### Fields of Instruction

#### Accounting and Business Law

*(College of Business Administration)*

**MAJORS**

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

**DEGREES**

- M.Acc. Business Administration................,..,..Ph.D.

**Keith G. Stanga, Head**

**Professors:**

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

**Associate Professors:**

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

**Assistant Professors:**

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

#### THE MASTER OF ACCOUNTANCY PROGRAM

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

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

**Admission Requirements**

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

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

**Course Requirements**

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

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

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

- **Business Core (9 hours):** Business Administration 502-03; Business Law 511.
- **Accounting Core (6 hours):** 506-07.
- **Accounting Concentration (9 hours):** Three concentrations are available:
  3. Taxation: 531, 532, 533, 534, 539.

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

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

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

- **Prerequisites:** 311, 341, 411, 414, and 431.
- **Business Core (12 hours):** Business Administration 502-03; Business Law 511; and a non-accounting business elective to be approved by advisor.
- **Accounting Core (9 hours):** 506-07, 521.
- **Accounting Concentration (9 hours):** Three concentrations are available:
  3. Taxation: 531, 532, 533, 534, 539.

Students must take at least three courses from the same concentration and one of the course numbers must end with 9.
Transfer Credits
A maximum of six semester hours taken at other AACSB accredited institutions that otherwise conform to the transfer policy of The Graduate School may be credited toward M.Acc. degree requirements.

Other Requirements
To qualify for the degree, a student must maintain a B average (3.0) or above in the program. The student must satisfactorily demonstrate his/her ability to recognize, analyze, and solve accounting policy problems and integrate concepts from the various areas of accounting by passing a comprehensive written examination. This examination is included in the capstone courses in each concentration as follows:

519, Seminar in Accounting and Auditing Policy; 536, Tax Policy; and 549, Systems Issues and Policies.

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

Ph.D. Concentration: Accounting
This degree provides a research-oriented terminal qualification for those seeking entry-level faculty positions in accounting.

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

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

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

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

Accounting

GRADUATE COURSES

415 GOVERNMENTAL AND NONPROFIT ACCOUNTING
416 ADVANCED TAXATION OF CORPORATIONS
417 ADVANCED TAXATION OF CORPORATIONS
418 CORPORATE AND ESTATE TAXATION
419 INCOME TAXATION
420 FINANCIAL ACCOUNTING
421 AUDITING
422 BUSINESS LAW AND PROFESSIONAL RESPONSIBILITY
423 LEGAL ENVIRONMENT OF BUSINESS

Business Law

GRADUATE COURSES

511 BUSINESS LAW AND PROFESSIONAL RESPONSIBILITY
512 LEGAL ENVIRONMENT OF BUSINESS
513 LEGAL ETHICS AND PROFESSIONAL RESPONSIBILITY

Advertising

(College of Communications)

MAJOR

DEGREES

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

Rona E. Taylor, Head

Professors:

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

Associate Professors:

Hale, Eric, Ph.D. ........................................... Georgia
Hoy, Marlene, Ph.D. ....................................... Oklahoma State
The Department of Advertising offers a concentration area for the master's degree with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

GRADUATE COURSES

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

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

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

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

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

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

Aerospace Engineering
See Mechanical and Aerospace Engineering

Agricultural and Biosystems Engineering
(See College of Agricultural Sciences and Natural Resources)

MAJORS DEGREES

Biosystems Engineering M.S., Ph.D.
Biosystems Engineering Technology B.S.

Luther R. Wilhelm, Interim Head

Professors:
Bledsoe, B. L., PE, Ph.D. ............ Oklahoma State
Barnes, T. A. (Emeritus), Ph.D. ...... Oregon State
Henry, Z. A. (Emeritus), Ph.D., PE, Ph.D. ...... NC State
Luttrell, D. H. (Emeritus), Ph.D. ...... Iowa State
Larson, L. J. (Emeritus), Ph.D. ...... Iowa State
Patterson, J. J. (Emeritus), Ph.D. ...... Iowa State
Ph.D. ............ Michigan State

Mote, C. R., PE, Ph.D. ............ Ohio State
Morse, M. J. (Emeritus), Ph.D. ...... Michigan State
Sewell, J. I. (Emeritus), Ph.D. ...... NC State
Shelton, C. H. (Emeritus), M.S. ...... VPI

Tompkins, F. D., PE, Ph.D. ........ Tennessee
Wilhelm, L. R., PE, Ph.D. ........ Tennessee
Wills, J. B., M.S. ........ Tennessee

Associate Professors:
Buschermohle, M. J., Ph.D. ............ Clemson
Freeland, R. S., PE, Ph.D. ............ Tennessee
Grindal, G. F., Ph.D. ............ Tennessee
Hart, W. E., Ph.D. ............ Purdue
Pardos, L. O., Ph.D. ............ Penn State
Ramsey, R. E., PE, Ph.D. ............ Cornell
Wilkinson, J. B., Ph.D. ............ Purdue
Womac, A. R., PE, Ph.D. .......... Tennessee
Yoder, D. C., Ph.D. ............ Purdue
Yoder, R. E. (Liaison), PE, Ph.D. ............ Colorado State

Assistant Professors:
Burns, R. T., PE, Ph.D. ............ Tennessee
Hubert, G. J., PE, Ph.D. ............ Illinois

Graduate programs leading to the Master of Science and Doctor of Philosophy with a major in Biosystems Engineering are available to graduates of a recognized curriculum in engineering, agriculture, or one of the physical or biological sciences. A graduate program leading to the Master of Science in Biosystems Engineering Technology is available to graduates of a recognized curriculum in agriculture or other related fields. These programs emphasize the application of engineering and computing technology to agricultural and other biological systems. Major focus areas of the program are machinery systems; environmental quality and resource conservation; instrumentation, sensor, and control systems; and bioprocessing. Prerequisite courses may be required depending upon the applicant's academic background and interest area within the program.

A completed departmental data sheet and three completed Graduate School Rating Forms are required in addition to the Graduate School application. International students must submit scores from the GRE general examination. Each applicant will be advised about any prerequisite courses before entering a program. The student's program of study must be approved by his/her advisory committee and must comply with the requirements of The Graduate School.

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

THE MASTER'S PROGRAMS

Biosystems Engineering
Applicants accepted into the program must complete at least 30 semester hours to earn a degree. Of these 30 hours, 20 must be in courses numbered 500 or greater (6 hours of thesis plus 14 hours of other courses). Other specific requirements for the 30 hours are:

Program electives
Thesis 500

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

Biosystems Engineering Technology

Thesis Option: Applicants accepted into the program must complete at least 30 semester hours to earn a degree. Of these 30 hours, 20 must be in courses numbered 500 or greater (6 hours of thesis plus 14 hours of other courses). Other specific requirements for the 30 hours are:

Biosystems Engineering Technology 504 (1) or 507 (1), 505 (1), and other major subject courses

Coursework in computational methods (mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department)
Program electives
Thesis 500

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

Non-Thesis Option: A non-thesis option in Biosystems Engineering Technology is available to qualified students. Applicants accepted into the program must complete at least 33 semester hours to earn a degree. Of these 33 hours, 20 must be in courses numbered greater than 500. Other specific requirements for the 33 hours are:

Biosystems Engineering Technology 504 (1) or 507 (1), 505 (1), and other major subject courses

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

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

Departmental Requirements

Students applying for admission into the doctoral program must submit evidence of ability to perform and report independent research to the satisfaction of the faculty of the department. An approved master's thesis will usually be acceptable for this purpose.

