee
Hough, Don, M.M......................................Tennessee
Jacobs, K. A., D.M.A.................................Texas
Johnson, A. E., D.M.A..............................Stanford
MacMorran, W. S., M.M......................Wisconsin
McClelland, D. K., M.A........................Columbia
Michalopulos, L. W., M.A......................Columbia
Scarlett, William P., M.M................Louisiana State
Searle, S. R., M.M.................................Tennessee
Teachey, J. C., D.M.A...............................Florida State
Young, S. E., Ph.D....................................North Carolina

Assistant Professors:

Brown, Donald R..................................Yale
Dudberry, T. S., M.M............................Yale
Goody, D. B., M.M.................................Texas
Hawthorne, W., Ph.D..............................Cincinnati
Schroeder, E., Ph.D.................................Stanford
Sperl, G. M., M.M.................................Indiana
Tyler, C. L., M.M.................................New Mexico

The Department of Music offers the Master of Music with concentrations in accompanying, choral conducting, composition, instrumental conducting, and sacred music. A thesis is required of students in composition and theory.

THE MASTER OF MUSIC PROGRAM

A minimum of 30-33 semester hours of coursework is required for the Master of Music degree. These hours are specifically distributed according to the area of concentration. All concentrations require coursework in music history/literature and music theory and allow for elective courses. Specific curricula are available from the Department of Music.

The graduate recital is given in lieu of thesis by Master of Music degree students with concentrations in performance, pedagogy, jazz, and accompanying. A performance project is given in lieu of thesis by students with concentrations in choral conducting, instrumental conducting, and sacred music. A thesis is required of students in composition and theory.

THE MASTER OF ARTS PROGRAM

A minimum of 33 semester hours, including 18 hours of coursework above the 500 level and 6 hours of thesis, is required for the Master of Arts. Specific curricula are available from the Department of Music. A reading knowledge of French or German must be demonstrated by applicants before being admitted to candidacy.

Music General

GRADUATE COURSES

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

501 Graduate Recital (2)

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

511 Lecture Recital (2)

521 Special Topics in Performance (1-3) Prereq: Consent of department head.

561 Church Music Performance Project (1-3) May be repeated. Maximum 3 hrs.

Music History

GRADUATE COURSES

410 Music History Genre (3) Topics vary. May be repeated. Maximum 8 hrs.

420 History of Opera (3) Dramatic, vocal, and orchestral elements in opera of Italian, French, and German schools. 1600-present.

430 Symphonic Literature (3) Literature for orchestra from Baroque to present, evolution of symphony.

440 Music of North America (3) Folk and art music of U.S. and Canada from colonial times to present.

450 Composer Seminar (3) Life and works of single composer. Subjects vary.

460 Music Aesthetics (3) Nature of music and musical experience, sense perception and emotions, music, and role of artist in society. Aesthetic viewpoint of individuals and historical era through selected writings.


490 Church Music Methods and Administration (3)
Music Instrumental

GRADUATE COURSES

410 Band Arranging (3) Study and application of techniques employed in scoring for marching and concert bands. Prereq: Music Theory 320.

490 Instrumental Conducting (3) Development of knowledge and skills in instrumental conducting; study of various periods and composers and relationship of different styles to conductor's art; musical analysis and practice in conducting. Prereq: Music Education 320 or equivalent.

570 Advanced Suzuki Pedagogy (2) Study of psychology, procedures and literature utilized by Shinichi Suzuki in Japan. Prereq: 495 or consent of instructor. May be repeated. Maximum 4 hrs.

580 Band Literature (3) Band literature and origins of band, its important expanded cultivation during past century in United States and Europe.

582 Instrumental Conducting Performance (1) Jury performance; conducting band or orchestra in public.

583 Practicum for Instrumental Conductors (1) Intern experience in choral music. S/NC only.

584 Practicum for Instrumental Conductors (1) Intern experience in field other than area of major interest. S/NC only.

595 Instrumental Conducting Seminar (3) Rehearsal and performance problems and techniques allied to score reading and preparation. Particular attention to individual problems. Prereq: 490 or equivalent.

Music Jazz

GRADUATE COURSES

410 Advanced Improvisation (3) Further development of individual skills and solving individual problems in jazz improvisation. Prereq: 210 and 220.

420 Jazz Pedagogy (1) Methods and materials relating to teaching of jazz, designing and administering jazz programs, and rehearsal techniques for jazz ensembles. Prereq: Studio music and jazz major or consent of instructor.

520 Seminar in Jazz (3) Topic varies.
520 Saxophone (1-4)
525 Horn (1-4)
530 Trumpet (1-4)
535 Trombone (1-4)
540 Baritone (1-4)
545 Tuba (1-4)
550 Percussion (1-4)
551 Accompanying and Coaching (1-4)
555 Voice (1-4)
560 Violin (1-4)
565 Viola (1-4)
570 Cello (1-4)
575 String Bass (1-4)
576 Electric Bass (1-4)
579 Guitar (1-4)
580 Piano (1-4)
585 Harpsichord (1-4)
590 Organ (1-4)
594 Composition (1-3)
595 Composition with Electronic Media (1-3)
599 Improvisation (1-4)

Music Ensemble

GRADUATE COURSES

501 Woodwind Choir (1) May be repeated.
503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hrs.
504 Jazz Ensemble (1) May be repeated.
505 Studio Orchestra (1) May be repeated. Maximum 12 hrs.
506 Trombone Choir (1) May be repeated.
509 Tubaf wreckage Ensemble (1) May be repeated.
510 Percussion Ensemble (1) May be repeated.
511 Marimba Choir (1) May be repeated.
512 Baroque Ensemble (1) May be repeated.
513 Synthesizer Ensemble (1) May be repeated.
514 Brass Choir (1) May be repeated.
515 Chamber Music Ensemble (1) May be repeated. Maximum 12 hrs.
520 UT Singers (1) May be repeated.
530 Chamber Singers (1) May be repeated.
532 Collegium (1) May be repeated.
534 Saxophone Choir (1) May be repeated.
540 Opera Theatre (1) May be repeated.
542 Opera Workshop (1) May be repeated.
550 Concert Band (1) May be repeated.
552 Campus Band (1) May be repeated.
554 Varsity Band (1) May be repeated.
556 Laboratory Band (1) May be repeated.
559 Marching Band (1) May be repeated.
570 Symphony Orchestra (1) May be repeated.

580 Concert Choir (1) May be repeated.
582 University Chorus (1) May be repeated.
583 Men's Chorale (1) May be repeated.
589 Women's Chorale (1) May be repeated.
599 Accompanying (1) May be repeated.

Nuclear Engineering

(College of Engineering)

MAJOR DEGREES

Nuclear Engineering .................................. M.S., Ph.D.

Thomas W. Kerlin, Head

Professors:

Dodds, H. L., Ph.D. .................. Tennessee
Fussell, J. B., Ph.D. .................. Georgia Tech
Kerlin, T. W., Ph.D. ................. Tennessee
Mihalczko, J. T., Ph.D. ............. Tennessee
Pasquarello, F. (Emeritus), PE, Ph.D. .... Western Michigan
Perez, R. B., Ph.D. .................. Western Michigan
Roland, H. C., Ph.D. ............... Tennessee
Stevens, P. N., Ph.D. .............. Northwestern
Uckan, N., Ph.D. .................... Michigan
Uhlig, R. E. (Distinguished Prof.), PE, Ph.D. ... Iowa

Associate Professors:

Katz, E. M., Ph.D. .................. Tennessee
Miller, L. P., Ph.D. ............... Texas A&M
Scott, T. H., Ph.D. ............... Florida
Upadhyaya, B. R., Ph.D. ............ California

The Department of Nuclear Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering M.S. or Ph.D. program (focusing on fission energy or fusion energy) or a radiation protection engineering concentration at the Master's level.

The radiation protection engineering concentration prepares students for careers in the radiation safety field (health physics). The program is designed for graduates of undergraduate programs in engineering, physics, biology and chemistry.

A joint fusion energy program has been developed between the Nuclear Engineering and the Electrical and Computer Engineering Departments. Cross-listed courses from each department are used to satisfy degree requirements. Students may have the opportunity to do their research at the Fusion Energy Division of Oak Ridge National Laboratory or at the Plasma Science Laboratory, affiliated with the Electrical and Computer Engineering Department. A limited number of Graduate Research Assistantships are available at each location. Further information about this program is available from the department.

Students in the Nuclear Engineering Department have an opportunity to affiliate with the Measurement and Control Engineering Center and the Waste Management Research and Education Institute. These organizations provide unique research opportunities.

THE MASTER'S PROGRAM

A graduate program leading to the Master of Science is available to graduates of recognized undergraduate curricula in engineering and physics. Each applicant will be advised as to the necessary prerequisite courses before he/she enters the program.

The student must complete 24 semester hours of coursework approved by the student's advisory committee that includes the following:

1. A major consisting of a minimum of 12 semester hours of graduate courses in nuclear engineering.
2. A minor of 6 semester hours of elective courses in mathematics, statistics or computer science.
3. Six semester hours in either nuclear engineering or a related field.

The M.S. candidate must also demonstrate research or design capability. This requirement may be satisfied by preparing a thesis or participating in the nuclear engineering practice school, as described below:

Thesis - The student performs independent research on a topic approved by the graduate committee. He/she submits a thesis on this research. The student then must pass an oral examination on the thesis and all graduate coursework. The student must enroll for a minimum of six semester hours of NE 500 (Thesis).

Practice School - The student addresses two to four separate research problems approved by his/her graduate committee. Each is similar to a thesis problem, but smaller in scope. The student must make an oral report and submit written reports on each project. He/she must pass an oral examination on practice school research and all graduate coursework. The student must enroll for sixteen semester hours of NE 598 (Nuclear Engineering Practice).

THE DOCTORAL PROGRAM

Students in the field of nuclear engineering desiring to study for the Doctor of Philosophy must have a Bachelor of Science or Master of Science from a recognized university, with a major in engineering or physics. All candidates will be required to demonstrate general competence in a comprehensive examination in the areas of engineering science, mathematics, physics, and nuclear engineering.

Specific course requirements for the Ph.D. in Nuclear Engineering include:

1. A minimum of 48 semester hours beyond the Bachelor's degree, exclusive of credit for the M.S. thesis or Nuclear Engineering Practice.
2. A minimum of 24 semester hours in doctoral research.
3. A minimum of 30 semester hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 9 semester hours of 600-level courses. These are exclusive of thesis or dissertation credit.
4. A minimum of 12 semester hours in mathematics, computer science, or statistics courses beyond nuclear engineering graduate requirements numbered 400 or above.
5. A minimum of 6 semester hours in courses numbered 500 or above from a
department other than nuclear engineering. The choice depends on the student's overall program and should expand his/her knowledge in a given field.

6. A reading knowledge of one foreign language may be specified by the student's doctoral committee.

The comprehensive examination is prescribed by the nuclear engineering faculty and consists of 12 hours of written examinations. All past examinations are filed in the library, and students are encouraged to review them. Students are invited to take the comprehensive examination only once and must complete it within 30 hours. A student who fails the written part of the examination must take and pass the examination the next time it is offered. Prerequisites and consent of instructor. May be repeated. Maximum 6 hrs.

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

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

511-12 Transport Processes in Nuclear Engineering (3,3) Rheology of non-Newtonian fluids; integral and system conservation equations for single- and multi-component fluids; in-depth development of differential equations for mass, energy, and momentum; exact and approximate solutions of equations of motion; boundary layer analysis; numerical analysis of fluid flow and heat transfer.

521 Nuclear Systems Dynamics and Control (3) Introduction to dynamics and control analysis and application of these methods to nuclear plant dynamics, simulation and control problems.

522 Experimental Methods in Reactor Dynamics (3) Introduction to time domain and frequency domain techniques. Measurement, analysis, and interpretation of process signals for reactor surveillance and diagnostics. Introduction to time-series modeling. Prerequisite: 521.

541 Reactor Fuel Management (3) Topics relative to reactor fuel management. Applicable topics in reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods. Prerequisite: 401.


543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental methods for reactors, reprocessing, fuel fabrication, in-core fuel management, reprocessing and waste disposal. Prerequisite: 401 and 405 or equivalent.

544 Nuclear Fuel Management (3) Variety of topics related to nuclear fuel cycle. Mining and milling, fuel fabrication, in-core fuel management, reprocessing and waste disposal. Prerequisite: 401 and 405 or equivalent.

545 Nuclear System Dynamics and Control (4) Methods for system modeling and simulation. Laplace transforms, frequency response, stability analysis, numerical methods, nuclear plant simulation and simulation, nuclear plant control. Prerequisite: 402.

546 Radiation Shielding (3) Types of radiation sources, fundamentals of gamma ray and neutron attenuation, biological effects, approximate methods of shield design, discrete ordinates, and Monte Carlo. Prerequisite: Physics 232.

547 Introduction to Nuclear Criticality Safety (3) Fundamentals of nuclear criticality safety; criticality accidents; safety standards; overview of experiments, computational methods, and applications. Prerequisite: Introduction to nuclear engineering and nuclear reactor theory.

548 Introduction to Fusion Energy (3) (Same as Electrical and Computer Engineering 463.)

549 Introduction to Fusion Energy II (3) (Same as Electrical and Computer Engineering 464.)

550 Nuclear Instrumentation (3) Physics and electronics associated with radiation detection, methods of data analysis, applicability of particular instrument measurement fundamentals of nuclear instrumentation operation.

551 Radiation Protection (3) Interactions of photons, neutrons, beta particles, and heavy charged particles with matter and mechanisms of energy loss; methods of radiation detection, internal and external radiation dosimetry; chemical and biological effects of radiation; regulations and standards. Prerequisite: Introduction to Nuclear Engineering 401 or equivalent.

552 Radiation Monitoring and Dose Assessment (3) Methods for work area and environmental monitoring; dose assessment; pathways analysis; risk projections and regulations. Prerequisite: 551.

553 Plasma Diagnostics I (3) (Same as Electrical and Computer Engineering 561.)

554 Plasma Diagnostics II (3) (Same as Electrical and Computer Engineering 562.)

555 Plasma Engineering (3) Integration of plasma physics models, fusion engineering design criteria, and fusion technology into design of future plasma experiments and reactors. Particle, momentum, and energy balance equations. Simulation of various fusion reactor plasmas. Prerequisite: 464 or consent of instructor. (Same as Electrical and Computer Engineering 563.)

564 Fusion Technology (3) Engineering problems associated with fusion reactor design; vacuum and magnetic confinement systems; materials and irradiation; plasma heating, fueling and impurity control; review of major design studies. Prerequisite: 563 or consent of instructor. (Same as Electrical and Computer Engineering 564.)

571 Reactor Theory and Design (3) Analytical and numerical techniques for neutronics modeling of nuclear systems. Forward and adjoint Boltzmann transport equation. Multigroup diffusion theory. Core analysis methods and codes. Prerequisite: 401 or equivalent.

572 Reactor Theory and Design (3) Analytical and numerical techniques for neutronics modeling of nuclear systems. Multigroup cross section theory for homogeneous and heterogeneous systems. Selected topics from literature. Prerequisite: 571 or equivalent.

581 Reactor Shielding (3) Application of analytic/deterministic solutions of Boltzmann transport equation to shield design problems. Spherical harmonics, moment methods, discrete ordinates, adjoint calculations, coupled analysis, and fast reactor shield design. Prerequisite: 406 or equivalent.

582 Monte Carlo (3) Analysis of radiation transport problems in radiation shielding by Monte Carlo method, description of MORSE code. Random sampling, evaluation of integrals, analog particle transport, techniques of variance reduction, forward and adjoint modes of analysis, importance function biasing, splitting/weight window survival biasing and contribution theory. Prerequisite: 581.

583 Process System Reliability and Safety (3) Qualitative and quantitative techniques for assessing and improving process systems reliability and safety. Fault tree analysis and associated failure dependency analysis. (Same as Chemical Engineering 585.)

588 Measurement Science I (3) Principles of measurement, introduction to measuring devices. Prerequisite: Consent of instructor. (Same as Chemical Engineering 586, Civil Engineering 588, Electrical and Computer Engineering 588, Engineering Science and Mechanics 588, Mechanical Engineering 588 and Aerospace Engineering 588.)

589 Measurement Science II (3) Modern industrial measurement systems, advanced topics in measurement. Prerequisite: 588. (Same as Chemical Engineering 589, Civil Engineering 589, Electrical and Computer Engineering 589, Engineering Science and Mechanics 589, Mechanical Engineering 589, and Aerospace Engineering 589.)

597 Special Topics in Nuclear Engineering (3) Lectures and recitation on recent advances in nuclear engineering. Prerequisite: Consent of instructor. May be repeated with consent of department. Prerequisite: 597 or equivalent.

598 Nuclear Engineering Practice (3-9) Experience in solving and reporting on engineering problems. Prerequisite: Approval of department. May be repeated with approval of department. Prerequisite: 598 or equivalent.

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

611-12 Selected Topics in Reactor Theory (3,3) Transport theory, control rod theory, stochastic methods. Selected topics from literature. Prerequisite: 572.

651 Plasma Engineering (3) Detailed modeling of plasma breakdown, start up, burn dynamics. Prerequisite: 564.

652 Special Topics in Fusion Engineering (3) Selected advanced topics in plasma engineering and fusion reactor engineering and technology. Prerequisite: 561.

503 Theory of Information Processing (3) Modern information theoretical methods for evaluating system performance from dynamic measurements. Prerequisite: 522 or equivalent.