To earn a degree, each doctoral student must complete at least 75 hours of approved graduate credit (beyond the baccalaureate degree) in Biosystems Engineering and supporting areas (engineering, computational methods, agricultural and biological sciences, and other related areas). Of the 75 hours, 48 must be in courses numbered greater than 500 (including 24 hours of course 600) and 6 hours of courses at UT numbered greater than 600. Other specific requirements for the minimum 75 hours are:

- **Major subject courses**: 18 hours
- **Coursework in computational methods**: mathematics, computer science, statistics, or any course containing appropriate computational components that may be approved by the department: 9 hours
- **Program electives (504, 505 or equivalent courses)**: 3 hours
- **Dissertation**: 24 hours

In addition to completing the minimum 75 hours of graduate credit required for a degree, each doctoral student must also pass a comprehensive examination as required by The Graduate School.

Biosystems Engineering

**GRADUATE COURSES**

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

423 Irrigation and Water Management System Design (3) Design of irrigation and agricultural waste management systems with consideration given to livestock waste characteristics, climate, water quantity, system characteristics, and impact on crop yield and water quality. Prereq: 315 Soil and Water Conservation, Engineering Science 341 Fluid Mechanics I, and Civil and Environmental Engineering 390 Hydraulics. 1 hr and 2 labs. F

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

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

451 Electronic Systems (4) Basic electronics with biological applications. Analog and digital electronics; sensing and controlling physical and environmental parameters; sensor selection and interfacing; signal conditioning; process control. Laboratory experiments and design projects. Prereq: Circuits and Electrical Engineering 315. 3 hrs and 1 lab. Sp

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

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

504 Professional Development Seminar (1) Planning and executing professional development: ethics and professionalism; departmental procedures and resources. (Same as Biosystems Engineering Technology 504.) 2 hrs. Sp

505 Professional Communications Seminar (1) Reviews and reports on discussion of ideas, recent advances and current topics: presentations by students. Should be taken in last full semester before graduation. Prereq: May be repeated in doctoral program. Maximum 2 hrs. (Same as Biosystems Engineering Technology 505.) S/N only. E

507 Professional Development Seminar (1) Same as Agricultural and Natural Resources 507, Animal Sciences 507, Biosystems Engineering Technology 507, Food Science and Technology 507, Ornamentals Landscape Design 507, and Plant and Soil Sciences 507. S/N only. F

510 Simultaneous Data and Research (3) Dimensional analysis, governing theory of models; true, distorted, dissimilar models; prediction equations; interpretation of data; applications to machinery, soil and water structures, buildings and other agricultural engineering related problems. Prereq: Engineering Science 321, 421. 2 hr and 1 lab. F/A

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

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

541 Principles of Compost Engineering (3) Comprehensive study of composting; survey of installed systems; thermodynamics of composting; biology of composting; kinetics of heat inactivation; feed conditioning; aeration; substrate characteristics; process kinetics; and odor control. Design component. Prereq: Thermodynamics, heat and mass transfer. F

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

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

550 Selected Topics (1-3) Lecture/group discussion on specialized topics. May be repeated. Maximum 6 hrs.

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

555 GIS and GPS Applications to Biosystems (3) Theory and applications of Geographical Information Systems (GIS) and Global Positioning Systems (GPS): acquiring, managing, and analyzing spatially-varying data. Site-specific agriculture, environmental site assessment, natural resource management, and hydrology. Prereq: Graduate in Biosystems Engineering. 3 hrs. (Same as Biosystems Engineering Technology 555.)

575 Applied Microbiology and Bioengineering (3) (Same as Chemical Engineering 575, Environmental Engineering 575, and Microbiology 575.) 3 hrs. Prereq: Professional Development Seminar (1). 2 hrs and 1 lab. F

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

**620 Computer Simulation of Agricultural Systems** (4) Scientific approach to digital simulation; system definitions and boundaries, formation of models, algorithms and solution techniques, encoding of prediction equations models, algorithms and solution techniques, encoding of prediction equations and model output, selection and calibration of simulation model results. Prereq: Knowledge of computer programming language. 2 hrs and 1 lab. F/A


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

Biosystems Engineering Technology

**GRADUATE PROGRAM**

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

432 Agricultural Machinery and Technology (3) Functions, selection, matching, and management of agricultural machinery systems. Tractor power ratings, engine and transmission systems, hydraulic systems, hitching, and ballasting. Field and material capacity, field efficiency, cost analysis, and machinery replacement. Functional analyses of tillage operations, planters and drills, no-tillage systems, hay harvest systems, forage and small grain harvesting, and cotton harvesting. Crop drying processes, off-road machinery safety considerations, and operator ergonomics. Prereq: Mathematics 123 Basic Calculus or 125 Finite Mathematics or consent of instructor. 2 hrs and 1 lab. Sp

442 Agricultural Waste Management and Pollution Control (3) Waste renovation fundamentals; characteristics of animal manure; techniques for collection, transporting, storing, and utilizing livestock waste. Prereq: Basic Calculus or Finite Mathematics or equivalent. 2 hrs and 1 lab. F

452 Small Internal Combustion Engines (3) Theory, concepts, and mechanics of small internal combustion engines; theoretical cycles; selection, operation, adjustment, and maintenance; troubleshooting and repair of single-cylinder engines. Prereq: Basic calculus or finite mathematics or equivalent or consent of instructor. 2 hrs and 1 lab. Sp

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

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

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

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

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

560 Physical Phenomena (3) Properties of materials, fundamentals of hydraulics, principles of electricity, thermal phenomena, applications in biological sys-
Agricultural and Extension Education

(College of Agricultural Sciences and Natural Resources)

MAJOR

Agricultural and Extension Education .......... M.S.

Roy R. Lessly, Head

Professors:
Dickson, Lewis H. (Emeritus), Ed.D. .......... Ohio State
Lessly, Roy R. (Liaison), Ed.D. ................. Oklahoma State

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

Assistant Professor:
Delnero, Jennifer A., Ph.D. ............ Oklahoma State

The Department of Agricultural and Extension Education offers a program leading to the Master of Science degree with a major in Agricultural and Extension Education. The

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

THE MASTER'S PROGRAM

Thesis Option

A candidate for the master's degree who elects the thesis option must successfully complete:

1. A minimum of 36 hours of graduate credit in courses approved by the student's advisory committee. Six hours of thesis may be counted toward this requirement.
2. A minimum of 20 hours of graduate credit in courses numbered at or above the 500 level.
3. A minimum of 12 hours of graduate credit in courses appropriate to the area of concentration taught in the department and a minimum of 6 hours taught from outside the department.
4. A minimum of 3 hours of graduate credit in coursework in each research methodology or statistics course.
5. A final oral examination.

Non-Thesis Option

A candidate for the master's degree who elects the non-thesis option must successfully complete:

1. A minimum of 36 hours of graduate credit in courses approved by the student's advisory committee.
2. A minimum of 24 hours of graduate credit in courses numbered at or above the 500 level.
3. A minimum of 12 hours of graduate credit in courses appropriate to the area of concentration taught in the department and a minimum of 6 hours taught from outside the department.
4. A minimum of 3 hours of graduate credit in coursework in each research methodology or statistics course.
5. A creative component designed by the student and approved by the student's advisory committee for 3 hours of graduate credit.
6. A written and oral comprehensive examination.