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. The Ph.D. program in Nuclear Engineering is available to residents of the states of Alabama, Kentucky, Mississippi, South Carolina, or West Virginia. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.
Nursing
(College of Nursing)

MAJOR DEGREE
Nursing......................................... M.S.N., Ph.D.

Sylvia E. Hart, Dean
Mildred M. Fenske, Associate Dean and
Director of M.S.N. Program
Maureen E. Groar, Director of Ph.D. Program

Professors:
Brown, Barbara E., Ed.D.................. Temple
Goodfellow, Dale H., Ph.D.................. Peabody
Groar, Maureen E., Ph.D.................... Illinois
Hart, Sylvia E., Ph.D........................ New York
Mozingo, John N., Ph.D............................ Walden
Reid, Barbara M., Ph.D..................... Texas

Associate Professors:
Davis, Mitzi M., Ph.D....................... Tennessee
Droppleman, Patricia G., Ph.D........ Tennessee
Fenske, Mildred M., Ph.D........... Vanderbilt
Foster, Miriam, Ph.D........................... Texas
Jolly, Mary Lue, Ed.D.................... Kentucky
Jowers, Laurie, Ph.D...................... Texas
Jozwik, John, Ph.D...................... Texas
Sharp, Theresa G., Ed.D............... Tennessee
Shoffner, Dava, M.S.N................... Tennessee

Assistant Professors:
Smith, Patricia, Ed.D................ Tennessee
Thomas, Sandra P., Ph.D........ Tennessee

Instructor:
Bowen, Sheila, Ph.D................ Tennessee

THE MASTER'S PROGRAM

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, parent-child nursing, mental health nursing, and primary care nursing.

Admission Requirements
1. Meet requirements for admission to The Graduate School.
2. Hold a Bachelor's degree in Nursing or complete the equivalent of an upper division undergraduate major in nursing in addition to meeting all M.S.N. degree requirements.
3. Have an undergraduate GPA of 3.0 or higher or a GPA of 3.0 for courses in the undergraduate major.
4. Complete the General portion of the Graduate Record Examination. NOTE: A strong performance on this examination may compensate for a GPA lower than 3.0.
5. Complete Graduate Program Data Forms.
6. Submit three Graduate School Rating Forms from individuals familiar with the applicant's current work performance or academic aptitude.

Special Requirements
1. Each student must hold personal professional liability insurance.
2. Registered nurses must be licensed to practice nursing in Tennessee.
3. Each student must present proof of a physical examination and rubella immunization or sufficient titer completed within six months of registering for clinical courses.
4. Each student must present evidence of current CPR certification.
5. Non-registered nurses must have completed 8 semester hours of chemistry or biology, a nutrition and microbiology course, and 12 semester hours of behavioral science courses.

Thesis and Non-Thesis Options
The thesis option is available for interested students and is especially encouraged for those who are considering pursuit of doctoral degrees sometime in the future. Students who choose the non-thesis option must complete a research-oriented project while registered for 580 Nursing Project.

Program Requirements
All students must complete a minimum of 40 semester hours distributed as follows:

Core (12 credits)
503-4 Holistic Nursing I,II 8
510 Theoretical Foundations of Nursing 2
520 Nursing Resource Management 2

Research (9-12 credits) - Graduate level statistics
Graduate level statistics course 3

501 Nursing Research: Methods, Design, and Analysis 3
500 Thesis 6
or 580 Nursing Project 3

Clinical Concentration (11 credits) - choose one
530-31 Adult Health Nursing I,II 11
540-41 Family Nurse Practitioner I,II 11
550-51 Parent-Child Nursing I,II 11
560-61 Mental Health Nursing I,II 11

Role Preparation (5 credits) - choose one
563 Teaching Strategies and Practicum (Not an option for non-nurse students) 5
or, 564 Nursing Management: Strategies and Practicum (Not an option for non-nurse students) 5

Elective (3 credits) - waived for those who choose thesis option
3. Students who are not nurses must complete the following undergraduate nursing courses in addition to meeting the requirements listed above:
301 Pharmacology 3
302 Introduction to Professional Nursing 9
304 Nursing Assessment and Health Promotion 4
311 Acute Care Nursing 10
313 Nursing Research 3
406 Nursing Leadership 3
414 Community Mental Health Nursing 6
415 Family/Community Health Nursing 6

Registered nurses whose undergraduate degrees are not in nursing must complete 304, 305, 313, 315 Clinical Nursing Practicum, and 403. They must also complete or successfully challenge the following:
301 Pharmacology 3
312 Acute Care Nursing Theory 6
402 Family Health Nursing Theory 3
412 Psychosocial Long Term Nursing Theory 3

Students who have science backgrounds are deficient may also need to take 214 Integrated Biomedical and Health Sciences and/or 450 Physiological Principles.

Final Examination Requirements
All students must successfully complete a final examination as required by The Graduate School. For thesis students, the examination will consist of an oral defense of the thesis as well as other written or oral questions designed to measure student mastery of the entire program of study. For non-thesis students, the written examination will cover the entire program of study and may, at the discretion of the student's committee, be followed by an oral examination.

Special Policies
1. Students must maintain a 3.0 GPA throughout the program. If the GPA for all graduate level courses is less than 3.0 after 20 credit hours are completed, the student will be required to withdraw from the program.
2. The clinical performance of any student for any course is found to be unsatisfactory, the student will receive a grade of 'F' for the course.
3. If a student achieves a final grade of 'D' or 'F' for any required undergraduate nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.
4. If the clinical performance of any student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

Requirements for Second Master's Degree
1. Those who already hold a Master's or doctoral degree may apply up to 9 semester hours from that degree to meeting MSN program requirements. In order to apply these hours to the MSN degree, the following criteria must be met:
   a. The courses utilized must be relevant to the MSN.
   b. The credits must have been earned within the time limits established for the MSN.
   c. The utilization of these courses must be approved by the student's committee, by the Dean of the College, and by the Dean of The Graduate School.
2. Regardless of the specific courses transferred in order to reduce degree requirements, the following distribution of required nursing courses must be completed:
   Core 12
   Clinical Concentration 11
   Role Preparation Research 5

THE DOCTORAL PROGRAM

The College of Nursing offers a doctoral program leading to the Doctor of Philosophy degree with a major in Nursing. This is a
cooperative program offered jointly with The University of Tennessee, Memphis College of Nursing. Students may complete all or part of the program at either site. The dissertation must be completed in its entirety at one site.

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:

1. Analyze, test, refine, extend, and expand the theoretical basis of nursing practice.
2. Conduct nursing research that generates and advances nursing as a discipline.
3. Provide leadership as nurse researchers, educators, and/or administrators in current and emerging health care settings.
4. Collaborate with members of other disciplines in health-related research of mutual concern.
5. Analyze, develop, and recommend health care policy at various levels.

Admission Requirements
1. Meet requirements for admission to The Graduate School.
2. Hold a Master's degree in nursing from a program accredited by the National League for Nursing.
3. Have a minimum cumulative graduate grade-point average of 3.3 on a 4.0 scale.
4. Have a cumulative score of at least 1000 on the verbal and quantitative sections of the GRE.
5. Have successfully completed a basic statistics course.
6. Complete Graduate Program Data Form, College of Nursing.
7. Submit Graduate School Rating Forms from three college level instructors and/or nurses and administrators who have supervised applicant's professional work.
8. Have a personal interview with the College of Nursing Graduate Student Admissions Committee.
9. Submit entire application (Graduate Application for Admission to Graduate School Rating Forms, Graduate Program Data form, academic transcripts, and GRE scores) and schedule personal interview by March 1st of the year preceding Fall admission.

Program Requirements

The following courses are required for all students:

601-2 Theory Construction and Analysis I, II 6
603-4 Advanced Nursing Research I, II 6
605-6 Advanced Nursing Research Seminar 4
611 Advanced Nursing Seminar 6
614 Nursing Preceptorship 3
615 Statistics 6
617 Computer Science 5
618 Electives 12
600 Dissertation 24
TOTAL 66

The electives should constitute a cogitate area. All 12 hours should be selected from a specific area of concentration. Appropriate cognate areas are anthropology, child and family studies, clinical psychology, education, management, technical leadership, professional, psychological, and other theories, concepts, and applications applicable to advanced clinical nursing practice. Prereq or coreq: 503. F,Sp

630 Adult Health Nursing I (6) Exploration and application of advanced nursing, physiological, and psychosocial theories to adult wellness of clients and families who are experiencing episodes of acute and chronic illnesses and related crises; role of clinical nurse specialist in adult health nursing care and management of clients and their families. Prereq: 501, 504, 510. 2 hrs and 4 labs. F

531 Adult Health Nursing II (6) Continuation of 530. Role of clinical specialist in providing and managing care of elderly and chronically ill adults across the lifespan; analysis and synthesis of advanced health-related research in practice settings. Prereq: 530. 2 hrs and 3 labs.

532 Adult Health Nursing Field Work and Seminar (5) Seminar and intensive clinical practice designed to facilitate further development of specialized knowledge and skills utilized for advanced clinical practice in adult health nursing. Prereq or coreq: 531. 1 hr and 4 labs. Sp

533 Directed Study in Technical Nursing Education (3) Philosophy, history, and contemporary issues in technical nursing and nursing education; teaching strategies for adult learner in community college; investigation of selected topics. Prereq: Graduate student or consent of instructor. Su

540 Family Nurse Practitioner I (6) Exploration and application of holistic nursing theories to nursing management of common health problems of individuals and their families; organization of clinical practice in role of nurse practitioner in various settings. Prereq: 501, 504, 510. 2 hrs and 4 labs. F

541 Family Nurse Practitioner II (5) Continuation of 540. Management of chronic health problems; clinical experiences in various settings. Prereq: 540. 2 hrs and 3 labs. Sp

542 Family Nurse Practitioner Field Work and Seminar (5) Seminar and intensive clinical practice designed to facilitate further development of specialized knowledge and skills utilized for advanced clinical practice as family nurse practitioner. Prereq or coreq: 541. 1 hr and 4 labs. Sp

550 Parent Child Nursing I (6) Exploration and application of selected advanced nursing, physiological, psychological, developmental, environmental, cultural, and other theories, principles, and concepts to care of child-bearing or child-rearing families in acute care or community settings; family wellness promotion and interventions designed to recognize and respond to threats to wellness of children. Prereq: 501, 504, 510. 2 hrs and 4 labs. F

551 Parent Child Nursing II (6) Continuation of 550. Role of clinical nurse specialist in provision and organization of nursing care for women and for child-bearing or child-rearing families in acute care or community settings; family wellness promotion and interventions designed to respond to threats to wellness of children. Prereq: 550. 2 hrs and 3 labs. Sp

552 Parent Child Nursing Field Work and Seminar (5) Seminar and intensive clinical practice designed to facilitate further development of specialized knowledge and skills utilized for advanced child-and child-rearing family practice. Prereq or coreq: 551. 1 hr and 4 labs. Sp

560 Mental Health Nursing I (6) Exploration and application of selected advanced nursing, physiological, and psychosocial theories to mental health intervention to clients experiencing mental health problems. Options for clinical practice with various at risk groups in acute care and community facilities. Prereq: 501, 504, 510. 2 hrs and 4 labs. F

561 Mental Health Nursing II (5) Continuation of 560. Families and groups with mental health problems. Prereq: 560. 2 hrs and 3 labs. Sp

562 Mental Health Nursing Field Work and Seminar (5) Seminar and intensive clinical practice designed to facilitate further development of specialized knowledge and skills utilized for advanced mental health nursing practice. Prereq or coreq: 561. Sp

563 Teaching Strategies and Practicum (5) Exploration, analysis, and application of selected educational, psychological, and philosophical theories and principles to instruction of undergraduate nursing students; teaching practice in collegiate nursing program. Prereq or coreq: 531, 541, 551, or 561. 3 hrs and 2 labs. Sp

564 Nursing Management: Strategies and Practicum (5) Exploration, analysis, and application of selected advanced management, supervisory, organizational, leadership, and other theories and concepts to administration of nursing services; management of clinical nursing nurse's facility. Prereq or coreq: 531, 541, 551, 561, 3 hrs and 2 labs. Sp

577 Special Topics (3) Topic is determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. F,Sp

580 Nursing Project (3) Research-oriented, student-initiated endeavor that culminates in a scholarly paper.
suitable for publication and/or presentation; project may take form of development of innovative nursing intervention program, comprehensive literature review that reflects synthesis or comprehensive analysis, or other formats approved by nursing faculty member. Required for all MSN candidates who select non-thesis option. Prereq: 501, 510. May be repeated. Maximum 6 hrs. F,Sp

585 Seminar in Gerontology (1) (Same as Human Ecology 585.)

593 Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F,Sp

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

601-02 Theory Construction and Analysis I, II (3,3) Nursing theory development; analysis of existing health and nursing theories; theory building from existing knowledge. Prereq: 503, 510, or consent of instructor. F,Sp

603 Advanced Nursing Research I (3) Advanced concepts in research methodology and data analysis and interpretation. Quantitative nursing research. Prereq: 601, 6 hrs of graduate-level statistics. F

604 Advanced Nursing Research II (3) Continuation of 603. Qualitative nursing research. Prereq: 603. Sp

605-06 Nursing Research Seminar (2.2) Selected research topics. Required of all doctoral students. Prereq: 604. F,Sp

611 Advanced Nursing Seminar (2) Current health and nursing issues: analysis and critique of current research on nursing and health care delivery system. Prereq: 620. Sp

612 Health and Nursing Policy/Planning (3) Policies affecting nursing education and practice; health policies and political processes; interactions between health professionals, consumer groups, and government in health policy development and health planning activities. Prereq: 611. F


614 Nursing Preceptorship (3) Individually designed practicum, field, or internship experiences in variety of administrative, educational, research, or clinical practice settings. Prereq: 612. Prereq or coreq: 613. Sp

Nutrition and Food Sciences

(College of Human Ecology)

MAJORS DEGREES

Food Science.................................M.S.
Nutrition........................................M.S.
Food Systems Administration...............M.S.
Human Ecology..............................Ph.D.

William C. Morris, Acting Head

Professors:


Skinner, Jean D., Ph.D........Oregon State

Assistant Professors:


Instructors:

Jones, K., MBA........East Texas State McGrath, M., M.S........Purdue

Master of Science programs are available in Nutrition, Food Science, and Food Systems Administration. Within the Nutrition program, a student may choose a concentration in nutrition science or public health nutrition.

A graduate degree combined with an approved pre-professional practice experience beyond the baccalaureate degree completes the requirement for eligibility as a member of The American Dietetic Association and qualifies the graduate to apply to take the Registration Examination to become a Registered Dietitian (R.D.). Students may receive more information from the department about R.D. requirements.

ADMISSION REQUIREMENTS

A completed file for review includes a College of Human Ecology application, Graduate Record Examination (GRE) scores for the general section, and completion of three Graduate School Rating Forms by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology. Admission into any of the graduate programs in the department is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. For all programs in Nutrition Science and Food Science, courses in general and organic chemistry, physiological chemistry, food and clinical analysis, microbiology, mathematics, physiology, economics, science of food, and nutrition are essential. For the Master's program in food systems administration, students are recommended to complete courses in food service systems administration, quantity food production, cost control, and personnel development are essential. In addition, students with work experience will be given preference.

THE MASTER'S PROGRAM

Nutrition

In Nutrition, students may choose a thesis or non-thesis option. Students emphasizing public health nutrition may choose the non-thesis option. Nutrition students who choose the non-thesis option must take 515 or 541 and 2 hours from 542-544, which are designed as courses in which the student will integrate knowledge from coursework and write a major paper upon completion of an individual project.

Thesis Option: The program consists of a minimum of 33 hours with at least 18 hours of coursework in the department. Six hours of Thesis 500 are required and may be applied toward the 33 hours. Six hours outside the department are recommended. A minimum of 22 hours at the 500 or 600 level is required.

An oral comprehensive examination is required upon completion of the thesis.

Non-Thesis Option: The program consists of a minimum of 36 hours with at least 20 hours of coursework in the department. NFS 503 or 504, 511, 512, 540, 541 and 2 hours from 542-544 are required. Students in public health nutrition must take 513, 514 and 515. Six hours in one area outside the department are required. A minimum of 24 hours at the 500 and 600 level is required.

A written comprehensive examination is given at the end of the program.

Food Science

In Food Science, students may choose a thesis or non-thesis option. Food Science students who choose the non-thesis option must take 541 and 544 or 545, which are designed as courses in which the student will integrate knowledge from coursework and write a major paper upon completion of an individual project.

Thesis Option: The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department. Six hours outside the department are required. A minimum of 22 hours at the 500 and 600 level is required.

An oral comprehensive examination is required upon completion of the thesis.

Non-Thesis Option: The program consists of a minimum of 36 hours with at least 20 hours of coursework in the department. NFS 503 or 504, 511, 512, 540, 541 and 544 are required. Six hours of Thesis 500 are required and may be applied toward the 33 hours. Six hours outside the department are recommended. A minimum of 24 hours at the 500 and 600 level is required.

A written comprehensive examination is given at the end of the program.

Food Systems Administration

In Food Systems Administration, students may choose a thesis or non-thesis option. Food Systems Administration students who choose the non-thesis option must take 541, 546 and 3 hours from 548, which are designed as courses in which the student will integrate knowledge from coursework and write a major paper upon completion of an individual project.

Thesis Option: The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department. NFS 503, 504, 511, 512, 540, 541 and 548 are required. Six hours of Thesis 500 are required and may be applied toward the 33 hours. Six hours outside the department are required. A minimum of 24 hours at the 500 and 600 level is required.