GRADUATE COURSES

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

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

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

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

522 Extension Teaching Methods (2) Teaching methods and techniques applicable to extension work, interrelationships and relative effectiveness. Research demonstrations, method demonstrations, meetings, tours, audio-visual aids. Prereq: 411 or consent of instructor.

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

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

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

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

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

528 Advanced Techniques for Teaching Agricultural Machines (3) Teaching techniques needed for planned instructional program. Prereq: 435, 436 or consent of instructor.

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

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

531 Extension History, Philosophy and Objectives (2) Historical and philosophical foundation of adult education in American agriculture. Prereq: 435, 436 or consent of instructor.

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

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

Agricultural Economics and Rural Sociology

(College of Agricultural Sciences and Natural Resources)

MAJOR

DEGREES

Agricultural Economics ......................... M.S.
Agricultural Economics

Graduate Courses

412 Agricultural Finance (3) Macro-finance, financial objectives, acquisition of debt and equity funds, capital investments, capital allocation, credit analysis, borrower and lender loan application analysis, insurance strategies, computer applications, and sources of agricultural credit, and financial intermediation. Prereq: Intermediate Economics. F

420 International Agricultural Trade and Marketing (3) Real and monetary aspects of international trade and effect on agricultural commodity flows; partial equilibrium analysis of international trade in agricultural products. Institutional aspects of international marketing of agricultural products. Prereq: Intermediate Agricultural Economics or consent of instructor. F

430 Agricultural Policy (3) Values, goals and policy process. Economic rationale and effects of policy. Historical development and current characteristics of commodity, credit, food, and trade policy. Prereq: Intermediate Agricultural Economics or consent of instructor. Sp

442 Agribusiness Management (3) Applications of advanced decision analysis and tools to analyze management decision problems in farm and nonfarm agribusiness settings. Case study work on strategic planning, financial analysis, leasing, bankruptcy, and business planning. Prereq: Farm Business Management or consent of instructor. F

450 Agricultural Industry Analysis and Forecasting (3) Analytical tools for decision making in agricultural sector; analysis of commodity supply and demand conditions; economic modeling; market forecasting; analysis of temporal and spatial patterns. Prereq: Agricultural Microeconomics and Introduction to Statistics or consent of instructor. F

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

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

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

505 Microeconomic Analysis (3) Theory of utility maximization and demand, production, cost, firm behavior, and supply; price in product and factor markets; efficiency and welfare. Prereq: Calculus and Intermediate Microeconomics or equivalent. F

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

525 Agribusiness Operations Research Methods (3) Applications of operations research methods and concepts for agribusiness. Theoretical background and applied considerations of each technique with emphasis on applications. Computer and other applications of each technique for relevant agribusiness problems. Prereq: Basic Calculus and 524. Sp

530 Agricultural Policy Analysis (3) Evaluation of public policy as related to agricultural industry and rural areas. Prereq: 505 and Economics 513 or consent of instructor. F

542 Advanced Agribusiness Production Decisions (3) Theoretical and empirical concepts in agricultural resource allocation; evaluation of both static and dynamic issues; decision theory with application to agricultural firms; aggregate impact of firm decisions on industry. Prereq: 505 or equivalent. Sp

550 Advanced Agribusiness Marketing (3) Use of economic concepts in agribusiness marketing decisions. Analysis of agricultural markets; buyer behavior in food and fiber markets; competitive environment. Profitability analysis of marketing and distribution decisions; market planning and strategy; product evaluation and new product introduction; pricing decisions. Prereq: 505, Regression and Correlation Methods or equivalent. Sp

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

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

595 Professional Internship (6) Supervised internship experience with appropriate agribusiness firm.

Rural Sociology

Graduate Courses

480 Technological and Community Change (3) Analysis of community processes whereby new technology spreads within a farm population and analyses of rural institutions related to change in rural communities. Prereq: Rural Sociology or consent of instructor. (Same as Sociology 480.) Sp

580 Advanced Rural Sociology (3) Application of sociological concepts and theory to analyze changes in structure and function of rural life in U.S. and developing countries. Demographic changes, rural social and community indicators, and rural development
Agriculture and Natural Resources

(College of Agricultural Sciences and Natural Resources)

GRADUATE COURSES

507 Professional Development Seminar (1) Planning and executing graduate research programs; ethics and professionalism; graduate program procedures and resources. (Same as Animal Science 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Food Science and Technology 507, Ornamental Horticulture and Landscape Design 507, and Plant and Soil Sciences 507.) F

509 Scientific Communication (1) Application of speaking, writing, and organizational skills in preparation of research proposals, slide presentations, abstracts, web sites, and vitae. (Same as Animal Science 509, Food Science and Technology 509, Ornamental Horticulture and Landscape Design 509, and Plant and Soil Sciences 509.) F

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

Animal Science

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

MAJOR

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

Kelly Robbins, Head

Professors:
Barth, K. M. (Emeritus), Ph.D. .......... Rutgers
Bell, M. C. (Emeritus), Ph.D. ........... Ohio State
Blotner, H. K. (Emeritus), Ph.D. ...... Ohio State
Chamberlain, C. C. (Emeritus), Ph.D. .... Iowa State
Eiler, H., D.V.M., Ph.D. ............... Illinois
Ericson, B. H. (Emeritus), Ph.D. Kans State
Godkin, J. D. (Liaison), Ph.D. .......... Massachusetts
Hall, O. G. (Emeritus), Ph.D. ............ Iowa State
Henry, R. W., D.V.M., Ph.D. ............ Ohio
Lidvall, E. R. (Emeritus), M.S. .......... Tennessee
Masinupcic, F. B., Ph.D. .......... Kansas State
McDonald, T. P. (Emeritus), Ph.D. . Tennessee
McLaren, J. B. (Emeritus), Ph.D. .... Michigan State
Miller, J. K., Ph.D. .................... Georgia
Murphree, R. L. (Emeritus), Ph.D. .......... Wisconsin
Oliver, S. P., Ph.D. .................... Ohio State
Richardson, D. O., Ph.D. .............. Ohio State
Robbins, K. R., Ph.D. .................. Illinois
Saxton, A., Ph.D. .................... NC State
Shirley, H. V. (Emeritus), Ph.D. .......... Illinois
Schultz, T. W., Ph.D. .................. Tennessee
Sims, M. H., Ph.D. ..................... Auburn
Tugwell, R. L. (Emeritus), Ph.D. .... Kansas State

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

Assistant Professors:
Edwards, J. L., Ph.D. .......... Florida
Reed, R. B., D.V.M., Ph.D. .......... Texas A&M
Tithof, P. K., D.V.M., Ph.D. .......... Michigan State

The Department of Animal Science offers graduate programs leading to the Master of Science and Doctor of Philosophy with a major in Animal Science. At the M.S. level, areas of concentration are nutrition, breeding, physiology (reproductive, mammary, and metabolic), and management with orientation towards beef cattle, dairy cattle, swine, and poultry. The Ph.D. program offers concentrations in animal nutrition, animal breeding, animal physiology, animal anatomy, and animal management. Specific information, contact the department head.

It is recommended that all first-year graduate students enroll in 507 and 509. All first- and second-year students are required to enroll in 509 each fall and each spring term.