A written comprehensive examination is given at the end of the program.
A written comprehensive examination is given at the end of the program.

ACADEMIC COMMON MARKET

The ACM is an interstate agreement among southern states for sharing academic programs. Residents of one of the participating states who qualify for admission may enroll in certain programs on an in-state tuition basis. Students planning to enter the Master's program in Food Systems Administration who are residents of Arkansas, Kentucky, South Carolina, or West Virginia; students planning to enter Food Science who are residents of Kentucky or South Carolina; and students planning to enter Nutrition who are residents of Alabama, Arkansas, Georgia, Kentucky, South Carolina, or Virginia are eligible.

THE Ph.D. CONCENTRATION

Students enrolled in the food science concentration specialize in either the physico-chemical or socio-cultural aspects of food in relation to people and their environment. Students are expected to develop strengths in nutrition and other fields by taking courses in a cognate area. Food systems administration, food technology, education, and the natural and behavioral sciences are among the potential cognate areas.

The nutrition science concentration enables students to study the science of nutrition from the cellular level to the application of nutritional principles by people in a changing environment. In either concentration, students may specialize in nutrition education, using nutrition and food science as foundation areas, and incorporating the study of food habits and factors that influence dietary change. Cognate areas could include sociology, education, communications, marketing, anthropology, and/or statistics. Students are expected to acquire advanced training in food science, chemistry, biology, and other natural and behavioral sciences. The doctoral program emphasizes human nutrition, experimental nutrition (small animals), and intermediary metabolism.

Requirements for both concentrations:
1. Sixteen hours with a concentration in food science or nutrition including 9 hours at the 600 level (exclusive of dissertation);
2. NFS 511, 512, 503 or 504 (nutrition science concentration) or 503 and 504 (food science concentration);
3. Minimum 4 hours of NFS 540;
4. Minimum 9 hours of statistics, computer science and research methods;
5. Minimum 2 hours in a cognate area;
6. Students without college teaching experience are required to take the fall semester seminar for GTAs and NFS 548 contains a faculty-supervised problem in college teaching.

GRADUATE COURSES

413 Experimental Food Science (3) Individual and group laboratory experimentation in food science; microcomputer applications. Prereq: 312, Plant and Soil Science 471, 1 hr and 2 labs. F

414 Nutrient-Drug Interactions (2) Nutrient effects on efficacy and toxicity of drugs; drug effects on absorption and metabolism of nutrients. Prereq: 300 or equivalent. Sp, A

423 Foodservice Systems Design and Equipment (3) Physical facility design; production and delivery system analysis; equipment selection and purchase analysis. Prereq: Quantity Food Procurement, Production and Service with lab or consent of instructor. A

500 Thesis (1-19) P/NP only. E

502 Registration for Use of Facilities (3-19) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. Prereq or coreq: 541 or equivalent, 413. F, A

503 Physicochemical Properties of Foods I (3) Proteins and lipids: physical and chemical characteristics; behavior in foods. Prereq: 201 or equivalent, 413. F, A

504 Physicochemical Properties of Foods II (3) Sugars, starches, non-starch polysaccharides, hydrocolloids, and pigments; physical and chemical nutriutturistics; behavior in foods. Prereq: 201 or equivalent, 413. F, A

505 Food Textura (2) Classification of foods according to textual parameters; instrumental and sensory methods in evaluation of texture. Prereq: 413 or Food Technology and Science 411, statistics or consent of instructor. 1 hr and 1 lab. Su

506 Sensory Analysis (3) Principles and methodology for sensory evaluation of food; application to laboratory and undergraduate studies in food science. Prereq or coreq: 413 or consent of instructor. 2 hrs and 1 lab. F

508 Culture, Food, and Nutrition (3) Food-related behavior of individuals and groups in United States. Sociocultural, economic, and technological influences of dietary patterns in nutrition and food surveys, public policy. Prereq: 301 or 313 or consent of instructor. F, A

509 Graduate Seminar in Public Health (1) Same as Public Health 509. Prereq: 509 and Social Work 509. F

511 Advanced Physiological Chemistry (4) Bioenergetics, flux control and hormonal interrelationships. Prereq: 313 or equivalent. F

512 Human Nutrition (3) Advances in carbohydrates, proteins, fats, trace elements, and nutritional requirement of humans. Prereq: 313 and 511. Sp

513 Community Nutrition (3) Orientation to community; assessment of nutrition problems, needs, and resources; functional roles of public health nutritionist. Concurrent field experiences. Prereq: 313 or consent of instructor. F

514 Community Nutrition (3) Planning, implementation, and evaluation of public health nutrition programs. Concurrent field experiences. Prereq: 513 or consent of instructor. Sp

515 Field Study in Community Nutrition (1-2) Personal participation in and evaluation of state or regional community nutrition program. Location of in-depth study to be selected in consultation with instructor. Prereq: 514 and consent of instructor. Su

516 Maternal and Child Nutrition (3) Nutrition principles related to growth and development during pregnancy, infancy, and childhood to age 5, high risk conditions. Prereq: 313 or consent of instructor. F

517 Childhood and Adolescent Nutrition (3) Application of nutrition principles to school age children; effects of diseases on growth and maintenance of the developing child; role of nutrition in health and disease. Prereq: 313 or consent of instructor. F

518 Nutrition and Aging (3) Nutritional problems of adults; nutritional requirements, dietary intake; effects of nutrition on health and aging. Prereq: 313 or consent of instructor. Su

519 International Nutrition (3) World food supply, demographics, socioeconomic, cultural, and technological factors related to food and nutrition; international intervention and assistance programs. Prereq: Consent of instructor. F, A

520 Nutritional Ecology (2) Examination of issues in natural, political, physical, and social environments that impact availability of food and nutrients in U.S. food supply. F, A

521 Physiological Basis for Diet and Disease (2) Altered nutrient needs as result of metabolic changes that occur in selected disease states. Prereq: 411 or consent of instructor. Sp

522 Nutrition Counseling (2) Individual eating habits and disorders, evaluation strategies for effectiveness of helping process. Prereq: 313 or consent of instructor. F

523 Nutrition and Behavior (2) Influence of nutrients on intracerebral metabolic processes, electro-physiological indicators of brain function and behavior of individuals; biological, cognitive, and personality aspects. Prereq: Consent of instructor. Su

524 Nutrition Education: Principles, Implementation, and Evaluation (3) Conceptual models, principles, application, and evaluation models in nutrition education research. Prereq: 508 or consent of instructor. Su, A

526 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, Memphis. Supervised project in related area. Prereq: Consent of department head. E

527 Nutrition in Mental Retardation and Developmental Disorders (1-9) Interdisciplinary diagnosis and treatment for developmentally-handicapped child; role of nutritionist; clinical experiences and lectures at Child Development Center, UT, Memphis. Prereq: Consent of department head. E

529 Management in Nutritional Care (2) Administrative and management aspects of food service; policy and planning in nutrition service; techniques in clinical settings: program development, planning, and evaluation. Prereq: 520, 422, or consent of instructor. Su

530 Computer-Assisted Foodservice Systems Management (3) Application of computer technology to foodservice industry; inventory, food cost accounting, production, and nutrient analysis. Prereq: 320 or consent of instructor. Su, A

531 Financial and Marketing Administration in Foodservice (3) Marketing and financial techniques used in foodservice administration; developing foodservice marketing plan, budgeting, foodservice accounting and information services. Prereq: 326 or consent of instructor. Sp

532 Human Resource Management in Foodservice (3) Identifying labor needs; development and maintenance of work force. Prereq: 422 or consent of instructor. F

533 Advanced Food Production and Delivery System Management (3) Analysis of food production and delivery systems; application of decision-making models and methods to optimize decisions. Prereq: 320 or consent of instructor. F

534 Special Topics in Foodservice Systems Administration (1-3) Contemporary developments and trends in industry. Prereq: Consent of instructor. May be repeated. E

535 Directed Study in Foodservice Systems Administration (1-3) Problems selected for study by student with guidance of faculty member. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

537 Seminar in Foodservice Systems Administration (1) May be repeated. S/NC only. Sp

540 Seminar in Nutrition and Food Sciences (1) May be repeated. S/NC only. Sp

541 Research Methods (1) Basic principles of planning, conducting, and interpreting nutrition, food sciences, and foodservice systems administration research. Prereq: 220, 422, or consent of instructor. Su

542 Advanced Experimental Nutrition (2) Application of research principles to individual project using experimental animals. Prereq or coreq: 541. Sp

543 Human Metabolic Research (3) Application of research principles to individual project using metabolic studies. Prereq or coreq: 541. Sp
Ornamental Horticulture and Landscape Design

(College of Agriculture)

MAJOR
Ornamental Horticulture and Landscape Design ................. M.S.

G. Douglas Crater, Head

Professors:

Callahan, L. M., Ph.D. .................................. Rutgers
Crater, G. Douglas, Ph.D. ..................................... Ohio State
Graham, E. T., Ph.D. ........................................ Penn State
Gresshoff, Peter M. (Rachef Chair of Excellence), Ph.D. .......... Australian National
McDaniel, G. L., Ph.D. ........................................ Iowa State
Williams, Don B., Ph.D. ....................................... Penn State

Associate Professors:

Day, J. W., Ph.D. ............................................. Mississippi State
Witte, Willard T., Ph.D. ........................................... Maryland

Assistant Professors:

Auge, Robert M., Ph.D. ....................................... Washington State
Rogers, S. M., M.L.A. ............................................. Georgia
Trigiano, R., Ph.D. ............................................... NC State

The Department of Ornamental Horticulture and Landscape Design offers the

Master of Science with concentrations in

• horticultural science and technology, nursery science and technology, or turfgrass science and technology. Various interests may be emphasized in any of these commodity areas, including micropropagation, innovative production and maintenance systems, computer-aided management systems, and the molecular biology, genetics, histology and stress physiology of ornamentals.

For admission, the student must have a B.S. in ornamental horticulture, horticulture, plant science, or a related agricultural or basic science discipline. Undergraduate transcripts must be evaluated by the department for prerequisite requirements, if any. Graduate research assistantships are available on a competitive basis. For further information, contact the department head.

THE MASTER’S PROGRAM

Thesis Option

1. A thesis is required. A Master’s committee of no fewer than 3 faculty members will be selected. Prior to research for the thesis, a proposal must be approved by the Master’s committee. Registration for a minimum of 6 hours of Thesis 500 is required.

2. In addition to the thesis requirement, a minimum of 24 hours of graduate credit is required. Not more than 10 hours of the minimum 30 hours can be below the 500 level. The academic program must be approved by the Master’s committee which may require additional coursework if the student’s progress or background indicates such need.

3. All students are required to include 510 Research Methods and 2 hours of 590 Seminar in their program and are expected to attend this course and participate in discussions each semester enrolled.

4. Twelve hours of coursework in the department must be at the 500 level or above exclusive of Thesis 500.

5. An oral examination covering the thesis and coursework is required.

Non-Thesis Option

1. A Master’s committee of no fewer than 3 faculty members will be selected.

2. Thirty-four hours of graduate coursework are required of which 22 hours must be at the 500 level or above.

3. All students are required to include 2 hours of 590 Seminar in their program and are expected to attend this course and participate in discussions each semester enrolled.

4. Twelve hours of coursework in the department must be at the 500 level or above.

5. Final comprehensive written and oral examinations shall be taken upon completion of no fewer than 32 hours of approved graduate work.

GRADUATE COURSES

410 Nursery Management and Production (3) Modern management methods as applied to retail and wholesale nurseries and landscape contracting firms. Methods of producing liners, container and field-grown woody ornamental plants. Prereq: 220, 330, and Plant and Soil Science 210, or consent of instructor. 2 hrs and 1 lab. Su.

440 Advanced Turfgrass Management (4) Principles and scientific basis of turfgrass culture: adaptation, ecology, physiology, soil fertility, and grass nutrition, climatic influences on grass culture; physiology of clipping and watering; design, construction, and management of golf courses; and physiological influences of pest infestation and control measures. Prereq: 340 or consent of instructor. 3 hrs and 1 lab. Sp.

460 Professional Practices in Landscape Construction and Management (2) Professionalism, salesmanship, proposals, bidding, estimating, specification, and contract management in landscape services industry. Interaction with industry representatives through special presentations. Prereq: 350 or consent of instructor. F.

480 Advanced Landscape Design (4) Comprehensive application of landscape design skills. Design applications involving site layout, landscape grading, applied landscape construction, planting design. Analysis, programming, design, detailing, estimating, and specifying applicable to variety of landscape projects. Prereq: 280, 350, and 380, or consent of instructor. 1 hr and 2-3 hr labs. Sp.

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

501 Special Topics in Ornamental Horticulture and Landscape Design (1-3) Topics to be assigned. May be repeated. Maximum 6 hrs. Prereq: Consent of instructor. E.

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


550 Microtechnique (3) Methods of investigating histostructure, histochemistry, ploidy, and physiological structures in ornamental and crop plants, light microscopy. Prereq: 8 hrs biological science, 8 hrs chemistry, and consent of instructor. 1 hr and 2 labs. Su.


590 Seminar (1) Current literature and developments. May be repeated. Maximum 3 hrs. E.

593 Problems in Ornamental Horticulture and Landscape Design (1-3) Independent study. Current topic related to technology and science. May be repeated. Maximum 6 hrs. E.
Pathobiology

(College of Veterinary Medicine)

**MAJOR**

Veterinary Medicine ........................................ D.V.M.

R. L. Michel, Head

**Professors:**

McGavin, M. D., Ph.D. .......... Michigan State
Michel, R. L., V.M.D., Ph.D. ...... Michigan State
Pattison, S., D.V.M. .......... Ohio State
Potgieter, L. N. D., Ph.D. .......... Iowa State
Schuller, H., M. D., V.M.D., Ph.D. ... Hannover

**Associate Professors:**

Edwards, D. F., D.V.M. .......... Georgia
McCracken, M. D., D.V.M., Ph.D. ... Purdue
Patton, S., Ph.D. .......... Kentucky
Shull, R. M., D.V.M. .......... Cornell

**Assistant Professors:**

Breed, M. A., D.V.M., Ph.D. ...... Texas A&M
Maddux, J., D.V.M., Ph.D. .......... Kansas State
Raimeneyer, C. R., D.V.M., Ph.D. ... Ohio State
Wilkinson, J. E., D.V.M., Ph.D. . . . Cornell

**Instructor:**

Petersen, M. G., D.V.M. .......... Colorado State

**Residents:**

Bouley, D., D.V.M. .......... Tennessee
Duncan, R. B., D.V.M. .......... Ohio State
Silva-Krott, I., B.V.Sc. .......... Austria

See Veterinary Medicine for Program Description.

**GRADUATE COURSES**

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

501 Special Topics in Pathobiology (1-2) May be repeated. Maximum 6 hrs. E

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

503 Comparative Pathology (3) Pathogenic mechanisms. Comparative aspects. Study of gross, microscopic and ultrastructural lesions. Prereq: Histology, 2 hrs and 1 lab. Sp, A

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

601 Advanced Topics in Pathobiology (1-3) Necropsy, histopathology, clinical pathology, clinical parasitology, clinical immunology, clinical bacteriology and mycology, and clinical virology. Prereq: Consent of instructor. Maximum 12 hrs. E

602 Veterinary Biopsy (1-2) Examination of biopsy specimens and interpretation of observations. Preparation of specimens for sectioning. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. E

603 Correlative Post-Mortem Pathology (1-3) Gross and microscopic post-mortem examination of animals. Correlative interpretation of clinical diseases and lesions. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

604 Veterinary Pathology Seminar (1) Microscopic slides and transparencies of lesions from cases examined by pathologists, residents, and graduate students. Interpretation of observations. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E

605 Pathobiology Seminar (1) Subjects of current interest in biomedical science. Students present one seminar per term enrolled. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. Class meets once monthly. E

606 Ultrastructural Pathology (1) Ultrastructural changes in diseased tissues, interpretation of observations. Prereq: Professional medical degree or consent of instructor. F, A

607 Diagnosis and Pathogenesis of Virus Diseases of Domestic Animals (1) Advanced study of virus diseases important to domestic animals: virus biology, pathogenesis, pathology and diagnosis. Technical training in virus diseases diagnosis. Prereq: Cellular and Comparative Biochemistry, and Advanced Topics in Biochemistry, Virology and Virology Lab, or Microbiology-Veterinary Medicine 811-812. 2 hrs and 1 lab. Sp, A

608 Techniques in Pathology (2) Fixation, processing and staining of tissue specimens; specialized gross dissection techniques; photography of gross specimens and photomicroscopy. Prereq: Consent of instructor. Sp, A

609 Principles of Pathology (1) Advanced topics in pathobiology and mechanisms of disease: pathophysiology, cellular degeneration, inflammation, immunopathology, hemostasis. Principal biochemical and morphologic responses of various cells, tissues, and organs to injury and other metabolic derangements. Participants present seminars on selected topics from current literature and textbooks. Prereq: Consent of instructor. F, A

**Philosophy**

(College of Liberal Arts)

**MAJOR**

Philosophy ........................................ M.A., Ph.D.

George G. Brankert, Head

**Professors:**

Aquila, Richard E., Ph.D. .......... Northwestern
Brankert, George G., Ph.D. .......... Michigan
Cebik, L. B., Ph.D. .......... Nebraska
Davis, John W., Ph.D. .......... Emory
Edwards, Rem B., Ph.D. .......... Emory
Graber, Glenn C., Ph.D. .......... Michigan
Postow, Betsy C., Ph.D. .......... Yale
Van de Vate, Dwight, Jr., Ph.D. .......... Yale

**Associate Professors:**

Bennett, James O., Ph.D. .......... Tulane
Cohen, Sheldon M., Ph.D. .......... Northwestern
Emmett, Kathleen A., Ph.D. .......... Ohio State
Nolt, John E., Ph.D. .......... Ohio State
Osborne, Martha Lee, Ph.D. .......... Tennessee

**Assistant Professors:**

Hamlin, H. Phillips, Ph.D. .......... Georgia
Jones, E. Roger, Ph.D. .......... Chicago
Lavin, Michael, Ph.D. .......... Stanford
Mazoue, James G. (Visiting), Ph.D. .... Tulane

The Department of Philosophy offers graduate study leading to the Master of Arts and Doctor of Philosophy. The M.A. program includes thesis and non-thesis options and offers concentrations in medical ethics and in religious studies. The Ph.D. program also has a concentration in medical ethics. Detailed information may be obtained from the Director of Graduate Studies in Philosophy.

**THE MASTER'S PROGRAM**

The department offers both a thesis and a non-thesis option. The course requirements for an M.A. with a thesis are 30 hours, including 6 hours in Philosophy 500. Of non-thesis hours, at least two-thirds must be in courses at or above the 500 level. No philosophy course numbered under 400 may be taken for graduate credit. There are no particular courses that M.A. students are required to take. The nature of the student's coursework should be determined in consultation with the student's faculty committee. The non-thesis M.A. requires 30 hours of coursework of which at least two-thirds must be in courses at or above the 500 level. Students seeking the non-thesis option must also pass a final written examination on all work offered for the degree. An additional oral examination may be required.

**THE DOCTORAL PROGRAM**

Specific requirements for doctoral students in Philosophy include a minimum of three academic years of graduate study involving at least 48 semester hours in coursework (normally 16 semester courses or their equivalent, exclusive of credit for thesis and dissertation) of which no fewer than 30 hours shall be in courses numbered over 500 and no fewer than 6 hours shall be in courses numbered over 600. The specific number and distribution of courses will be determined by the student's faculty committee.

Students must demonstrate a reading knowledge of one foreign language, normally a living language in which there exists a significant body of philosophical literature. (In special circumstances relating to the area of dissertation research, the Graduate Committee may approve a language not satisfying these conditions.) This may be done by passing the doctoral language examination given by the appropriate department, if available, or by passing French 302 or German 332 with a B or better. Bi- or multilingual (normally, foreign) students, whose native language (other than English) is one in which there is a significant body of philosophical literature, are exempted from the foreign language requirement.

**SPECIAL CONCENTRATIONS**

**Medical Ethics**

The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Detailed information concerning the program can be obtained from either the Director of Graduate Studies in Philosophy or the Director of the Medical Ethics Program.

**Religious Studies**

The department has an M.A. program of graduate study with a concentration in religious studies. Details concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Department of Religious Studies.

**ACADEMIC COMMON MARKET**

An agreement among southern states for sharing graduate programs allows legal resi-
The M.A. and Ph.D. programs in Philosophy are available to residents of the states of Alabama, Maryland, Texas, Virginia, or West Virginia; the M.A. and Ph.D. with a concentration in Medical Ethics to residents of Kentucky; and the Ph.D. program to residents of Arkansas or Louisiana. Additional information may be obtained from the Office of Graduate Admissions and Records.

GRADUATE COURSES

400 Special Topics (3) May be repeated when topic varies. Maximum 6 hrs.

411 Modern Religious Philosophies (3) (Same as Religious Studies 411.)

412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) (Same as Religious Studies 412.)

420 Topics in History of Philosophy (3) Figures or movements from antiquity through mid-twentieth century. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

425 American Philosophy (3) Colonial to early 20th Century. Prereq: 6 hrs of philosophy or consent of instructor. Movements from antiquity through mid-twentieth century. Prereq: 6 hrs of philosophy or consent of instructor. Maximum 9 hrs.

427 Topics in Logic (3) Prereq: 6 hrs of logic or consent of instructor. May be repeated when topic varies. Maximum 6 hrs.

440 Contemporary Ethical Theory (3) Topics in metaethics or ethics. Prereq: 6 hrs of philosophy or consent of instructor.

446 Theoretical Issues in Medical Ethics (3) Prereq: 240 or 345 or consent of instructor. (Same as Religious Studies 446.)

460 Philosophy of Science (3) Methodological and conceptual issues in natural and social sciences: patterns of theory modification and replacement, nature of explanation and causation, status of theoretical entities. Prereq: 360 and 1 yr of natural or social science, or consent of instructor.

465 Philosophy of History (3) Speculative and critical aspects of philosophy of history. Prereq: 6 hrs of philosophy or consent of instructor.

473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Prereq: 6 hrs of philosophy or consent of instructor.

475 Analytic Metaphysics and Epistemology (3) Topics in metaphysics and epistemology in recent Anglo-American tradition. Prereq: 6 hrs of philosophy or consent of instructor.

476 Philosophy of Language (3) Survey of issues such as meaning, reference, and truth. Prereq: 6 hrs of philosophy or consent of instructor.

479 Topics in the History of American Philosophy (3) Topics in the history of American philosophy. Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 9 hrs.

505 Philosophy of Scientific Method (3) May be repeated. Maximum 9 hrs.

524 Topics in the History of Twentieth-Century European Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

527 Topics in the History of American Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

530 Topics in Logic and Philosophy of Mathematics (3) May be repeated. Maximum 9 hrs.

540 Topics in Value Theory (3) May be repeated. Maximum 9 hrs.

542 Ethics (3) Dominant movements in history of ethics. May be repeated. Maximum 9 hrs.

544 Applied Ethical Theory (3) Single author, tradition, or topic in ethical theory, application to issues in health, business, technology, ecology, and other practical fields. May be repeated. Maximum 9 hrs. (Same as Religious Studies 544.)

546 Orientation to Medical Ethics (3) Survey of ethical theories in application to issues in medical ethics. Prereq: Consent of Medical Ethics Committee.

547 Clinical Medical Ethics (2) Medical terminology, history of medical ethics, case study discussion, clinical observation. Open only to students concentrating in medical ethics. May be repeated. Maximum 4 hrs. S/NC or letter grade.

548 Clinical Residency in Medical Ethics (3-12) Open only to students concentrating in medical ethics. Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 20 hrs. S/NC only.

553 Philosophical Topics in Literature and the Arts (3) Aesthetics, criticism, art and society. May be repeated. Maximum 9 hrs.

560 Philosophy of Natural Sciences (3) Nature of subject matter and method of science. May be repeated. Maximum 9 hrs.


570 Philosophy of Religion (3) Examination of central problems. (Same as Religious Studies 570.)

575 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

577 Philosophy of Mind (3) Relation of mental to physical and of role of words in discourse for mental activities, thinking and feeling. May be repeated. Maximum 9 hrs.

590 Social and Political Philosophy (3) Philosophical problems concerning social and political life: family, state, freedom, justice; major theoretical responses: anarchism, social contract, Marxism. May be repeated. Maximum 9 hrs.

591 Foreign Study (1-15) See page 31.

592 Off-Campus Study (1-15) See page 31.

593 Independent Study (1-15) See page 31.

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

620 Topics in the History of Ancient and Medieval European Philosophy (3) May be repeated. Maximum 9 hrs.

622 Topics in the History of Modern Philosophy (3) May be repeated. Maximum 9 hrs.

624 Topics in the History of 20th-Century Philosophy (3) May be repeated. Maximum 9 hrs.

640 Topics in Value Theory (3) May be repeated. Maximum 9 hrs.

646 Topics in Medical Ethics (3) Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 9 hrs.

675 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

DEGREES

MAJORS

PHYSICAL EDUCATION AND DANCE

DEGREES

Physical Education and Dance

(Williamsville)

(Countylevel)

Ph.D.

Majors:

Bassett, David R., Jr., Ph.D.,........ Wisconsin
Bowman, Patricia C., M.S.,........... Tennessee
Donovan, T. J., Ed.D.,................. Houston
Kelley, D. R., Ed.D.,.................... Georgia State
Lewis, J. L., Ed.D.,..................... Tennessee
McCulchen, M. G., Ed.D.,............. North Carolina

Adjunct Faculty:

Acker, J. E., M.D.,........... Tennessee
Buckles, Tina M., Ph.D.,............ Tennessee
O'Connell, D. G., Ph.D.,............. Toledo

THE MASTER'S PROGRAM

The Department of Physical Education and Dance offers the Master of Science with a major in Physical Education with the following concentrations:

Adapted Physical Education
Exercise Physiology and Fitness
Motor Behavior
Pedagogy in Physical Education
Philosophical and Sociological Foundations of Sport

Sport Administration/Management (an interdisciplinary concentration with Health, Leisure, and Safety)

The Master of Science program permits the student to select a thesis or non-thesis option. The thesis option requires a minimum of 30 hours. The non-thesis option requires 32 hours, including a project. All M.S. students must complete a course in research design or statistics and register for two credits of Physical Education 601.

Associate Professors:

Beitel, Patricia A., Ed.D.,........... North Carolina
Croskey, R. J., M.F.A.,.............. Southern Methodist
DeSensi, J. T., Ed.D.,................. North Carolina

Jones, Ralph E., Ph.D.,............... Toledo
Mead, B. J., Ph.D.,.................... Purdue
Morgan, W. J., Ph.D.,............... Minnesota

Assistant Professors:

Bassett, David R., Jr., Ph.D.,........ Wisconsin
Bowman, Patricia C., M.S.,........... Tennessee
Donovan, T. J., Ed.D.,................. Houston

Kelley, D. R., Ed.D.,.................... Georgia State
Lewis, J. L., Ed.D.,..................... Tennessee
McCulchen, M. G., Ed.D.,............. North Carolina

Adapted Physical Education
Exercise Physiology and Fitness
Motor Behavior
Pedagogy in Physical Education
Philosophical and Sociological Foundations of Sport

Sport Administration/Management (an interdisciplinary concentration with Health, Leisure, and Safety)

The Master of Science program permits the student to select a thesis or non-thesis option. The thesis option requires a minimum of 30 hours. The non-thesis option requires 32 hours, including a project. All M.S. students must complete a course in research design or statistics and register for two credits of Physical Education 601.
THE DOCTORAL PROGRAM

The Doctor of Education with a major in Physical Education is available with concentrations in the following areas:

1. Adapted Physical Education
2. Exercise Physiology
3. Motor Behavior
4. Philosophical and Sociological Foundations of Sport

The Doctor of Philosophy with a major in Physical Education includes the concentrations and specializations listed under Education.

ADMISSION REQUIREMENTS

Applicants are required to complete the departmental application which will be sent to all applicants upon their initial inquiry about the program. Specific questions about these programs should be directed to the head of the Department of Physical Education and Dance.

The following retention policy applies to all graduate students seeking a degree in the Department of Physical Education and Dance:

1. Graduate students are required to maintain an overall 3.0 GPA.

GRADUATE ASSISTANTSHIPS

A limited number of graduate assistantships are available for qualified women and men who are graduates of accredited colleges or universities. These assistantships are open to students in the Master's and doctoral programs. Students interested in these opportunities should file their applications before February. Letters should be addressed to:

Graduate Assistantships Coordinator
Department of Physical Education and Dance
University of Tennessee
Knoxville, TN 37996-2700

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S. program in Physical Education is available to residents of the state of Texas. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

Physical Education

GRADUATE COURSES

405 Sociology of Sport (3) [Same as Sociology 405.] 414 Physical Activity and Fitness (2) Relationship of exercise to cardio-respiratory function. Body composition, healthy low back, and stress. Prereq: 200, 292. (Same as Health 414.)

423 Readings in Physical Education (2) Review of current and classic literature in physical education.

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

522 Registration for Use of Facilities (3-15) Required for the student who is registered during any semester when student uses University facilities and/or faculty time before degree is completed. May be used toward degree requirements. May be repeated. S/NC only. E

509 Graduate Seminar in Public Health (1) [Same as Public Health 509, Nursing 509, Nutrition and Food Science 509 and Social Work 509.]

511 Administrative/Supervisory Processes in Physical Education (3) Organizational concepts, management strategies, and supervisory techniques related to physical education programs at all levels.

512 Application of Theory to Curricular/Methodological Decision in Physical Education (3) Application of curricular principles and theories to educational situations for development of curricula and lessons in physical education. Various methodological approaches.

514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social-political issues.

515 Social Theories of Sport (3) Liberal, democratic and Marxist social theories of sport. [Same as Sociology 594.]

528 Motor Behavior: A Theoretical Perspective (3) Motor behavior from information processing perspective; overview of current research that supports theoretical background. Prereq: Undergraduate course in general psychology or consent of instructor.

531 Biomechanics of Human Performance (3) Human movement: teaching, coaching and sports medicine. Prereq: 422 or equivalent.

532 Seminar in Research Techniques in Physical Education (3) Evaluates, compares, and contrasts research techniques in physical education with consideration for and experiences in appropriate review, design, and analysis procedures, and proposal development.

533 Psychology of Sport (3) Social psychological factors influencing human behavior in sport context; discussion of contemporary theory, research, and methodology. Prereq: General psychology course or consent of instructor.

534 Motor Behavior and Skill Acquisition (3) Topical explanation and application of principles of human movement behavior to acquisition and performance of skills; discussion of current research and methodology.

541 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and/or sport. May be repeated.

542 Sociological Aspects of Sport and Physical Education (3) Examine sociocultural factors influencing sport and physical education. Pertinent issues and research applications. Prereq: Consent of instructor. [Same as Sociology 542.]

543 Human Motor Development (3) Changes in selected motor performance and related attribute areas during critical developmental periods within context of perceptual-motor development theories and explanations of factors affecting motor behavior.

544 Theories of Physical/Movement Education (3) Integration of various theoretical approaches to physical education/movement education within cultural context; research and field work.

553 Advanced Adapted Physical Education (2) Curricular development and teaching methodology in programming for child with special education needs. Prereq: 411 or consent of instructor. Coreq: 554.

554 Advanced Adapted Physical Education Practicum (1) Curricula and methodologies implemented in lab in school for handicapped. Coreq: 553.

555 Motor Assessment and Programming for the Child with Special Education Needs (3) Criterion and norm-referenced tests used in development of individualized education plans for children with special physical education/motor development needs. Testing protocols which purport to get at basis of dysfunction; those which just measure symptoms of dysfunction; efficacy of remediation theories based or related to testing protocols. Prereq: Motor behavior course in exceptional children and development of remedial programs for children assessed appropriate for school/parent implementation.

560 Physiology of Fitness (3) Adaptations that take place with training and detraining, and influence of environmental and heredity factors. Prereq: Undergraduate courses in human physiology of exercise. Coreq: 561.

561 Physical Fitness Testing and Evaluation (1) Laboratory; testing and evaluation of physical fitness factors in apparently normal population. Coreq: 560.

562 Advanced Physiology of Exercise (3) Laboratory; quantitative approach to scientific inquiry. Prereq: Undergraduate physiology of exercise.


569 Fitness Testing, Programming, and Leadership for Diverse Populations (3) Clinical experience in selecting, administering, and evaluating exercise tolerance tests on cycle ergometer and treadmill. Individual fitness programs for diverse populations. Practice in leading variety of activities aimed toward different fitness levels. Prereq: 550. Coreq: 568. [Same as Public Health 559.]

585 Seminar in Gerontology (1) [Same as Human Ecology 585, Nursing 585, Educational and Counseling Psychology 585, Public Health 585, and Social Work 585.]

593 Directed Independent Studies (1-3) May be repeated. Prereq: 532 or consent of instructor.

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

601 Research Seminar in Physical Education (1) Research topics in different aspects of physical education, sport, and human movement. May be repeated. S/NC only.

622 Directed Independent Research (3-6) Prereq: Doctoral student or consent of instructor. May be repeated.

633 Advanced Motor Behavior (1-3) In-depth analysis, synthesis, and discussion of contemporary theory and topics; research development and production; motor control learning, sport psychology, motor development.

661 Seminar in Exercise and Applied Physiolgy (1) Prereq: 551. May be repeated with consent of instructor. S/NC only.

664 Research Participation in Applied Physiology (1-6) Participation in research with faculty member whose interests coincide with those of student. S/NC only.

681 Practicum (1-3) Intern experience in areas of major interest. May be repeated.

Dance

GRADUATE COURSES

410 Ballet: Level III (2) Instruction and practice in advanced classical ballet techniques. Prereq: Dance majors and minors or consent of instructor. May be repeated. Maximum 16 hrs.

415 The Teaching of Creative Dance (2) Theory, methods, materials, and practical experience in presentation and integration of creative dance in grades K-6.

420 Jazz: Level III (2) Instruction and practice in advanced jazz and musical theater dance styles and techniques. Prereq: Dance majors and minors and consent of instructor. May be repeated. Maximum 16 hrs.

430 Modern: Level III (2) Instruction and practice in advanced modern dance techniques. Prereq: Dance
majors and minors or consent of instructor. May be repeated. Maximum 16 hrs.

450 Composition III (3) Application of choreographic and production skills culminating in presentation of two works. Prereq: 350.

460 Rhythmic Analysis (3) Basic nature and principles of music, rhythm, and rhythmic notation; correlation with dance movement and composition. Prereq: Consent of instructor.