THE MASTER'S PROGRAM

For admission to the M.S. program, a student must have obtained a 3.0 grade-point average on a 4.0 scale (or a 3.0 each term during the junior and senior years) in a completed undergraduate degree program in one of the animal sciences or a related area. The student must submit evidence (letters of recommendation, personal interview, etc.) that indicates ability to complete requirements for the M.S. Prerequisite courses may be required if the student has not completed the undergraduate degree program. If the student has an unsatisfactory grade-point average, acceptance may be on a probationary (non-degree) basis and a minimum of 9 hours of graduate coursework must be completed in the first term with a minimum grade-point average of 3.0 for admission to the M.S. program.

The program requires the writing of a thesis based on original research; the completion of a minimum of 24 hours of graduate coursework, of which at least 14 hours must be taken in courses numbered at or above the 500 level; and 6 hours of thesis. Included in the course requirement are 1 hour of Agriculture 512 and a minimum of 3 hours in statistics. These statistics courses must be chosen from the 400, 500, or 600 level of courses approved by the ICGSP. The remaining of the coursework will be selected jointly by the student and the major professor depending on the student's area of concentration and professional objectives.

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

THE DOCTORAL PROGRAM

The doctoral program requires a minimum of 48 semester hours of coursework beyond the B.S. and a minimum of 24 hours of doctoral research and dissertation. The 48 hours of coursework must include:
1. A minimum of 16 hours in related fields outside of animal science.
2. At least 24 hours credit at the 500 and 600 level, exclusive of doctoral research and dissertation, of which a minimum of 6 hours must be at the 600 level. Students in the nutrition, breeding, physiology, or anatomy concentration must complete at least 12 hours at the 500 and 600 level in the respective concentration or closely related area. Students in the management concentration must complete 12 hours at the 500 of 600 level in two non-management concentrations.
3. A minimum of 1 hour of Agriculture 512 in addition to that required at the M.S. level.
4. A minimum of 6 hours in 400-, 500-, or 600-level statistics courses approved for the ICGSP.

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

GRADUATE COURSES

420 Advanced Reproduction (3) Collection, evaluation, and preservation of ova, spermatozoa and embryos; application of methods of natural breeding and techniques of artificial insemination and embryo transfer; herd sire and dam evaluation; pregnancy determination; gestation and parturition; infertility; recent advances in theriogenology. Prereq: 330 or equivalent. 1 hr and 2 labs. F

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

440 Advanced Animal Breeding (3) Computer simulation of genetic improvement for multiple traits in swine, beef, and dairy cattle; evaluation of alternative breeding strategies and industrial programs in swine, poultry, sheep, beef, and dairy cattle; breed development, improvement, and utilization. Prereq: 340 or equivalent, 1 hr and 1 lab. Sp

481 Beef Cattle Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete production and management programs. Structure of industry, enterprise establishment, systems of production, produc-
Animal Science--Veterinary Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine

Anthropology

(College of Arts and Sciences)

MAJOR DEGREES

Anthropology

Jan F. Simek, Head

Professors:

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

Faulkner, Charles H., Ph.D. ................................................ Indiana

Harrison, Faye V., Ph.D. ........................................... Stanford

Jantz, Richard L., Ph.D. .............................................. Kansas

Klippel, Walter E., Ph.D. ................................................ Missouri

Logan, Michael H., Ph.D. .............................................. Penn State

Parmalee, Paul W. (Emeritus), Ph.D. .................................. Texas A&M

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

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

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

Associate Professors:

Howell, Benita J., Ph.D. .............................................. Kentucky

Kongeberg, Lyle, Ph.D. .......................................... Northwestern

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

Marks, Murray K., Ph.D. .............................................. Tennessee

Assistant Professor:

Ferreira, Mariana, Ph.D. ........................................... California (Berkeley)

Research Associate Professor:

Chapman, J., Ph.D. .............................................. North Carolina

Research Assistant Professors:

Elam, J., Michael, Ph.D. ........................................... Missouri

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

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

THE MASTER'S PROGRAM

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

All prospective M.A. students must make formal application to The University of Tennessee Graduate School. Copies of the application form, transcripts, and GRE scores that are sent to The Graduate School should also be sent directly to the Department of Anthropology at The University of Tennessee, Knoxville, TN 37996-0720.

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

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

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

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

Applicants to the Ph.D. degree program should meet the same academic standards as M.A. program applicants and furnish the same materials (see The Master's Program). Admission to the program requires either:
1. Acceptance of a Master's degree in anthropology; or
2. Acceptance of a Master's degree in another discipline, with the provision that the student will follow the first-year program with entering M.A. students, i.e., complete the core courses (510, 560, 590) and pass the Graduate Evaluation Examinations.

Doctoral Committee: A doctoral committee is appointed following admission to the program. In consultation with this committee, the student defines the future program of studies. When the student and committee have agreed upon the specific fields of specialized competence over which the student will be examined, a brief dissertation proposal may be submitted. In the case of concentration, the student will be required to take a comprehensive written examination. The exam will consist of three sections and be given by the student's committee. All three sections must be taken within seven consecutive days.

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

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

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

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs on an in-state tuition basis. The M.A. program in Anthropology is available to residents of the states of Alabama, Delaware, Louisiana, Mississippi, South Carolina, or West Virginia. The Ph.D. program is available to residents of Louisiana, Virginia, or West Virginia. The Department does not accept completion of the intermediate (200 level) sequence of a language as a formal option for fulfilling the language requirement.

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

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

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

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

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

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs on an in-state tuition basis. The M.A. program in Anthropology is available to residents of the states of Alabama, Delaware, Louisiana, Mississippi, South Carolina, or West Virginia. The Ph.D. program is available to residents of Louisiana, Virginia, or West Virginia. The Department does not accept completion of the intermediate (200 level) sequence of a language as a formal option for fulfilling the language requirement.

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

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

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

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

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

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs on an in-state tuition basis. The M.A. program in Anthropology is available to residents of the states of Alabama, Delaware, Louisiana, Mississippi, South Carolina, or West Virginia. The Ph.D. program is available to residents of Louisiana, Virginia, or West Virginia. The Department does not accept completion of the intermediate (200 level) sequence of a language as a formal option for fulfilling the language requirement.

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

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

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

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

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

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

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs on an in-state tuition basis. The M.A. program in Anthropology is available to residents of the states of Alabama, Delaware, Louisiana, Mississippi, South Carolina, or West Virginia. The Ph.D. program is available to residents of Louisiana, Virginia, or West Virginia. The Department does not accept completion of the intermediate (200 level) sequence of a language as a formal option for fulfilling the language requirement.

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

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

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

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

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

Defense of Dissertation Examination: When the dissertation has been tentatively accepted by the committee, a final oral examination will be held. The committee conducts the exam, which is ordinarily held as a colloquium in which the candidate will expound on the nature and significance of his/her contribution to anthropological knowledge as set forth in the dissertation.
410 Principles of Cultural Anthropology (3) Exploration and illustration of major concepts, theories, and methods in cultural anthropology, with application to analysis of specific ethnographies. Prereq: 130.

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

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

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

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

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

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

440 Cultural Ecology (3) Concepts and methods in studying dynamic interaction between prehistoric and present day cultures and their environments: ecological theory, methods of analysis, and review of selected case studies. Prereq: 120, 150, 410, or consent of instructor.

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

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

464 Principles of Zooloagchnology (3) Basic osteological studies of major vertebrate groups; aboriginal use of animals in subsistence and culture. Identification and interpretation of anthropologically derived mollusk and vertebrate remains; introduction to laboratory use of comparative collections. Prereq: 120 or consent of instructor.

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

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

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

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

484 Museology III: Field Projects (1-12) (Same as Art 484.)


490 Primate Evolution (3) Living and fossil primate taxonomy, ecology, and comparative anatomy. Survey of primate fossil record; origin of major primate lineages. Prereq: 110 or consent of instructor.

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

500 Thesis (1-15) PrN only. E

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

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

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

511 Special Topics in Cultural Anthropology (3) Seminars for advanced students on topics of special interest: ethnogenetics, cultural ecology, social organization, religion, and art. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

512 Urban Studies in Anthropology (3) Process of urbanization examined cross-culturally; theory and methods in researching urban communities; urban problems and urban people. Prereq: Consent of instructor.

513 Rural Studies in Anthropology (3) Theory, method, and ethnographic research on selected problems and aspects of traditional agrarian groups in U.S. and peasant societies. Prereq: Cultural area course or equivalent. May be repeated. Maximum 9 hrs.

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

515 Medical Anthropology (3) Cultural impact on health and disease. Prereq: Consent of instructor.

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


521 Laboratory Studies in Zooloagchnology (4) Examination and comparison of skeletons of major vertebrate groups, shells of terrestrial and aquatic mollusks, in relation to animal remains from archaeological contexts. Basic osteology and shell characters of species encountered in aboriginal sites; use of comparative collections. May be repeated. Maximum 8 hrs.

522 Seminar in Anthropology (3) Theoretical and practical issues in contemporary anthropology; ethnography, paleoanthropology, taphonomy, ceramic analysis, agricultural cultural origins, and regional archaeologies. May be repeated. Maximum 9 hrs.

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


560 Theory in Archaeology (3) Detailed consideration of theory in contemporary archaeology: modes of scientific orientation, research design, methods of data collection, forms and processes of data and analysis and interpretation.

561 Archaeological Resource Management (3) Federal legislation and regulations affecting identification, protection, and management of archaeological resources. Professional ethics and responsibilities and relationship of federal and state agencies, public interest groups, and professional archaeologists in conduct of federally sponsored archaeology. May be repeated. Maximum 6 hrs.

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

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

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

581 Forensic Anthropology (3) Application of physical anthropology to problems in human identification: Determination of age, sex, and race of skeletal remains and preparation of reports for legal medicine. Prereq: 480.

582 Paleoanthropology (4) Fossil record from origins of hominids to appearance of anatomically modern human species; functional morphology and phylogenetic relationships of fossil humans. Prereq: 480.

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

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

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

590 Method and Theory in Biological Anthropology (3) Current methods of analysis in biological anthropology and of past and current history of theoretical perspectives: Paleoanthropology, human osteology and human variation and population structure. Prereq: Consent of instructor.

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

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

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

600 Doctoral Research and Dissertation (3-15) PrN only. E

601 Advanced Graduate Research (1-15) Independent investigation of special problems in anthropology by advanced graduate students. May be repeated. Maximum 12 hrs. Only 3 hrs may count toward 600-level requirement.

611 Theory in Cultural Anthropology (3) Critical evauation of current issues in cultural anthropology, primarily for doctoral students in cultural anthropology.

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

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

Degree Requirements

Track 1 requires a minimum of 30 semester hours of undergraduate preparation and 60 semester hours of graduate coursework, taking approximately 3 1/2 years of full-time study. A minimum of 4 hours of architectural electives or approved electives from another discipline must be taken at the 500 level or above.

Track 2 requires a minimum of 30 semester hours of graduate coursework.

Both tracks require 6 hours of Thesis 500 with a public presentation and oral defense of the thesis. Retention in the program is contingent upon evidence of satisfactory progress toward the degree. Each student's progress will be reviewed each semester by the Graduate Program Head. Any questions regarding progress will be reviewed by the Graduate Program Advisory Committee.

For further information, contact the School of Architecture.

ACADEMIC COMMON MARKET

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

For Track 1 applicants, a bachelor's degree with a 3.0 GPA from a regionally accredited college or university is required. International applicants must have an equivalent 4-year degree and a minimum 3.0 GPA. Candidates with a GPA less than 3.0 may be considered for conditional admission when evidence of exceptional promise is demonstrated. Undergraduate work should include at least 12 semester hours of humanities, a basic understanding of physical principles of systems and analytical procedures and an understanding of mathematical principles and analytical procedures, as well as a general understanding of the use of computers. The School requires a separate application for Architecture including an essay and three letters of recommendation. A personal on-site interview is desirable but not mandatory. For those applicants from an accredited 4+2 architecture programs, a portfolio is required in addition to the above requirements.

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

The general portion of the Graduate Record Examination is required of all applicants. Applicants should take the GRE at least one semester in advance of application for admission.
445 Advanced Lighting (3) In-depth analysis and innovative concepts in design of lighting. Prereq: 342.

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

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

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

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

504 Issues in Preservation (3) Architectural issues: preservation, restoration and conservation of historic structures. Prereq: Consent of instructor.

507 Seminar in Contemporary Architectural Theory (3) Readings, discussions, lectures in contemporary architectural thought. Principles underlying historical character of contemporary architecture. In-depth analysis of selected contemporary examples and their contributions to architectural theory and design.

509 Seminar in Architectural Technology (3) Technological aspects influencing building form. Role of technical aspects of structural, environmental and building infrastructure as integrated systems supporting access and efficacy of building.

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

513 Cultural Aesthetics (3) Principles underlying cultural character of architecture. Role of social, political and economic forces which influence interpretation of factors creating building's character.

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

515 Seminar in Issues in Urban Design (3) Investigations of urban forms, patterns, and attitudes that have shaped towns and cities. Prereq: Consent of instructor.

516 Materials and Methods of Construction (3) Properties of interior and exterior building materials and their relation to construction methods and detailing. Theory of materials selection and application and role materials and methods play in design process.

521 Principles of Architectural Form (3) Historical and contemporary architectural theory through investigation of literature and related examples. Theories of understanding and application to related generation of architectural form and space in response to both cultural and environmental focus.

525 Special Topics in Architecture (1-3) Student- or instructor-initiated course. May be repeated. Maximum 9 hrs. S/NC or letter grades.

526 Directed Readings in Architecture (3) Readings on topics of interest: primary texts, history, theory, urban issues, technology, and professional practice. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

528 Topics in Architectural History and Theory (3) Historic topics, ideas and theories in architecture. Prereq: Consent of instructor.

532 Computer Applications for Architecture (3) Advanced use of computers in architecture. Prereq: Consent of instructor.

531 Research Methods (3) Quantitative and qualitative methods of research in architectural inquiry. Systematic study and application of applied and speculative investigations in field of architectural research. Review and identification of techniques and methodologies and applications for architectural research and scholarship.

533 Advanced Topics in Architectural Technology (3) In-depth investigations and analysis: architectural technology lighting, structure, enclosure, mechanical and other architectural technologies. Prereq: Consent of instructor.