465 Dance Notation (3) Fundamentals of movement notation; notation and reading of elementary movement studies.

480 History of Dance I (3) Dance of various societies and culture from pre-history through 19th century.

481 History of Dance II (3) Development of dance in theatre, recreation and education during 20th century.

490 Philosophy of Dance and Related Arts (3) Aesthetic principles and current trends in dance; relationship with other art forms.

493 Directed Independent Studies (1-3) Independent study in specialized area with dance. Prereq: Consent of advisor. May be repeated. Maximum 8 hrs.

495 Dance Pedagogy (3) Principles and methods of teaching of dance with practical application in mini-teaching experience. Prereq: Upperclass or graduate standing and consent of instructor.

Physics and Astronomy (College of Liberal Arts)

MAJOR DEGREES

Physics ..................... M.S., Ph.D.

William M. Bugg, Head

Professors:

Bingham, C. R., Ph.D. ............... Tennessee
Blass, W. E., Ph.D. ............... Michigan State
Brau, J. (On Leave), Ph.D. .......... MIT
Breazeale, M. A. (On Leave), Ph.D. ......... Michigan State
Bugg, W. M., Ph.D. ............... Tennessee
Burgdorfer, J. Ph.D. ............... Frie Universitat Berlin
Callico, T. A., Ph.D. ............... Purdue
Childers, R. W., Ph.D. ............... Vanderbilt
Christophorou, L. G., Ph.D. ............ Manchester
Close, F. E. (Distinguished Scientist), Ph.D. ............... Oxford
Colglazier, E. W., Ph.D. ............... Cal Tech
Collins, T. C., Ph.D. ............... Florida
Condo, G. T., Ph.D. ............... Illinois
Cramer, H. W. (UTSI), Ph.D. .......... Yale
Deeds, W. E. (Emeritus), Ph.D. .......... North Carolina
Dicks, J. B. (Distinguished Prof.), Ph.D. ......... Vanderbilt

Associate Professors:

Macek, J. (Distinguished Scientist), Ph.D. .......... Rensselaer
Mahan, G. D. (Distinguished Scientist), Ph.D. .......... California
Mason, A. A. (UTSI), Ph.D. .......... Tennessee
McGregor, W. K. (UTSI), Ph.D. .......... Tennessee
McLaren, A. H. (Emeritus), Ph.D. .......... Michigan
Obenshain, F. E., Jr., Ph.D. .......... Pittsburgh
Painter, L. R., Ph.D. .......... Tennessee
Parks, J. E., Ph.D. .......... Tennessee
Pegg, D. J., Ph.D. .......... New Hampshire
Riedinger, L. L., Ph.D. .......... Vanderbilt
Ritchie, R. H., Ph.D. .......... Tennessee
Rusk, W. R. (Emeritus), M.S. .......... Tennessee
Schwehrer, H. C. (Emeritus), Ph.D. .......... MIT
Sellin, I. A. (On Leave) (Chancellor's Res. Unit), Ph.D. .......... Chicago
Shih, C. C., Ph.D. .......... Cornell
Stelson, P. H., Ph.D. .......... MIT
Thompson, J. R., Ph.D. .......... Duke
Thomson, J. O., Ph.D. .......... Illinois
Weheler, G. W. Ph.D. .......... Yale
White, J. W. (Emeritus), Ph.D. .......... North Carolina

Assistant Professors:

Breinig, M., Ph.D. .......... Oregon
Duckett, K. E., Ph.D. .......... Tennessee
Elston, S. B., Ph.D. .......... MIT
Ferrell, T., Ph.D. .......... Clemson
Haneland, T. H., Ph.D. .......... Michigan
Lide, R. W., Ph.D. .......... Michigan
Muehlhausen, J. W., Ph.D. .......... Tennessee
Shieh, S. Y., Ph.D. .......... Maryland
Ward, B. F. L., Ph.D. .......... Princeton

Graduate programs leading to the Master of Science and the Doctor of Philosophy are offered in a number of concentration areas: atomic and low temperature physics, biophysics, chemical physics, elementary particle physics, health physics, heavy ion atomic physics, molecular spectroscopy, nuclear physics, plasma physics, condensed matter physics, theoretical physics, and ultrasonics.

The University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in quantum optics and laser physics, atomic and molecular spectroscopy, fluid physics, and theoretical physics. For additional information, contact the department head.

ADMISSION REQUIREMENTS

A student who enrolls in The Graduate School with the intention of attaining an advanced degree in Physics will have completed an undergraduate major in Physics or its equivalent. Physics 311-12, 321, 431-32, and 461-62-63 or 411-12 constitute the minimum courses prerequisite to graduate study.

A student who intends to present Physics as a graduate minor will have completed an undergraduate minor in Physics or its equivalent. Physics 311 and 431-32 constitute the minimum coursework prerequisite to a minor in Physics.

First-year graduate students are required, for advising purposes only, to take a qualifying examination in undergraduate physics during the fall semester registration period.

THE MASTER'S PROGRAM

Thesis Option

This program is designed primarily for students intending to go into industrial or governmental laboratories as physicists. The course requirements include 24 semester hours of physics courses, of which at least 12 semester hours are taken from Physics 511-12, 521-22, 531-32, 541-42, or 571-72. Each candidate must present an acceptable thesis, 6 hours of 500, and pass an oral examination on course material and thesis.

Non-Thesis Option

This program is designed primarily for students intending to teach in colleges or universities on the elementary or intermediate level, or for students specifically intending to work toward a Ph.D. Students seeking the non-thesis option must apply to the department's graduate committee for permission to enroll under this program. The requirements are the satisfaction of completion of 30 hours of coursework composed of 18 semester hours from Physics 511-12, 521-22, 531-32, 541-42, and 571-72; 6 semester hours in a minor field; and 6 semester hours from other courses numbered above 400 (preferably of laboratory nature.) At least 20 hours must be taken at the 500 level or above. In addition, the candidate must pass a written examination administered by the committee.

THE DOCTORAL PROGRAM

All students are expected to take Physics 521-22, 531, 541-42, 551, 561, 571-72, and 611. Physics 601-02 are normally required of students specializing in atomic physics; Physics 621-22 of students in nuclear physics; Physics 626-27 of students in elementary particle physics; Physics 663-64 of students in plasma physics; Physics 681-62 of students in health physics; Physics 671-72 of students in solid state physics; and Physics 681-82 of students specializing in molecular spectroscopy. Students specializing in chemical physics may substitute Chemistry 572 for Physics 551 and should complete at least
Astronomy

GRADUATE COURSES

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary, consideration of quasars, pulsars, black holes and current developments in field. Acceptable for major credit in physics. Prereq: Physics 232 and consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in astronomy and astrophysics. Acceptable for graduate credit in physics with consent of department. May be repeated with consent of department. Maximum 9 hrs.

Physics

GRADUATE COURSES

401 Background of Physics (2) Survey of historical development and philosophical foundations of natural science. Classical theories of gravitation, electromagnetism, and relativity. Unifying mathematici- cal principles underlying physical applications. Readings from important original papers, thought-provoking problems and order-of-magnitude calculations combining different fields of classical physics, and written report on independent study. Recommended for graduate students who plan to teach. Prereq: Senior standing in physics or consent of instructor.

402 Forefront of Physics (2) Survey of modern developments of physics in various fields of quantum mechanics, quantum electrodynamics and recent theories of particles, fields and their interactions. Discussion of unće resolved experimental results and current interest, readings in recent literature, and applications in other fields, with final oral report and term paper. Recommended for beginning graduate students. Prereq: 401 or consent of instructor.


421 Modern Optics (4) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces; mathematics of wave motion and interfer- ence. Rayleighs of Fourier optics and holography. Prereq: 431 or 232 and consent of instructor. 3 hrs and 3 labs.

425 Principles of Nondestructive Testing (3) (Same as Engineering Science and Mechanics 425.)
GRADUATE COURSES

401 The City in the U.S. (3) Development and character of U.S. cities. Contemporary issues and selected case studies. (Same as Urban Studies 401.)

402 Survey of Planning (3) History of city development and of planning; U.S. experience in urban and other levels of planning. State of the art, process, comprehensive plan, implementation devices, Planning in society. Not for credit for M.S.P. degree.

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

501 Thesis and Major Paper Proposal/Writing (1) Preparation

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

510 Fundamentals of Planning (2) History of planning, structure and development of urban areas, operations of contemporary planning, trends and issues.

511 Graphic and Oral Communications in Planning (1)

515 Theory of Planning (2) Analysis of nature and objectives of planning process; role of planner and planning function in public decision-making. Prereq: 510 or consent of instructor.

520 Planning Research Methods (3) Research techniques in subject areas associated with city and regional planning. Research tools, data collection and analysis as basis for planning and decision-making.

521 Computers in Planning (3) Basic computer concepts, hardware and software, use of mainframe and microcomputers in planning and government.

522 Computers in Planning II (3) Software and systems for planning and local government. Content varies. Projects in small group or individual study mode. Prereq: 521 and consent of instructor.

523 Statistics for Planners (3) Applications of basic descriptive and inferential classical and non-parametric techniques in planning research. Data organization and display, measures of location, dispersion and association, data transformations; some basic probability theory; selected one and two sample tests; correlation and regression analysis. Prereq: 520 or consent of instructor.

524 Advanced Data Analysis (3) Applications of statistical data analysis in planning. Regression analysis, plus selected multivariate, non-parametric, and analytical procedures of computer science for data analysis. Prereq: 521, 523 and consent of instructor.


526 Library Research for Planning (1) Survey of publications of interest to planners, resources and research techniques. Use of facilities and collections of library.

530 Planning Analysis and Forecasting (3) Methods of urban and regional analysis and modeling in urban and regional studies. Population, employment, and economic base studies, forecasting techniques. Coreq: 520 or consent of instructor.

531 Urban and Regional Analysis (3) Past, present and possible future patterns of urban and regional structures drawing on contemporary theories, models, and empirical research.

532 Planning Methods (3) Preparation of comprehensive plans for urban areas or regions. Development of baseline data and forecasts, formulation of alternative plans and strategies, and development of plan implementation programs. Extensive laboratory experience. Prereq: 510, 520, 530 and 531 or consent of instructor.

537 Planning and Transportation (3) (Same as Civil Engineering 555.)

538 Urban and Site Design (3-6) Principles of design of residential subdivisions and some components of physical community, shopping centers, institutional complexes, central business districts. Problems of reviewing alternative designs against each other or written regulations. Extensive laboratory experience.

539 Planning for Historic Preservation (3) Planning for preservation, restoration, and conservation of historic buildings, areas and sites as related to comprehensive planning process. National, state, and local government role in preservation, designation of sites, legislative needs, financing and administrative organizations.

540 Legal Aspects of Planning (3) Legal basis for planning and guiding community development. Legal tools of planning. Prereq: 510 or consent of instructor.

545 Planning and Property Development (2) Process of urban physical growth and change; functioning of private sector real estate development and its relationship to planning. Partnership roles of public and private sectors in urban development and redevelopment. Prereq: 510 or consent of instructor.

546 Housing (3) Nature and demand for housing in U.S. and abroad. U.S. experience. Private market processes and public programs and problems of housing supply, impact of new technology, and governmental programs to improve supply and quality of housing.


551 State and Regional Planning (3) Theory and practice of planning at state, sub-state, and metropolitan levels.

552 Development Planning in the Third World (3) Seminar on urban and regional development in Third World nations. Population growth, settlement patterns, economic development, land framework of integrated resource management. (Same as Ecology 552.)

553 Natural Resource Management and Environmental Assessment in Developing Nations (3) (Same as Ecology 537 and Botany 537.)

554 TVA, Planning and Development (3) Review and evaluation of leading U.S. national experiment in river basin planning and development, Tennessee Valley Authority.

555 Environmental Planning (3) Role of planners and planning in maintenance of balance between natural and built environment. (Same as Ecology 555.)

560 Policy Analysis and Strategic Planning (3) Models of policy making process and role of strategic planning and applied decision making. Quantitative and qualitative approaches, evaluative research and program evaluation, and impact assessment.

590 Practicum (6) Prereq: Consent of instructor. S/NC or letter grade.

591 Special Topics (1-3) Prereq: Consent of instructor.

592 Readings in Planning (1-3) Prereq: Consent of instructor. May be repeated.

593 Problems in Planning (1-3) Prereq: Consent of instructor.

Plant and Soil Science

(College of Agriculture)

MAJOR

DEGREES

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

John E. Foss, Head

Professors:

Bell, Frank F. (Emeritus), Ph.D. .... Iowa State

Coffey, D. L., Ph.D. ............... Purdue

Conger, B. V., Ph.D. .......... Washington State

Foss, John E., Ph.D. ........... Minnesota

Fribourg, Henry A., Ph.D. .... Iowa State

Josephson, L. M. (Emeritus), Ph.D. .............. Wisconsin

Parks, William L., Ph.D. ........... Purdue

Pickett, B. S. (Emeritus), Ph.D. .......... Michigan State

Reynolds, John H., Ph.D. ............. Wisconsin

Saatz, Lloyd F. (Emeritus), Ph.D. .......... NC State

Skold, L. N. (Emeritus), M.S. ...... Kansas State

Springer, M. E. (Emeritus), Ph.D. .......... California

Swingle, H. D. (Emeritus), Ph.D. .......... Louisiana State

Winters, Eric (Emeritus), Ph.D. .......... Illinois

Associate Professors:

Allen, Fred L., Ph.D. .......... Minnesota

Ammons, J. T., Ph.D. .......... West Virginia

Dayton, D. E., Ph.D. ............... NC State

Hayes, R. M., Ph.D. .......... Illinois

Krueger, W. A., Ph.D. .......... Illinois

Lessman, Gary M., Ph.D. .......... Michigan State

Lewis, R. J., Ph.D. .......... NC State

Reich, V. H., Ph.D. .......... Iowa State

Sams, C. E., Ph.D. .......... Michigan State

Tyler, D. D., Ph.D. .......... Kentucky

West, D. R., Ph.D. .......... Nebraska

Assistant Professors:

Graveel, J. G., Ph.D. .......... Purdue

Rhodes, G. N., Jr., Ph.D. .......... NC State

The Department of Plant and Soil Science offers graduate programs leading to the Master of Science and the Doctor of Philosophy. Concentrations for the graduate programs are offered in soil science, plant breeding and genetics, and crop physiology and ecology.

For further information, contact the department head.

THE MASTER'S PROGRAM

The program requires writing a thesis based on original research. A minimum of 30 hours is required for the Master's degree program of which 6 credits must be Thesis 500. At least 14 credits must be taken in courses numbered above the 500 level. The student's advisory committee will consist of the major professor, who will act as chairperson of the committee, and a minimum of two other faculty members. The advisory committee approves the student's research problem and coursework and conducts the final oral examination covering the thesis and graduate courses.

THE DOCTORAL PROGRAM

A minimum of 72 hours beyond the Bachelor's degree, exclusive of credit for Thesis 500, is required. Of this number, 24 hours must be Doctoral Research and Dissertation 600. A minimum of 26 hours must be completed in courses numbered above 500
exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 600. A minimum of 9 hours of the courses must be taken during the doctoral program but they must be outside the department in one or more cognate areas.

The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from outside the department. The committee must approve all coursework applied toward the degree, certify the student's mastery of the major field and any cognate fields, direct the research, and recommend the dissertation for approval and acceptance by the Graduate School.