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


581 Foreign Study (1-9) Open to all students.

582 Off-Campus Study (1-9) Open to all students.

593 Independent Study (1-9) Open to all students.

Art

(College of Arts and Sciences)

MAJOR

Art ........................................................................ M.F.A.
Norman Magden, Head

Professors:


Yates, S., M.F.A. ...................... North Carolina (Greensboro)

Associate Professors:


Assistant Professors:

Brodden, Sally B., M.F.A. ....... NY College of Ceramics (Alfred) Everson, Kevin, M.F.A. ............... Ohio Jung, A., M.F.A. ......................... Wisconsin Smith, Peter, M.F.A. .................. RISD Wright, S. E., Ph.D. ....................... Stanford

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

THE MASTER'S PROGRAM

To become a candidate, the applicant must be admitted by The Graduate School and approved by the Department of Art. In addition to the admission requirements of The Graduate School, the Department of Art specifically requires the following:

1. A detailed letter of intent including statement requesting assistantship, if desired.
2. Three letters of recommendation from former professors or professionals in the field.
3. An undergraduate major in art or evidence of equivalent proficiency.
4. A portfolio to be evaluated by the faculty.

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

M.F.A. Requirements

A minimum of 60 hours is required:

1. Successful completion of 20 hours of studio in a concentration area. An inter-area program must be approved by the graduate faculty only after the second semester in residence. Ten hours of concentration must be in second year courses (512, 514, etc.)
2. A minimum of 9 hours of graduate level academic (non-studio) courses of which at least 6 hours are to be in art history.
3. Eleven hours of electives which may consist of any combination of courses offered by the University for graduate credit.

4. Art 599, Project in lieu of Thesis (20 hours). A third year of semi-independent study. Student must have completed all other coursework prior to registration. Four semesters (of the first 40 hours) beyond the Bachelor's degree are required in residence. An exception is made for working professional designers who may complete their first 20 hours, with the permission of the faculty, on a part-time basis. Residence is defined by the Department of Art as (1) a minimum enrollment of 6 hours per semester and (2) use of Department of Art facilities so that students are available for discussion and criticism.

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

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

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

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

GRADUATE MINOR IN THE HISTORY OF ART
A graduate minor in Art History may be
arranged with consent of the student’s
committee, the instructors involved, and The
Graduate School. Prerequisite is an under-
graduate Art History minor, or its equivalent,
and reading knowledge of French, German,
or Italian, unless waived by the Art History
faculty.

Art
GRADUATE COURSES
481 Museology I: Museums, Purpose and Function
(3) Development of museums of art, history, natural
and applied science. (Same as Anthropology 481.)
482 Museology II: Exhibition Planning and Install-
ation (3) Exhibition concept development and imple-
mentation. Exhibition design and installation techniques.
Publicity, production, mounting and framing, shipping and
storage. Prereq: Consent of instructor. (Same as Anthropology 482.)
484 Museology III: Field Projects (1-12) Special field
projects: restoration, preservation, registration, and
other related research on or off campus. Prereq: 481 and
482, and consent of instructor. May be repeated. Maximum 12 hrs.
499 Special Topics (3) Student- or instructor-initiated
course offered at convenience of department. May be repeated. Maximum 12 hrs.
502 Registration for Use of Facilities (3-15) Re-
quired for the student not otherwise registered during
any semester when student uses University facili-
ties and/or faculty time before degree is completed. May
be repeated. S/NC only.
507 Professional Practices: Teaching Internship
(1) Individual study in development of skills and
and individuality in teaching studio courses. For students
who are not GTA’s, Prereq: Consent of instructor. May
not be used toward degree requirements. May be repeated.
S/NC only.
591 Foreign Study (1-15) See College of Arts and
Sciences.
592 Off-Campus Study (1-15) See College of Arts and
Sciences.
593 Independent Study (1-15) See College of Arts and
Sciences. Prereq: Consent of instructor.
595 Visiting Artist Seminar (2) Contemporary art
issues by different visiting artists. May not be used
toward art history requirement. May be repeated.
Maximum 8 hrs.

Art Ceramics
GRADUATE COURSES
421 Ceramics: Advanced Handbuilding (4) Contin-
ued investigation of ceramic form: development of
individual direction. Prereq: Ceramics: Handbuilding
and Throwing II. May be repeated. Maximum 10 hrs.
422 Ceramics: Advanced Throwing (4) Continued
depth investigation of ceramic form: development of
individual direction. Prereq: Ceramics: Handbuilding
and Throwing II. May be repeated. Maximum 12 hrs.
424 Ceramics: Clay Arts and Glazes (3) Clay,
clay bodies, glaze theory and calculation. Formulating,
mixing and testing of clay bodies and glaze formu-
las. Prereq: Ceramics: Portfolio Review.
425 Ceramics: History Seminar (3) History of ceram-
ic art through lectures and student presentations.
May not be used toward art history requirement. Prereq:
Ceramics: Portfolio Review.
426 Ceramics: Kiln Design (3) Designing kilns,
traditional and non-traditional, construction meth-
ods, and kiln operation. Prereq: Ceramics: Portfolio Review.
429 Ceramics: Special Topics (3) Student- or instruc-
tor-initiated course offered at convenience of depart-
ment. Prereq: Consent of instructor. May be repeated.
Maximum 12 hrs.
521 Graduate Drawing I (2-6) May be repeated.
Maximum 10 hrs.
522 Graduate Drawing II (2-5) May be repeated.
Maximum 10 hrs.
593 Independent Study (1-15) See College of Arts and
Sciences. Prereq: Consent of instructor.
595 Visiting Artist Seminar (2) Contemporary art
issues by different visiting artists. May not be used
 toward art history requirement. May be repeated.
Maximum 8 hrs.
599 Projects in Lieu of Thesis (10) Prereq: All
graduate course work and successful second year
evaluation by graduate faculty. May be repeated.
Maximum 20 hrs. S/NC only.

Art Design/Graphic
GRADUATE COURSES
405 Computer Enhanced Graphic Design (3) Explo-
ation of new technologies and their significa-
tion to graphic design. Prereq: Intermediate Graphic Design I.
451 Advanced Graphic Design (3) Theory and tech-
niques of visual problem-solving as applied to ad-
vanced applications of graphic design. Prereq: Inter-
mediate Graphic Design II with a grade of C or better.

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

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

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

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

Studies in Graphic Design/Art History
550 Studies in Graphic Design/Art History
(3) Design and illustration. See College of Arts and
Sciences. Prereq: Consent of instructor.

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

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

Art Drawing
GRADUATE COURSES
419 Special Topics in Drawing and Painting (3)
Student- or instructor-initiated course offered at
convenience of department. Prereq: Consent of instruc-
tor. May be repeated. Maximum 12 hrs.
511 Graduate Drawing I (2-6) May be repeated.
Maximum 10 hrs.
512 Graduate Drawing II (2-6) May be repeated.
Maximum 10 hrs.
593 Independent Study (1-15) See College of Arts and
Sciences. Prereq: Consent of instructor.
595 Visiting Artist Seminar (2) Contemporary art
issues by different visiting artists. May not be used
 toward art history requirement. May be repeated.
Maximum 8 hrs.

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

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

GRADUATE COURSES


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

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

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

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

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

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

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

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

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

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

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

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

595 Visiting Artist Seminar (3) Contemporary art issues by different visiting artists. Prereq: Determined by department. May be repeated. Maximum 12 hrs.

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

Art Painting

GRADUATE COURSES

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

441 Digital Photography I (2-6) Advanced photography, individual concepts and techniques for creation of photographic works as art form: individual projects. Prereq: Intermediate Intaglio or consent of instructor. May be repeated. Maximum 12 hrs.

443 Painting IV (6) Advanced painting, individual concepts and techniques for creation of works as art form: individual projects. Prereq: Intermediate Intaglio or consent of instructor. May be repeated. Maximum 12 hrs.