GRADUATE COURSES

411 Soil Microbiology (3) Soil microbial population and role in soil ecosystem, microbial transformations of inorganic and organic compounds, decomposition of residues, dynamics of soil organic matter. Prereq: 210 and Chemistry 110 or 350 or consent of instructor. F

412 Soil Genesis, Classification, and Mapping (3) Soil genesis and formation; observing and describing morphology of field and forest soils, use of soil chemical and physical properties, classification; mapping. Two Saturday field trips. Prereq: 210 or consent of instructor. 2 hrs and 1 lab. Sp

413 Soil Chemistry (3) Principles concerning structure and chemical properties of soil materials; colloidal fraction as related to exchange, chemical equilibria, soil acidity, oxidation-reduction, weathering, nutrient availability and waste disposal. Prereq: 311 or consent of instructor. F

414 Soil, Land Use, and the Environment (3) Soil as environmental component and soil properties affecting land use. Resource development in environmental planning; consideration of nonengineering aspects of site selection for land use, soil survey and resource data in land use, recognition and prevention of soil pollution. Prereq: 210 or consent of instructor. Sp

421 Crop Physiology and Ecology (3) Principles of plant physiology and ecology as applied to crop production. Effects of environmental factors on physiological processes. Prereq: 230, Botany 321. 2 hrs and 1 lab. Sp

433 Agricultural Pesticides (3) Regulation of pesticide use; application, 1, and-squar tests, analysis of variance, mean separation procedures, linear regression and correlation. Prereq: Mathematics 121 or equivalent. F

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

501 Seminar (1) Application of speaking, writing, and organizational skills in preparation and presentation of scientific material to both scientific and general audiences. Preparation of abstracts for scientific presentations. F, Sp

502 Registration for Use of Facilities (1-15) Required for all students not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E


512 Pedology (3) Physical and chemical weathering processes, factors of soil formation. Prereq: 412 or consent of instructor. 2 hrs and 1 lab. F, A

514 Soil Physics (3) Physical and chemical relationships among solid, liquid and gaseous phases of soil system. Dynamics, interrelationships and interaction of phases on soil structure, moisture characteristics, aeration and relationship to plant growth. Prereq: 413 or consent of instructor. 2 hrs and 1 lab. F, A

530 Integrated Pest Management (3) (Same as Entomology and Plant Pathology 530.)

551 Advanced Plant Genetics (3) Discovery of genetics: controlling elements, induced mutations, genome organization, polyploidy, hybridization, extrachromosomal inheritance, apomixis, incompatibility systems, and genetic engineering of higher plants. Prereq: Biology 220. F


571 Design and Analysis of Biological Research (3) (Same as Animal Science 571.)

593 Special Problems in Plant and Soil Science (1-3) May be repeated. Maximum 8 hrs. E

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

601 Special Topics in Soil Science (1-3) Thermodynamics of soil solutions, clay structure and surface chemistry, soil mineralogy, plant mineral nutrition, soil microbiology, water movement and use by plants, soil structure, soil properties, interactions in the soil-plant environment. May be repeated. Maximum 6 hrs. E

603 Special Topics in Crop Physiology and Ecology (1-3) Physiology of crop growth and reproduction. Interactions of physiology and genetics to provide more effective gene manipulation and applications of quantitative methods in crop physiology and ecology research. May be repeated. Maximum 6 hrs. E

605 Special Topics in Plant Breeding and Genetics (1-3) Crossing methods and applications. Prerequisites of quantitative parameters, mutations, chromosome dynamics, polyplody, genetic engineering, inter-specific hybridization, linkage, screening methods, genome organization. May be repeated. Maximum 6 hrs. E

613 Advanced Soil Chemistry (3) Surface and colloidal chemistry of soil minerals; recent developments in ion transport, ion movement, surface charge and surface complexation and soil colloidal stability. Prereq: 413 or consent of instructor. F

631 Advanced Crop Physiology (3) Relationship of growth and development to environment, interactions, specific hybridization, linkage, screening methods, genome organization. May be repeated. Maximum 6 hrs. E

653 Advanced Plant Breeding (4) Development and utilization of concepts of quantitative parameters, inbreeding, heterosis, methods of selection, in vitro breeding, interspecific hybridization, stability parameters, genetic resistance and susceptibility to pests and environmental stresses. Prereq: 453 and 571 or equivalent or consent of instructor. 3 hrs and 1 lab. Sp

671 Advanced Research Planning (3) Development of agricultural research project utilizing prescribed resources and emphasizing experimental design and statistical techniques. Prereq: 571. Animal Science 572. Statistics 461, or equivalent. (Same as Animal Science 671.) F, A
THE MASTER OF ARTS PROGRAM

A Bachelor's degree or its equivalent is required for admission. Normally an overall average of 3.0 is also required together with an average of 3.2 in the last two years of political science or social science. In addition, the applicant must have earned a composite score of at least 1100 on the verbal and quantitative parts of the GRE normally required.

Students pursuing the Master of Arts degree may follow one of two options:

**Thesis Option:** (30 hours) Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and 512). No more than 6 hours may be earned through thesis credit.

**Non-Thesis Option:** (36 hours) Coursework, plus a written comprehensive examination on all coursework is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and 512), and 3 hours in the 600-level research seminar in the student's first field of interest.

THE MASTER OF PUBLIC ADMINISTRATION PROGRAM

The M.P.A. program is intended to prepare students for public service careers by acquainting them with management principles, analytical tools, and the ethical dilemmas they will face as public administrators. It consists of a total of 36 semester hours, including a core program, an elective specialization, and a recommended internship.

Applications for admission to the program must have a Bachelor's degree or its equivalent. Normally, an overall average of 3.0 and an average of 3.2 in the last two years of political science or social science courses is required. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

The M.P.A. is a non-thesis program. Specific requirements include the following:

1. Core - 21 hours
   b. General perspectives - elective courses (3 hours): 558 Political Analysis; 558 The Politics of Administration.
   c. Analytical skills (6 hours): 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.
   d. Management skills (6 hours). Choose two of the following: 560 Public Budgeting and Finance; 562 Public Management; 564 Human Resources Management in Public Organizations.

2. Specialization - 9 hours
   a. A specialization is designed by the student in consultation with the coordinator of the M.P.A. program. Possible specializations include governance, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.
   b. Recommended internship with a public agency.
   c. Internships are arranged in consultation with the coordinator of the M.P.A. program.

4. A written final examination, which may be followed by oral examination, is required.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science in the College of Liberal Arts offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the M.P.A. and J.D. degrees in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science and The Graduate School for the M.P.A. degree. Applicants must also be accepted by the Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant's LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the M.P.A. program. Application may be made prior to or after matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 15 hours required for the M.P.A. degree.

Curriculum

A dual degree candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees. As well as the requirements for the dual program. The College of Law will award a maximum of 9 semester hours of credit toward the J.D. degree for successful completion of approved graduate level courses (500 or 600 level) offered in the Department of Political Science. The M.P.A. program will award a maximum of 9 semester hours of credit toward the M.P.A. degree for successful completion of approved courses offered in the College of Law. All courses for which this cross-credit is awarded must be approved by the J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (Law 821) and are encouraged to take Local Government (Law 824). An internship is strongly recommended for students in the dual degree program, as it is for all M.P.A. candidates, but an internship is not required.

During their first two years in the dual program, students will spend one additional year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the M.P.A. program. During those first two years, students may not take courses in the separate area, without the approval of the J.D.-M.P.A. coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the J.D. or the M.P.A. degree for courses taken in the other program except as such courses quality for credit without regard to the dual program.

Awarding of Grades

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student's GPA or class standing. The College of Law will award a grade of Satisfactory for an approved M.P.A. course in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of 2.3 or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

THE DOCTORAL PROGRAM

The Ph.D. program prepares students for careers in college teaching, as well as careers in other occupations related to service in the public or private sectors. Applicants for admission to the program should normally have completed a Master's degree in political science or a related field with a 3.0 GPA (3.5 for international students) and have earned a composite score of at least 1100 on the verbal and quantitative parts of the Graduate Record Examination.

Students admitted to the program must complete 78 hours of course work beyond the Bachelor's degree, must successfully pass written and oral comprehensive examinations in three broad subfields of political science, and must pass a final oral examination on the dissertation. In addition, students must satisfy a research tool requirement. This requirement may be satisfied either by demonstrating competency in one foreign language, or by completing 12 hours of coursework, numbered 500 or above, in empirical methodology.

In addition to the total hours required for the degree, the following requirements must also be met:

1. At least 63 hours must be in political science courses.
2. At least 48 hours in political science courses must be in courses numbered above 500.
3. Completion of Political Science 510 and 512.
4. At least 6 hours must be earned in political science courses numbered above 600, exclusive of dissertation hours.
5. A total of 24 hours must be earned by writing the dissertation.

GRADUATE COURSES

410 Special Topics in United States Government and Politics (3) May be repeated with consent of department. Maximum 6 hrs.
420 Political Attitudes and Opinions (3) Nature, formation, development, and disintegration of politically relevant attitudes and opinions in American political system.
421 Political Parties and Interest Groups (3) Examination of role of political parties and organized groups in American politics and government.
422 Political Campaigns and Elections (3) Analysis of nature of campaigns and elections in American political process.
430 United States Constititional Law: Sources of Power and Restraint (3) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional control of political and economic rights.
431 U.S. Constitutional Law: Civil Rights and Liberties (3) Analysis of current issues in civil rights and liberties including: first amendment freedoms, equal protection, privacy and rights of accused.
440 Public Management and Human Resources (3) Mobilization and management of technical and human resources in pursuit of public sector organization goals.
441 Budgetary Process and Financial Management (3) Fiscal planning, budget and expenditure process in government, their policy and administrative implications.
442 Administrative Law (3) Legal dimensions of administrative power and procedures, and constitutional control over administrators.
452 Black African Politics (3) Recent evolution and current political environment of Black African nations. (Same as Afro-American Studies 452.)
454 Government and Politics of China and Japan (3) Examination of the political setting, structure and political processes in China and Japan.
455 Latin American Government and Politics II (3) Selected topics on Latin American political dynamics, consideration of leading theoretical explanations. (Same as Latin American Studies 455.)
459 Government and Politics of the Soviet Union (3) Origins and development of Soviet political system, and study of selected policy areas.
460 Revolution (3) Examination of characteristics, theories, and consequences of revolution with particular focus on left-wing revolutions and movements.
461 Policy Making in Democracies (3) Comparative approach to theory and process of making public policies.
463 Contemporary Middle East Politics (3) Governments and movements in Middle East, their characteristics, bases, and relationships.
464 Special Topics in Comparative Government (3) May be repeated with consent of department. Maximum 9 hrs.
469 Soviet Foreign Policy (3) Overview of Soviet international behavior since 1917 and examination of selected problems of Soviet foreign policy post World War II.
470 International Law (3) Nature and development of international law and compliance. Function of international law in context of international conflict.
475 Ancient and Medieval Political Thought (3) Survey of major western political thinkers from Socrates to Marsilio of Padua.
476 Modern Political Thought (3) Survey of major western political thinker from Machiavelli to Marx.
500 Thesis (1-18) P/NC only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
510 Scope and Methods in Political Science (3) Procedures of analysis in political science.
512 Quantitative Political Analysis (3) Methods and techniques of quantitative political analysis: univariate and bivariate statistics.
513 Quantitative Political Analysis (3) Methods and techniques in quantitative political analysis: multivariate model building.
514 Research and Methodology in Public Administration (3) Basic assumptions and techniques of research in public administration; measurement, analysis, and reporting of data.
520 Political Theory (3) Survey of major ideas, thinkers, and works of Western political theory.
528 Topics in Political Theory (3) Selected issues and problems in normative political theory. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.
530 Topics in American Government and Politics (3) Survey of literature, approaches to research and analysis, critical examination of major works, and overview of research in various subfields. May be repeated with consent of department. Maximum 9 hrs.
531 Topics in Parties and Elections (3) Analysis of party systems and electoral behavior. May be repeated with consent of department. Maximum 9 hrs.
534 Topics in American National Institutions (3) Deals with cleavage in American political culture. May be repeated with consent of department. Maximum 9 hrs.
536 Comparative State Politics (3) Government and political processes of fifty states: general and particular characteristics. May be repeated with consent of department. Maximum 9 hrs.
538 Urban Politics and Administration (3) American urban structures and public policies. May be repeated with consent of department. Maximum 9 hrs.
540 Public Law (3) Selective examination of published research and current approaches in subfields of constitutional law, judicial process, and judicial behavior. May be repeated with consent of department. Maximum 9 hrs.
542 The Politics of Criminal Justice (3) Selective examination of contemporary problems of research and public policy formulation: criminal process; law enforcement; and correction, state and court administration; and prison administration. May be repeated with consent of department. Maximum 9 hrs.
546 Law and the Administrative Process (3) Constitutional position; decisional processes, regulation and management, limitations on governmental action; questions of structure, role, and administrative choice. May be repeated with consent of department. Maximum 9 hrs.
550 Public Administration (3) Overview of public administration theory and function.
552 Organization Theory (3) Appraisal of major theories of organization and their applicability to public sector.
554 Contemporary Public Policies (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor. May be repeated with consent of department. Maximum 9 hrs.
556 Policy Analysis (3) Role of administrators in policy analysis and decision making. May be repeated with consent of department. Maximum 9 hrs.
558 The Politics of Administration (3) Examination of public administration in context of American political system, policy making and political roles of public administrators and agencies. May be repeated with consent of department. Maximum 9 hrs.
600 Public Budgeting and Finance (3) Technical and political aspects of planning, preparing and adopting government budgets. Management implications of revenue collection, debt management, treasury function, accounting, internal auditing, purchasing risk management, post-auditing.
562 Public Management (3) Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies. May be repeated with consent of department. Maximum 9 hrs.
564 Human Resource Management in Public Organizations (3) Analysis of contemporary issues, challenges, methods and strategies related to effective management of human resources in public sector.
566 Ethics, Values, and Morality in Public Administration (3) Moral-ethical-value dilemmas confronting administrators in American public system.
567 Comparative Public Administration (3) Comparison of policy-making structures and public policies in selected countries. May be repeated with consent of department. Maximum 9 hrs.
568 Special Topics in Public Administration (3) Analysis of selected issues and problems in public administration. May be repeated. Maximum 9 hrs.
569 Internship in Public Administration (3-9) Open to students participating in approved internship programs. May be repeated with consent of department. Maximum 9 hrs. S/NC only.
570 Comparative Government and Politics (3) Selected topics in modern governments. May be repeated with consent of department. Maximum 9 hrs.
572 The Politics of Development (3) Selected topics dealing with political problems of less developed countries. May be repeated with consent of department. Maximum 9 hrs.
574 Area Seminar in Comparative Government and Politics (3) Selected topics in area studies: African, Asia, Latin America, Middle East, Soviet Union and Eastern Europe or Western Europe. May be repeated with consent of department. Maximum 9 hrs.
580 International Politics (3) Survey of literature and major aspects of international politics. May be repeated with consent of department. Maximum 9 hrs.
582 Theory and Analysis of U.S. Foreign Policy Processes (3) Theoretical approaches to decision making in foreign policy area and analysis of policy-making process. May be repeated with consent of department. Maximum 9 hrs.
588 Special Topics in International Politics (3) Selected issues and problems in international politics. Specific content determined by instructor. May be repeated with consent of department. Maximum 9 hrs.
591 Foreign Study (1-15) See page 31.
592 Off-Campus Study (1-15) See page 31.
593 Independent Study (1-15) See page 31.
595 Readings and Special Problems in Political Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 15 hrs.
600 Doctoral Research and Dissertation (3-15) P/NC only. E
610 Research Seminar in Empirical Theory and Methodology (3) Advanced methods and procedures of analysis in political science. May be repeated with consent of department. Maximum 9 hrs.
620 Research Seminar in Political Theory (3) Research into selected topics. May be repeated with consent of department. Maximum 9 hrs.
630 Research Seminar in the American Political Process (3) Research into selected topics. May be repeated with consent of department. Maximum 9 hrs.
640 Research Seminar in U.S. Constitutional Law (3) Systematic analysis of published research and judicial decision: development of constitutional law as major component of public policy. May be repeated with consent of department. Maximum 9 hrs.
Polymer Engineering
See Materials Science and Engineering

Psychology
(College of Liberal Arts)

MAJOR DEGREES

Psychology........................................ M.A., Ph.D.

Raymond D. Fowler, Head

Professors:

Burghardt, Gordon M., Ph.D.......... Chicago
Burstein, Alvin G., Ph.D.......... Chicago
Byrne, Jack F., Ph.D.......... Tennessee
Calhoun, William H., Ph.D.......... California
Cohen, Charles P., Ph.D.......... Kansas
Fine, Harold J., Ph.D.......... Syracuse
Fowler, Raymond D., Ph.D.......... Penn State
Handel, Stephen J., Ph.D.......... Johns Hopkins
Handler, Leonard, Ph.D.......... Michigan State
Lawler, James E., Ph.D.......... North Carolina
Lounsbury, John W., Ph.D.......... Michigan State
Lubar, Joel F., Ph.D.......... Chicago
Malone, John C., Ph.D.......... Duke
Newton, Kenneth R. (Emeritus), Ph.D.......... Tennessee
Pollio, Howard R. (Distinguished Prof.), Ph.D.......... Pennsylvania
Rasch, Norman L., Ph.D.......... Pennsylvania
Samejima, Fumiko, Ph.D.......... Keio
Shrader, Raymond J. (Emeritus), Ph.D.......... Tennessee
Sundstrom, Eric D., Ph.D.......... Utah
Wahler, Robert G., Ph.D.......... Washington
Wiberley, J. Albert, Ph.D.......... Syracuse

Associate Professors:

Barlow, Jack M., Ph.D.......... Tennessee
Johnson, Michael G., Ph.D.......... Johns Hopkins
Kandel, Daniel, Ph.D.......... Tennessee
Lawler, Kathleen A., Ph.D.......... North Carolina
Loucks, Sandra, Ph.D.......... Pennsylvania
McIntyre, Anne, Ph.D.......... Yale
Morgan, Wesley G., Ph.D.......... Tennessee
Saudargas, Richard S., Ph.D.......... Florida State
Travis, Cheryl B., Ph.D.......... California (Davis)

Assistant Professors:

Beauchaine, Lorrie, Ph.D.......... Tennessee
Berez, William, Ph.D.......... Tennessee
Coleman, Kerita, Ph.D.......... Harvard
Erickson, Jeffrey, Ph.D.......... Tennessee
Laurence, Lance T., Ph.D.......... Tennessee
Levy, Robert D., Ph.D.......... California
Murray, James, Ph.D.......... Case Western
Nash, Michael, Ph.D.......... Ohio

O'Connor, Edward, Ph.D.......... Massachusetts
Smith, Michael, Ph.D.......... Tennessee
Watrous, Peter, Ph.D.......... Tennessee
Waugh, Mark, Ph.D.......... Florida

THE MASTER'S PROGRAM

Graduate study leading to the Master of Arts in general psychology is normally available only to students in the doctoral program in psychology. Requirements are (1) a score of at least 630 on the GRE in psychology; (2) at least 30 hours of graduate-level courses in psychology; and (3) a Master's thesis based on at least 8 hours of Thesis 500. A non-thesis Master's degree is available with the approval of the student's supervisory committee upon successful completion of a total of at least 36 hours in graduate-level courses in psychology and a final written examination.

THE DOCTORAL PROGRAM

A student with a B.A. or B.S. may apply to the Department of Psychology for admission to the doctoral program with a concentration in general psychology or clinical psychology. The doctoral program with a concentration in ethology or physiology is offered through the Life Sciences Program. Doctoral study in industrial and organizational psychology is offered through the Intercollegiate Program in Industrial and Organizational Psychology, to which application is made through the Department of Management.