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

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

Art Printmaking

GRADUATE COURSES

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

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

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

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

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

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

563 Printmaking III (2-6) Directed exploration of any or all matrix-based imaging: intaglio, relief, lithography,
Art Sculpture

GRADUATE COURSES

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

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

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

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

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

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

Astronomy

See Physics and Astronomy

Audiology and Speech Pathology

(College of Arts and Sciences)

MAJORS

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

Patrick J. Carney, Head

Professors:

Asp, Carl W., Ph.D. .................... Ohio State
Carney, Patrick J., Ph.D. .............. Iowa
Nabelek, Anna (Emeritus), Ph.D. .... Poland
Nabelek, Igor V. (Emeritus), Sc.D. .. Prague
Peterson, H. A. (Emeritus), Ph.D. ... Illinois
Silverstein, B. (Emeritus), Ph.D. .... Purdue

Associate Professors:

Burchfield, Samuel B., Ph.D. ......... Michigan State
Carney, Patrick J., Ph.D. .............. Tennessee
Gordon, Pearl A., Ph.D. ............... Tennessee
Swanson, Lori A., Ph.D. ............... Purdue
Thelin, J. W., Ph.D. ........... Iowa

Assistant Professor:

Erickson, Mary E., Ph.D. .............. Southern Cal
Harkrider, Ashley, Ph.D. .......... Texas
Hedrick, Mark, Ph.D. ............... Vanderbilt
McCullough, Gary .................. Vanderbilt
Ruark, Jacki L., Ph.D. ............. Pittsburgh

THE MASTER'S PROGRAM

A major is offered in Audiology or in Speech Pathology. Admission to these graduate programs is competitive. Both of these graduate programs are accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association.

The master's degree program in speech pathology is a two-year program and consists of the completion of 42 semester hours of academic content courses (including thesis) plus practicum. A minimum of three academic courses must be completed during all semesters (terms) except one. That is, students must take a minimum of nine semester hours of academic courses for at least four semesters or terms and six semester hours in the other semester or term.

The required courses are 506, 511, 526, 561, 582, 539 or 541, 520 or 584, and at least two seminars from the following courses: 522, 523, 531, 626, or 681 and at least 15 hours of elective courses. Undergraduate coursework may not be substituted for seminar courses. Students who have not completed an undergraduate course in each of the following three areas: articulation/phonological processing disorders, voice disorders, and fluency disorders, must complete one graduate course in each of the three areas.

Students majoring in speech pathology may elect either the thesis or non-thesis option. The master's program in speech pathology with thesis includes six hours of 500 credit in the preparation of an acceptable thesis representing original independent work, and a final oral examination. Students in the non-thesis option must pass a final written examination.

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

THE DOCTORAL PROGRAM

The Ph.D. program in Speech and Hearing Science seeks to develop individuals for professional careers in a variety of positions including research and college teaching in the concentration areas of speech and language pathology, audiology, speech-language science or hearing science. The degree program is research oriented with primary emphasis on processes involved in normal, deviant, or disordered speech, language and hearing. Students will be expected to demonstrate their knowledge in areas related to the concentrated field of study. These areas include:

1. Basic speech, hearing, or language processes;
2. Basic speech, hearing, or language disorders or differences;
3. Related disciplines providing insight into human communication processes;
4. Technical skills in instrumentation and experimental design which enable the student to investigate problems pertaining to speech and hearing processes.

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

The total program is a minimum of 60 semester hours, including a minimum of:
1. 24 semester hours in dissertation 600.
2. 6 semester hours in a research tool.
3. 6 semester hours in a cognate area outside the department.
4. 24 semester hours in 600-level coursework within the department of which:
GRADUATE COURSES

431 Stuttering (2) Nature, appraisal and treatment. Prereq: 304 or consent of instructor.

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

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


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

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

473 Audiology II (3) Basic principles of clinical audiometry; pure tone, speech, masking and testing of special auditing tests. Prereq: 371.

494 Aural Habituation/Rehabilitation of the Hearing Impaired (3) Psychosocial aspects, amplification components/characteristics, assistive devices, speech acoustics, speech perception, speech reading, parent-infant, preschool school years of children, communication impairments/handicaps/remediation of adults, effects of aging/remediation on the elderly, and case studies. Prereq: Consent of instructor.

475 Audiology III (3) Basic principles of clinical audiometry: pure tone, speech, masking and testing of special auditing tests. Prereq: 371.

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

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

504 Appraisal of Speech and Language Disorders (3) Diagnostic procedures for children and adults with speech and language disorders. Prereq: Consent of instructor.

506 Neutral Bases of Speech and Language (3) Structure and function of the central and peripheral nervous systems, role in speech and language. Prereq: 306.

507 Anatomy and Physiology of Hearing (3) Structure and function of the peripheral and central auditory systems, and their roles in mediating auditory pro- cesses. Prereq: 473 or equivalent or consent of instructor.

511 Introduction to Research in Speech and Hearing (3) Analysis of research in speech and hearing sciences, methods, and interpretation of research results. Prereq: Consent of instructor.

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

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

514 Practicum in Verbo-Tonal Habilitation (1-4) Prereq: 494, 595, or consent of instructor. May be repeated. Maximum 6 hrs.

515 Practicum in Aural Rehabilitation (1-4) Prereq: 473 and 494. May be repeated. Maximum 6 hrs.

517 Instrumentation in Audiology and Speech Pathology (3) Principles of instrumentation in audiology and speech pathology; laboratory assignments for familiarization of students with instruments for measuring speech and hearing processes.

520 Aphasia (3) Historical review of aphasia literature, theories of brain functioning, classification and terminology, testing for aphasia, ororomotor assessment, therapy considerations and prognosis for recovery. Prereq: 506 or equivalent or consent of instructor.

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

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

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

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

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

532-33-34 Advanced Clinical Practice in Speech-Language Pathology (1-4, 1-4, 1-4) Prereq: 434 or equivalent or consent of instructor. 534 may be repeated. Maximum 8 hrs. Enrollment for less than 2 hrs must have prior departmental approval.

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

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

539 Motor Speech Disorders (3) Neuromotor organization for speech production; types of motor speech disorders and associated neuromotor symptoms; diagnosis and management of motor speech disorders. Prereq: 506.


541 Pediatric Oromotor Disorders (3) Evaluation, diagnosis, and treatment of pediatric oromotor disorders; structure and function of feeding and speech skills. Prereq: 506 or consent of instructor.

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

543 Amplification Technology (3) Description of hearing aid circuits, components and performance characteristics. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

544 Amplification for the Hearing-Impaired (3) Speech acoustics/psychoacoustics. Influence of noise, reverberation, and audiological processing issues for audiological intervention, counseling, and training in audiological intervention. Prereq: 473 or equivalent or consent of instructor.

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

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

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

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

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

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

552 Seminar in Speech Pathology (1-3) Current research in speech pathology. Topics vary. Prereq: 300 hrs in speech pathology. May be repeated with consent of department. Prereq: 434 or equivalent or consent of instructor.

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

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

556 Child Language Disorders (3) Current literature on assessment and intervention techniques for young language learners. Prereq: 461 or equivalent or consent of instructor.

557 Multicultural, gender and age-related issues. Prereq: Consent of instructor. May be repeated. Maximum 10 hrs.

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

562 Language Disorders: Birth to Three (3) Overview of family-focused, transdisciplinary intervention programs. Prereq: 461 or equivalent or consent of instructor.