Departmental Requirements

All students in the doctoral program in psychology must obtain a score of at least 650 on the GRE in psychology by the end of the first year, and all students must pass the departmental general psychology examination (a comprehensive, two-day essay exam offered twice each year) by the end of the second year. In addition, each student must pass the doctoral comprehensive examination, complete an acceptable doctoral dissertation, and conduct a satisfactory oral defense of the dissertation. All doctoral students must complete a minimum of 78 hours of graduate-level courses, including courses required by their program; at least 6 hours in courses outside of psychology; and at least 24 hours of dissertation research (Psychology 600).

General Psychology

This program allows students to select from a variety of specializations oriented toward careers in research and teaching in psychology in academic, institutional, or industrial settings. The program is highly flexible and individualized and seeks to provide a professional apprenticeship. Specializations include behavioral medicine and health psychology, child and adolescent development, cognitive and symbolic processing, conditioning and learning, ethology, existential phenomenology, psychometrics, psychophysiology, social psychology, and others. Requirements of the program are as follows:

1. Statistics 537-38, or equivalent, and two additional courses numbered above 500 in research methodology, quantitative methods, statistics, or psychometrics.

2. Competence in general psychology, demonstrated by completing Psychology 513 (Foundations of Psychology) or Psychology 490 (History and Systems of Psychology) or equivalent, plus at least one course or sequence or equivalent from each of four categories in the following list. (This requirement may be met by passing approved written examinations.)
   d. Developmental psychology: 511 Developmental Psychology; 512 Life-span Development; 574 Child Psychopathology.
   e. Individual differences and personality: 445 Measurement and Testing; 470 Theories of Personality.
   f. Social psychobiological psychology: 440 Organizational Psychology; 550 Social Psychology.

3. Research practicum (509) - research apprenticeship involving participation in the ongoing research of two different members of the faculty during the first two semesters in the program.

4. Pre-dissertation research project completed during the second year, involving the collection of original data or original analysis of existing data, reported in publishable form and acceptable to the doctoral supervisory committee.

5. At least 4 graduate seminars in psychology numbered above 600.

Clinical Psychology

This program is designed to lay the groundwork for a professional career as a licensed clinical psychologist capable of working in both academic and applied settings. The program emphasizes the theoretical foundations of psychology as well as supervised experience oriented toward the development of practical skills. The program uses the scientist-practitioner model of clinical psychology. Requirements are as follows:

1. Apprenticeship with one faculty member during the first year, one day each week.

2. Pre-dissertation research project completed before forming a doctoral supervisory committee, reported in written form acceptable to the student's faculty advisor and the director of clinical training.

3. Supervised clinical placement two days (16 hours) each week during the second, third, and fourth years.

4. Satisfactory completion of listed courses (or equivalents) in the following nine categories:
   a. Foundations of Psychology (513);
   b. Measurement and Testing (445);
   c. Personality Theory and Research (570-71);
   d. Lifespan Development (512);
   e. Statistics and research methods (504)

Empirical Methods in Psychology plus
489 Supervised Research (1-9) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs in 399, 491, 492, and 493 combined may apply toward undergraduate major.

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

502 Registration for Use of Facilities (3-16) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E


505 Research Design (3) Techniques for planning and conducting research in controlled and natural settings: experiments, quasi-experiments, observational studies, surveys, and program evaluations. Development of questions and hypotheses for study. Design of studies to maximize validity. Prereq: Consent of instructor.

508 Readings and Special Issues in Psychology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

509 Research Practicum (2) Required of first-year graduate students in psychology. May be repeated. Maximum 9 hrs.

510 Topics in Psychology (3) Intensive examination of selected issues in psychology. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

511 Developmental Psychology (3) Normal processes of human socialization: physical, cognitive, and emotional development from conception through infancy, childhood, and adolescence. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

512 Life-Span Development (3) Theories and research concerning normal human development throughout life, adulthood and old age. Prereq: Consent of instructor.

513 Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (4) Intensive survey. Prereq: Consent of instructor.

516 Colloquium in Ethology (1) Current research and theory. May be repeated. Maximum 9 hrs. (Same as Zoology 516.) S/NC only.

517-18 Proseminar in Industrial and Organizational Psychology (3,3) (Same as Management 567-568.) S/NC only.

520 Interventions for Behavioral Change (3) Principles and techniques for planning, implementing, and evaluating interventions developed from social learning theory. Interventions by people in community: teachers or supervisors. Token economies and strategies for self-control. Prereq: Consent of instructor.

525 Laboratory Techniques and Instrumentation (3) Procedures for laboratory research involving humans and nonhuman animals; techniques for collecting, transforming, storing, and retrieving data using microcomputers. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

526 General Vertebrate Neuroanatomy (3) Lecture and laboratory. Structure and functioning of central and peripheral nervous systems. Prereq: 461, 469, or equivalent and consent of instructor. (Same as Zoology 526.)

527 Behavioral Neurology (3) Disorders of nervous system, organic brain dysfunctions. Diagnosis and treatment. Prereq: Consent of instructor.

528 College Teaching in Psychology (3) Concepts, techniques, and materials for teaching psychology at college and/or university level. Supervised practice. Prereq: Consent of instructor. S/NC only.


545 Advanced Animal Behavior (3) (Same as Zoology 545.)

546 Ethological Psychology (3) Basic ethology and comparative psychology. Implications for human behavior. Prereq: Consent of instructor.

549 Internship in School Psychology (1-4) (Same as Educational and Counseling Psychology 549.)

550 Social Psychology (3) Survey of theory and research concerning interpersonal interaction and individual behavior in social context. Prereq: Consent of instructor.

555 Psychometrics (3) Basic concepts: factor analysis, scaling, test theories, personality models and their applications, computerized adaptive testing and other topics. Prereq: Statistics 537-538 or equivalent. May be repeated. Maximum 6 hrs.


557 Applied Psychological Measurement (3) Issues and techniques in applying psychological measurement in organizational, clinical, and community research. Prereq: Statistics 537-538 or equivalent consent of instructor. May be repeated. Maximum 6 hrs.

560 Psychology of Learning (3) Review of current evidence from research involving human and/or nonhuman animals. Prereq: 400 and consent of instructor. May be repeated. Maximum 6 hrs.

570 Personality: Theory and Research I (3) Advanced survey of psychodynamic and neo-Freudian approaches to personality: related research. Prereq: 470 or equivalent.

571 Personality: Theory and Research II (3) Advanced survey of behavioral and humanistic approaches to personality: related research. Prereq: 470 or equivalent.

572 Descriptive Psychopathology (2) Diagnostic criteria of the DSM-III. Excerpts from written case-histories and recorded interviews. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

573 Dynamics of Psychopathology (3) Psychodynamic view of the causes and symptoms of major psychoses, neuroses, and adjustment disorders. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

574 Atypical Development in Childhood (3) Research on etiologies of atypical patterns of development in infancy and childhood. Prereq: 511 and consent of instructor. May be repeated. Maximum 6 hrs.

576 Object Relations (3) European and American conceptions of normal and psychopathological development of object relations. Significance for psychotherapy, psychoanalysis, and psychoanalytic theory. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

578 Clinical Aspects of Human Sexuality (3) Variation in human sexual behavior. Theories of etiology, treatment. Prereq: Consent of instructor.

591 Foreign Study (1-15) See page 31.

592 Off-Campus Study (1-15) See page 31.

593 Independent Study (1-15) See page 31.

594 Psychological Assessment I (3) Basic concepts and techniques of adult assessment: intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

595 Psychological Assessment II (3) Basic concepts and techniques of adult assessment, intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology and 594 or consent of instructor.

596 Laboratory in Psychological Assessment (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Prereq: 594 or 595. May be repeated. Maximum 6 hrs.
597 Evaluation of Development in Childhood (3) Structured and projective tests and interview techniques for evaluation of intellectual, personality, and social development in childhood. Prereq: 511 and admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

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

601 Seminar in Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

605 Seminar in Research and Quantitative Methods (3) Prereq: 500, Statistics 535-538 or equivalent, or consent of instructor. May be repeated. Maximum 12 hrs.

610 Seminar in Applied Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

611 Seminar in Developmental Psychology (3) Prereq: 511 and consent of instructor. May be repeated. Maximum 12 hrs.

613 Seminar in Existential-Phenomenological Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

616 Seminar in Behavioral Neuroscience (3) Prereq: 461, 499, and consent of instructor. May be repeated. Maximum 12 hrs.


620 Seminar in Social and Organizational Psychology (3) Prereq: 440 or 550 and consent of instructor. May be repeated. Maximum 12 hrs.

622 Seminar in Comparative and Ethological Psychology (3) Prereq: 546 or consent of instructor. May be repeated. Maximum 12 hrs.

623 Seminar in Methods of Naturalistic Research (3) Prereq: 546 or consent of instructor. May be repeated. Maximum 12 hrs.

624 Seminar in Psychometrics (3) Prereq: 555 or consent of instructor. May be repeated. Maximum 9 hrs.

625 Seminar in Organizational Psychology (3) (Same as Management 625.)

626 Seminar in Industrial Psychology (3) (Same as Management 626.)

627 Seminar in Applied Industrial Psychology (3) (Same as Management 627.)

635 Ethical, Legal, and Professional Issues in Psychology (3) (Same as Educational and Counseling Psychology 625.)

638 Current Topics in Industrial/Organizational Psychology (3) (Same as Management 638.)

661 Advanced Psychometrics (3) Construction and standardization of psychological tests, questionnaires, rating scales; theory of errors of measurement; item analysis, scaling, equating, and development of norms; factor analysis; and other topics. Prereq: 555 or consent of instructor. May be repeated. Maximum 9 hrs.

668 Seminar in Psychopathology (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

670 Psychodynamic Psychotherapy I (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

671 Psychodynamic Psychotherapy II (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology and 670 or consent of instructor.

673 Laboratory in Psychotherapy (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 670 or 671. May be repeated. Maximum 6 hrs.

674 Group Psychotherapy (3) Theory and practice. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 6 hrs.

675 Inference in Psychotherapy (3) Uses of actuarial data for assessment of strategies and tactics in psychotherapy. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

676 Special Techniques in Psychotherapy (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

678 Hypnosis and Imagination (3) Demonstration and practice of hypnoid induction. Survey of clinical applications of hypnosis and imagination. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

680 Seminar in Psychotherapy (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

681 Seminar in Assessment (3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 12 hrs.

683 Seminar in Behavioral Medicine (3) Current research and theory concerning relationships between behavior and health. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

684 Neuropsychology (3) Investigation of brain-behavior relationships in adults and children. Introduction to administration of RITAN neuropsychological screening battery, Luria battery, and other tests of brain dysfunction. Prereq: Consent of instructor.

685 Psychopharmacology (3) Connections between pharmacology and psychology. Prereq: Consent of instructor.

690 Field Work in Industrial and Organizational Psychology (1-12) (Same as Management 690.)

695 Field Placement in Social and Developmental Psychology (1-3) Prereq: Admission to doctoral program in clinical psychology and consent of instructor. May be repeated. Maximum 24 hrs.

696 Psychology Clinic (1-3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 24 hrs.

Religious Studies
(College of Liberal Arts)

Charles H. Reynolds, Head

Professors:
Dungan, David L., Th.D. ............... Harvard

Hughemphreys, W. Lee, Ph.D. ............. Union

Linge, David E., Ph.D. ............... Vanderbilt

Lusby, F. Stanley, B.D. ......... Colgate Rochester

Norman, Ralph V., Jr., Ph.D. .......... Yale

Reynolds, Charles H., Ph.D. .......... Harvard

Associate Professors:
Fitzgerald, James L., Ph.D. .............. Chicago

Gwynne, Rosalind W., Ph.D. .......... Washington

Hodges, John O., Ph.D. ............... Chicago

Levering, Miriam L., Ph.D. .............. Harvard

Assistant Professors:
Bokenkamp, Stephen R., Ph.D. ........... California

Hackett, Rosalind J., Ph.D. ............. Aberdeen

A Master's degree in Philosophy with a concentration in religious studies is available. (Details of this program are described under Philosophy.) Graduate courses in religious studies provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

GRADUATE COURSES

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from the eighteenth to twentieth centuries. (Same as Philosophy 410.)

412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) Investigation of selected writings and philosophical problems of traditions of Samkhya, Yoga, Vedanta, Buddhism, or Jainism. Prereq: 374 or 376 or consent of instructor. (Same as Philosophy 412.)

416 Jesus and Paul Compared (3) Central ideas and concepts of each person compared with equivalent concepts in the other. Advanced study of Gospels and Epistles of Paul, involving extensive independent research.

425 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

430 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

435 Seminar in Asian Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

446 Theoretical Issues in Medical Ethics (3) (Same as Philosophy 446.)

490 Readings and Research in Religious Studies (3) Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

499 Proseminar in Religious Studies (3) For advanced students in religious studies; required for majors. Selected specific topics: nature and function of myth in religion, problem of evil, transcendence, theories of religion, hermeneutics, integrating various disciplines involved in study of religion. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

531 Topics in Religion and Society (3) Prereq: Consent of instructor.

532 Topics in the History of Religions (3) Prereq: Consent of instructor.

533 Topics in Religious Thought (3) Prereq: Consent of instructor.

544 Applied Ethical Theory (3) (Same as Philosophy 544.)

566 Topics in U.S. Religious History (3) Research in methods and sources for investigating United States religious history. Prereq: 351, 353, 355, 430, or consent of instructor. May be repeated. Maximum 6 hrs. (Same as History 566.)

570 Philosophy of Religion (3) (Same as Philosophy 570.)

591 Foreign Study (1-15) See page 31.

592 Off-Campus Study (1-15) See page 31.

593 Independent Study (1-15) See page 31.
Romance Languages
(College of Liberal Arts)

MAJORS

DEGREES

French ........................................ M.A.
Spanish ........................................ M.A.
Modern Foreign Languages........ Ph.D.

John B. Romeiser, Head

Professors:
Barret, Paul E., Ph.D. .................... California
Brady, Patrick, Ph.D. ...................... Sorbonne
Cobb, Carl W., Ph.D. ...................... Tulane
Elliott, Jacqueline C., M.A. ............. Illinois
Heflin, William H., Ph.D. ................ Florida State
Irving, Thomas B. (Emeritus), Ph.D. Princeton
Mauro, Ferdinando D. (Emeritus), Ph.D. Florida State

Associate Professors:
Petrovska, Marija, Ph.D. .................... Kentucky
Pinsky, Clara (Emeritus), Ph.D. ....... California
Romeiser, John B., Ph.D .................... Vanderbilt
Vazquez-Bigi, A. M., Ph.D. ............... Minnesota
Wallace, Albert H., Ph.D. ................. North Carolina
Washburn, Yulan M., Ph.D. .............. North Carolina

Assistant Professors:
Brizio, Flavia, Ph.D. ....................... Washington
Cazanave, Odile, Ph.D. .................... Penn State
Holmlund, Christine, Ph.D. ............. Wisconsin
DiPuccio, Denise M., Ph.D. ............. Kansas
Duncan, Cynthia K., Ph.D. ............... Illinois
Hendel, Michael H., Ph.D. ............... Florida
Levy, Karen D., Ph.D. ..................... Kentucky

The Department of Romance Languages offers two advanced degrees: the Master of Arts in French and in Spanish and the Doctorate of Philosophy in Modern Foreign Languages. Inquiries should be addressed to the head of the department. The head, through the coordinators of Spanish and French, will make available further departmental requirements, regulations, and materials not listed below.

THE MASTER'S PROGRAM

Thesis Option

1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500. Thesis. In French, 501 is required; in Spanish, 550. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, and under certain conditions the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major, 6 in the minor.

2. A thesis, with a minimum of 6 semester hours in course 500.

3. A written examination covering the coursework and selected items from a master reading list.

4. A final oral examination covering the thesis.

Non-Thesis Option

1. Completion of at least 30 semester hours, with a maximum of 9 at the 400 level, the rest at the 500 level, including 501 (French) or 550 (Spanish). Under certain conditions, the student may take 600-level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours must be taken in the major, 6 in the minor.

2. Three term papers that have been accepted by the student's advisory committee.

3. A written examination covering the coursework and selected items from a master reading list.

4. A final oral examination to discuss the papers (French M.A. only).

THE DOCTORAL PROGRAM

The Ph.D. in Modern Foreign Languages is offered jointly by the Department of Germanic and Slavic Languages and the Department of Romance Languages and requires advanced training in at least two foreign languages.

Admission Requirements

Applicants must have completed a B.A. in either French, German or Spanish to be accepted into this program. Both graduates of institutions in the United States and those with undergraduate degrees from institutions outside the United States must have a grade point average of at least 3.0. Consideration will also be given to applicants who do not have an undergraduate degree in one of the three foreign languages but do have the equivalent of an undergraduate major in one of them.

Requirements for the Ph.D.

Candidates must complete a minimum of 63 semester hours of course work beyond the Bachelor's degree in addition to 24 hours of doctoral research and dissertation. The program shall consist of a first concentration, a second concentration, and a cognate field.

1. First Concentration: French, German or Spanish. It will consist of a minimum of 39 semester hours beyond the Bachelor's degree, distributed as follows:

- A minimum of 21 hours at the 500 level (exclusive of thesis hours) including French 584 (3), German 550 (3), or Spanish 550 (3); German 512 (3), French 512 (3), or Spanish 512 (3); French 515-16 (2,2), or German 520 (3).

2. At least 12 hours at the 600 level (exclusive of dissertation hours).

2. Second Concentration: French, German, Italian, Russian, or Spanish (different from the first concentration). It shall consist of at least 18 hours of courses beyond the Bachelor's degree, at least 12 of which must be at the 500 or 600 level.

3. Cognate Field: Six hours must be in courses numbered 400 and above in a field outside the department of the first concentration but related to the student's principal area of research. If the cognate field is yet a third foreign language, a reading proficiency exam will be administered after completion of the 6 cognate hours by the language section concerned.

4. Additional Requirements: A student must demonstrate competence in languages of both his/her first and second concentrations by taking a test in each language. The test will include reading, writing, listening and speaking, and should be completed by the time the student reaches 40 hours of study beyond the Bachelor's degree. Standardized examinations that may be used for this purpose include applicable portions of either the National Teachers Examination, the MLA Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI).

If the student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination of translation into English administered by the department concerned) in a third language is required. If the student's first and second languages are Romance languages, the third language should be chosen from another language branch.

A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate will be required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

Graduate Teaching Assistants in the program should have the opportunity and will be strongly encouraged to instruct in at least two foreign languages, subject to staffing needs.

Doctoral students will be strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g. Fulbright, McClure, Rotary fellowships).

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UTK on an in-state tuition basis. The Ph.D. program in Modern Foreign Languages is available to residents of the state of Alabama. Additional information may be obtained from the Residency Assistant in the Office of Graduate Admissions and Records.

For additional courses, refer to Germanic and Slavic Languages.

French

GRADUATE COURSES


411 French Literature of the 16th Century (3) Highpoints of 16th-century French literature. Excerpts from Rabelais and Montaigne; readings of poems from writers from Lyon and members of Pèlerie. Prereq: 212, 218 or equivalent.

413 French Literature of the 19th Century (3) Major works of Enlightenment. Prereq: 212, 218 or equivalent.


416 Survey of Francophone Literature (3) Writing in French outside of France. Prereq: 212, 218 or equivalent.

420 French Cinema (3) French cinema from earliest days through New Wave directors. Prereq: 212, 218 or equivalent. May apply toward major.

422 Advanced Grammar (3) Improving one's written French by studying basic and more refined structures of French language. Writing creative free-style compositions. Prereq: 342 or 345. 2 hrs weekly.

425 Introduction to Descriptive Linguistics (3) Phonetics and phonology and syntax. Types of languages, linguistic groups, dialects, and dialect geography. Application of descriptive linguistics to specific languages. Its practical use in learning languages and in language teaching. Introduction to transformational grammar. Prereq: 6 hrs of upper-division courses in a modern or ancient language (exclusive of German and French 301-02, courses in literature in translation, and general courses in Latin and Greek requiring no knowledge of these languages), or consent of department.

430 Advanced Conversation (1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation. Prereq: 342 or 345. 2 hrs weekly.

433 Advanced Conversation (1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation. Prereq: 342 or 345. 2 hrs weekly.

434 Advanced Conversation (1) Informal conversation with native speaker on contemporary topics. Stresses in-class contact rather than outside preparation. Prereq: 342 or 345. 2 hrs weekly.

429 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance languages. (Same as Spanish 429 and Linguistics 429.)

430 Techniques in Literary Analysis (2) Required for M.A. program. Intensive course in explication de texte, a close stylistic analysis of texts representative of different eras and of different genres.

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

501 Techniques in Literary Analysis (2) Required for M.A. program. Intensive course in explication de texte, a close stylistic analysis of texts representative of different eras and of different genres.

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

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and foreign language skills, and cultural insights through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by department.

515-16 Bibliography and Methods of Research (2,2) Survey of bibliographical tools and scholarly contributions in French literature and language. Practical exercises on compiling of scholarly data.


531 French Literature of the 16th Century I (3) Literature of first half of 16th century. Rabelais and other prose writers, humanists, and poetry of Marot, Lyonnais group, and young Pléiade poets.

532 French Literature of the 16th Century II (3) Literature of second half of 16th century, mature works of l'âme writers and such poets as d'Aubigné and Sponde; Montaigne; writers of scientific works and monumentalists; drama.

541 French Literature of the 17th Century I (3) French poems and prose works of 17th century.

542 French Literature of the 17th Century II (3) Classical French theatre of 17th century.

551-52 French Literature of the 18th Century: the Philosophes (3,3) Textual analysis of works of Voltaire, Diderot, Rousseau, and other major French 18th-century writers.

559 Problems in Linguistics: Romance Languages (3) Maximum 6 hrs with consent of department. (Same as Spanish 559 and Linguistics 559.)


571-72 Trends in Modern French Literature (3,3) In-depth study of some of most revolutionary, challenging poets, novelists, dramatists of 20th century.

581-82 The French Novel (3,3) French novel from 17th through 20th centuries.

583 Problems in Stylistics (3) Survey of comparative English-French stylistics. Development and improvement of one's written French.

584 Literary Criticism: the Foundations of Romance Criticism (3) Survey of critical ideas utilized over centuries and applied to various types of literature.

591 Foreign Study (1-15) See page 31.

592 Off-Campus Study (1-15) See page 31.

593 Independent Study (1-15) See page 31.

Portuguese

GRADUATE COURSES

431-32 Directed Readings in Brazilian and Portuguese Literature (3,3) May be repeated with consent of instructor.

591 Foreign Study (1-15) See page 31.

592 Off-Campus Study (1-15) See page 31.

593 Independent Study (1-15) See page 31.

Spanish

GRADUATE COURSES

421 Phonetics (2) Prereq: 212, or 218 or equivalent.

422 Advanced Grammar (3) Finer points of grammatical structures. Required of all majors. Native speakers must receive consent of instructor. Prereq: 212, 218 or equivalent.

423-24 Advanced Conversation and Composition (3,3) Advanced conversational and written skills in Spanish for pre-professionals.

426 Methods of Historical Linguistics (3) (Same as German 426, Russian 426, Spanish 426 and Linguistics 426.)

429 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance languages. (Same as Spanish 429 and Linguistics 429.)

430 Theatrical French (2-3) Performance in one or more French plays. Prereq: 212, 218 or equivalent and consent of instructor. May apply toward major.

431 Highlights of French Civilization (3) Survey of French civilization from the Gauls to World War II. Historical events, daily life, all forms of arts. Prereq: 212, 218 or equivalent.

432 Contemporary French Culture (3) French contemporary civilization and culture since World War II. Problems, trends, and organization of French society today. Prereq: 212, 218 or equivalent.

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

589-95 French Directed Readings with Diego Calvino. Prereq: 212 or consent of instructor.

621-22 Seminar in French Literature (3,3,3) 621 Intermediate: 620-16th Century; 623-17th Century. May be repeated with consent of department. Maximum 6 hrs each.


Italian

GRADUATE COURSES

401 Dante and Medieval Culture (3) Introduction to significance of this great Italian writer. Prereq: 212 or consent of instructor.

402 Petrarch and Boccaccio (3) Prereq: 212 or consent of instructor.

403-04 Literature of the Rinascimento (3,3) From Pucio to Tasso, Quattrocento and Cinquecento. Prereq: 212 or consent of instructor.

405 Modern Italian Poetry (3) From Pascoli to Montale. Prereq: Italian 212 or consent of instructor.

406 The Modern Italian Novel (3) From Manzoni to Calvino. Prereq: 212 or consent of instructor.

409 Directed Readings (3)

510-11 Readings in Italian Literature (3,3) Topics vary. May be repeated with consent of department.

512-13 Special Topics (3,3) Topics vary. May be repeated with consent of department.

591 Foreign Study (1-15) See page 31.

592 Off-Campus Study (1-15) See page 31.

593 Independent Study (1-15) See page 31.

431-32 Directed Readings in Brazilian and Portuguese Literature (3,3) May be repeated with consent of instructor.

591 Foreign Study (1-15) See page 31.

592 Off-Campus Study (1-15) See page 31.

593 Independent Study (1-15) See page 31.
others. Genres and periods vary. Prereq: 311, 312 or equivalent.

473-74 Survey of Spanish American Literature (3, 3) 473—Historical survey from Conquest to late 19th century. 474—Major literary movements, writers and works of 20th century. Prereq: 311, 312 or equivalent.

479 Social Protest Literature of Latin American (3) Analysis of literature as means of unmasking social ills that have traditionally beset Latin America. Indigenismo, Black literature, women writers, role of writer in Latin American society. Prereq: 311, 312 or equivalent.

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

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

512 Teaching a Foreign Language (3) Practical application of methods for teaching and basic language skills and cultural aspects through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by department.

522 Advanced Communication Skills for Teachers and Other Professionals (3) Advancement of oral and written proficiency in Spanish through extensive use of authentic contemporary materials; class lectures and discussions; oral and written presentations and reports. Especially recommended for graduate students, teachers and other professionals seeking to maintain or enhance high level communicative competency.

531 Old Spanish (3) Old Spanish language and medieval Spanish literature through 13th century.

532 Medieval Spanish Literature (3) Spanish literature of 14th and 15th centuries.

533 The Picaroscopic Novel (3) Lazarillo de Tormes, Guzmán de Alfarache, and Buscón.

534 Don Quixote (3)

535 Golden Age Poetry (3) Garcilaso, Fray Luis de León, San Juan de la Cruz, Lope de Vega, Quevedo, and Gongora.

536 The Golden Age Theatre (3) Major dramatists of period: Lope de Vega, Tirso de Molina, Ruiz de Alarcon, Guillerín de Castro, Cid, Moreto, and Rojas Zorrilla.

541 Galdós and the 19th-Century Spanish Novel (3) Analysis of works by Galdós and other major 19th-century novelists, Pardo Bazán, Valera, Clarín, and Pereda.


543 The 20th-Century Spanish Novel (3) Baroja, Azorín, Valle-Inclán, Pérez de Ayala, Cela, Dalí, Goytisolo, Mutis, and at least one present-day novelist.

545 Modern Spanish Poetry (3) From Bécquer, Unamuno, A. Machado, Jiménez, Lorca, Guilín, Alexandre, and a contemporary, Celaya.

547 Modern Spanish Drama (3) Major playwrights of 20th-century Spain.

550 Techniques of Literary Analysis and Research Methods (3) Theoretical and critical essays on various techniques of literary analysis. Exploration of bibliographical and research materials.

551 Special Topics in Spanish or Spanish American Literature (3) May be repeated. Maximum 6 hrs.

552 Directed Readings (3)

553 Problems in Linguistics: Romance Languages (3) (Same as French 559 and Linguistics 559.)


573 The Spanish American Novel: Chile and the River Plate Nations (3) Novels from Chile, Argentina, Uruguay and Paraguay. Modern world.


576 Contemporary Spanish American Poetry (3) Major poets in Spanish American from post-modernismo to present day.

577 Spanish American Drama (3) Major playwrights of 20th-century Spanish America.


579 The Spanish American Short Story (3) Short story by major writers in Spanish America from Romantismo to present day, theory and criticism of genre.

591 Foreign Study (1-18) See page 31.

592 Off-Campus Study (1-18) See page 31.

593 Independent Study (1-15) See page 31.

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

621-22 Seminar in Spanish Literature (3, 3) Topics vary in field of Peninsular literature. May be repeated with consent of department. Maximum 9 hrs.

631-32 Seminar in Spanish American Literature (3, 3) Topics vary. May be repeated with consent of department. Maximum 9 hrs.

631-32 Seminar in Spanish American Literature (3, 3) Topics vary. May be repeated with consent of department. Maximum 9 hrs.

679 The Spanish American Short Story (3) Short story by major writers in Spanish America from Romantismo to present day, theory and criticism of genre.

691 Foreign Study (1-18) See page 31.

692 Off-Campus Study (1-18) See page 31.

693 Independent Study (1-15) See page 31.

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

696 Graduate Teaching Assistantship (1-4) May be repeated. Maximum 6 hrs. E

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

512 Teaching a Foreign Language (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

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

Russian

See Germanic and Slavic Languages

Social Work

(College of Social Work)

MAJOR

DEGREES

Social Work M.S.S.W., Ph.D.

Eunice Shatz, Head

Professors:


Associate Professors:


Residents:


See Veterinary Medicine for Program Description.
Assistant Professors:
Campbell, P. M., D.S.W. Alabama
Charping, J. W., Ph.D., Peabody
Collier, J. C., M.S.W. Tulane
Ford, A. R., M.S.W. Atlanta
Jennings, J. Ph.D., Michigan
Johnston, O. C., M.S.W., California
Lunn, N., M.S.S.W. Tennessee

THE MASTER'S PROGRAM

The Master of Science in Social Work program prepares social workers to provide professional leadership in: 1) the direct provision of social work services and 2) social welfare administration and planning. These objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either social work treatment or social welfare administration and planning.

Admission Requirements

Admission to the professional curriculum is based on the following requirements:

1. A Bachelor's degree from an accredited college or university with appropriate preparation in the social sciences. At least three-fourths of the applicant's undergraduate work should be in the social sciences, humanities, physical sciences, and other liberal arts subjects. Those with other academic backgrounds should request consultation regarding ways in which they might be admitted.

2. A grade-point average of 2.5 on a 4.0 scale, with preference given to applicants with 3.0 and above. Applicants with less than a 2.5 may be considered for provisional admission on the basis of supplemental evidence of ability to perform at a satisfactory level.

3. Personal qualifications acceptable for entrance into the professional practice of social work. Preference is given to applicants with a B average in undergraduate work and substantial preparation in the social sciences.

Applications should be filed no later than March 1 for the year in which admission is desired.

Advanced Standing

The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires: (1) a BSW from an accredited program, (2) an overall undergraduate GPA of 3.0 or greater, and (3) successful completion of all areas of an examination covering the five foundation areas. Students admitted into advanced standing are required to complete a minimum of 36 hours of study in either of the college's concentrations - social work treatment or social welfare administration and planning. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.

Specific information about the advanced standing program is available from the college. Application for admission to the advanced standing program is through the regular admission process.

Extended Study

Planned part-time programs are available in all three branches of the college. Admission requirements are the same as for full-time study. Coursework can be completed over a three- or four-year period. One year of the student's period of study must be on a full-time basis.

General Requirements

1. A minimum of 54 semester credit hours including a) completion of foundation courses and field practice (15 hours), b) the course Social Work with Oppressed Populations (2 hours), and c) at least five courses (15 hours) and three semesters of field practice (16 hours) in the social work treatment concentration or at least four courses (12 hours) and three semesters of field practice (16 hours) in the social welfare administration and planning concentration.

2. Students may select a thesis or non-thesis option. Those students pursuing the thesis option receive 6 credit hours for successful completion of a thesis.

3. Successful completion of a comprehensive exam or thesis defense.

4. An overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

The Professional Curriculum

The professional curriculum is a 15-semester hour sequence of five basic areas required of all students before entering either of the concentration programs. As the initial phase of the educational program, the foundation curriculum contributes to the process of professional identification while presenting a comprehensive and broad knowledge base from which to operate in the future as practitioners, supervisors, administrators, and planners.

Upon completion of the foundation curriculum (at the beginning of the second semester), students select a concentration in either social work treatment or social welfare administration and planning.

Social Work Treatment: The social work treatment concentration provides the educational basis for practice with individuals, families, and groups in order to enhance their social functioning, ameliorate problems, and prevent social dysfunction. The concentration provides knowledge of theory and methodology basic to individual, family, and group methods applicable in the treatment of diverse client problems.

Social Welfare Administration and Planning: The social welfare administration and planning concentration provides the educational basis for leadership in the design, implementation, and continued delivery of effective human service programs at local, regional, and state levels. This concentration emphasizes theory and skills related to administration and planning, and permits considerable flexibility in tailoring a program to fit the student's individual interests, capabilities, and career goals.

Field Practice

Field instruction is a critical component of the student's first- and second-year programs. Through cooperation with a wide range of social agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to insure that students have quality field practice experiences, meeting the objectives of the core curriculum and the concentration.

The college uses a concurrent class and field plan. Students are in field two days per week during the first year and three days per week in the second year.

First-year agency placements are selected to provide experiences related to the foundation curriculum content and beginning concentration. Within the placement, each student's experiences are planned and designed according to educational objectives.

Second-year placements are selected according to the student's area of concentration, individual career interests, and educational needs. The student actively participates with the field practice coordinator and the educational committee in selection of the second-year placement. The second-year field placement experience focuses on the integration of social work knowledge and values, and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of the field placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled University breaks and may result in variations in holidays and office hours for the student.

Transfer Credits

Coursework equivalent to the first year of the Master's program, completed in another accredited graduate social work program, is usually accepted toward degree requirements. Applicants must meet the admission requirements of The Graduate School and the College of Social Work. Transfer courses must be approved as equivalent to required and/or elective courses taken for graduate credit and passed with a grade of B or better. An S (earned on an S/NC system) for the field practicum is also accepted. In addition, transfer courses must be part of an otherwise satisfactory graduate program (B average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of 6 semester credits from work earned in disciplines other than social work may be transferred as elective credits. The student's academic committee must approve the request and the transfer credit must meet Graduate School requirements.

Proficiency Examination

Students in the Master's program may earn a maximum of nine hours by proficiency examination, with the exception of field practice courses. Students interested in proficiency examinations are referred to The Graduate School statement describing the procedure for applying for examination.

THE DOCTORAL PROGRAM

The College of Social Work offers the Doctor of Philosophy with a major in Social Work.

The focus of social work education at the doctoral level is to foster the development of an attitude of scientific inquiry, knowledge of the scientific method, ability to extend the knowledge base of social work practice, and effective participation in leadership roles in social work education, research, and practice.