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

564 Pediatric Audiology (3) Theoretical and practical considerations in evaluation and treatment of hearing impairment in children. Prereq: 450 or equivalent or consent of instructor.

565 Electrophysiological Assessment of Auditory Function (3) Auditory-evoked potentials and their clinical uses. Use of various evoked potentials in evaluation of auditory function and determination of hearing loss. Prereq: 450 or equivalent or consent of instructor.

566 Vestibular Disorders (3) Anatomy, physiology, and pathophysiology of vestibular system and its role in balance. Prereq: 450 or equivalent or consent of instructor.

567 Psycholinguistic Concepts in Speech Pathology (3) Psycholinguistic concepts and information theory; studying the normal acquisition of language and certain disorders of language. Prereq: Consent of instructor.
582 Speech and Language Services in School (3) Organization and implementation of speech and language programs in schools.

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

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

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

594 Advanced Aural Habilitation/Rehabilitation of the Hearing-Impaired (3) Study of grieving process, counseling, group and individual amplification systems, classroom/speech acoustics, central auditory problems, therapy methods for habilitation and rehabilitation, speech reading, school-based programs, programs for adults and the elderly, student research reports/case studies. Prereq: Consent or instructor. May be repeated. Maximum 6 hrs.

595 The Verbotonal System: Auditory/Speech Perception (3) Innovative theory, therapy procedures, and SUVAG amplification/filters for diagnosis/evaluation/remediation of spoken language/listening skills of hearing-impaired children/adults: use of rhythm, movements and suprasegmentals; special audiometric tests, acoustic filters, correcting misarticulations through optimal listening; central auditory treatment; second (foreign) language through listening/spoken language: relationship of concepts to conventional concepts/practice; student research reports. Prereq: Phonetics and Acoustics of Speech, 473 and 494 or equivalents or consent of instructor.

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

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

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

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

566 Directed Research (1-4) Participation in ongoing or non-dissertational research. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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

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

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

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

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

595 The Verbotonal System: Auditory/Speech Perception (3) Innovative theory, therapy procedures, and SUVAG amplification/filters for diagnosis/evaluation/remediation of spoken language/listening skills of hearing-impaired children/adults: use of rhythm, movements and suprasegmentals; special audiometric tests, acoustic filters, correcting misarticulations through optimal listening; central auditory treatment; second (foreign) language through listening/spoken language: relationship of concepts to conventional concepts/practice; student research reports. Prereq: Phonetics and Acoustics of Speech, 473 and 494 or equivalents or consent of instructor.

600 Doctoral Research and Dissertation (3-15) Prerequisite only. E.

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

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

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


609 Seminar in Speech Science (2) Experimental areas: speech physiology, acoustic analysis, recognition, perception and intelligibility of speech, communication theory, and psycholinguistic measurement of speech and language. Topics vary. Prereq: 601 or consent of instructor. May be repeated. Maximum 6 hrs.

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

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

626 Advanced Seminar in Neuropsychology-based Communication Disorders (3) Topics vary. Prereq: 520, 539, and 524, or consent of Instructor. May be repeated. Maximum 6 hrs.

650 Advanced Seminar in Audiology (2) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

652 Advanced Seminar in Speech and Language (2) Topics vary: aberrations of voice, articulation, speech time and rhythm, language development or use, and language/speech impediment. Prereq: Consent of Instructor. May be repeated. Maximum 8 hrs.

655 Practicum in College Teaching (1-3) Supervised experience in college teaching. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NC only.

656 Directed Research (1-4) Participation in ongoing or non-dissertational research. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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

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

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

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

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

Aviation Systems
(UT Space Institute)

MAJOR DEGREE

Aviation Systems ........................................ M.S.

Frank G. Collins, Co-Chair

Ralph D. Kimberlin, Co-Chair

Professors:

Collins, F. G., Ph.D. ..................... California

Kimberlin, R. D. (Liaison),

Ph.D. ........................................ RWTH (Germany)

Mason, A. A. (Emeritus), Ph.D. ...... Tennessee

Paludan, C. T. (Emeritus), Ph.D. .... Denver

Wu, J. M. (Emeritus), Ph.D. .......... Cal Tech

Young, R. L. (Emeritus), Ph.D. . Northwestern

Associate Professors:

Lewis, William D., Ph.D. .......... Georgia Tech

Soles, U. P., Ph.D. ...................... Tennessee

Research Assistant Professor:

Stellar, Frederick W., M.S. .......... Georgia Tech

The University of Tennessee

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

To qualify for admission to this program, the applicant must possess a Bachelor's degree in engineering or science from an accredited institution, and fulfill The University of Tennessee Graduate School admission procedures and grade-point standards. It is expected that the student will have a basic knowledge of computer utilization and statistics; an understanding of aerodynamic fundamentals, aircraft propulsion, and performance; and some understanding of economics.

Both thesis and non-thesis programs are available. The thesis program involves a minimum of 30 semester hours credit while the non-thesis program involves a minimum of 33 semester hours credit.

THESIS OPTION

The thesis program involves satisfactory completion of the following requirements:

Research and Development Specialization

1. Twelve hours of 500-level courses in the major field of aviation systems.

2. Six hours in industrial engineering (engineering management).

3. Six hours of electives from the major field, mathematics or engineering.

4. Six hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.


Administration Specialization

1. Twelve hours of 500-level courses in the major field of aviation systems.

2. Three hours in industrial engineering (engineering management).

3. Three hours in economics or finance.

4. Six hours of electives selected from the major field, mathematics or engineering.

5. Six hours of Aviation Systems 500 demonstrating the ability to conduct and report on an independent investigation.


NON-THESIS OPTION

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

Research and Development Specialization

1. Twelve hours of 500-level courses in the major field of aviation systems.

2. Twelve hours of Management Science (engineering management).

3. Twelve hours of electives in the major field, mathematics or engineering.

4. Three hours of an assigned project under Aviation Systems 550.

5. A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.

Administration Specialization

1. Twelve hours of 500-level courses in the major field of aviation systems.

2. Three hours in industrial engineering (engineering management).

3. Three hours in economics or finance.

4. Twelve hours of electives in the major field, mathematics or engineering.

5. Three hours of an assigned project under Aviation Systems 550.

6. A comprehensive final written examination on all coursework submitted for the degree and defense of the project course paper.
GRADUATE COURSES

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

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

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

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

504 Airports and the Community (3) Structure of airports and their communities. Technology and economics of cargo, baggage, ticket and passenger handling. Airport management, economics and logistics. Interfaces with community, plans, programs and developments for collecting and distributing passengers and freight from various types of airports. Types of airport developments and their projections. Prereq: 501.

505 Governmental Policies for Aviation (3) Theoretical and legal basis for economic and governmental regulation of aviation. Historical and legislative development of aviation regulatory agencies, organizational structure, administrative and enforcement procedures. Prereq: 501.

506 Aircraft Design (3) Design process, compromise of conflicting requirements, economical, industrial, and legal aspects. Definition of mission requirements, synthesis and optimization techniques, safety and reliability, systems integration, standards and regulations, teamwork and design-making process.

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


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

Biochemistry and Cellular and Molecular Biology

(College of Arts and Sciences)

MAJOR DEGREES

Biochemistry and Cellular and Molecular Biology ................. M.S., Ph.D.

John W. Koontz, Head

Professors:

Bagby, R. M., Ph.D. ....................................... Illinois
Carlson, J. G. (Emeritus) (Distinguished Prof.), Ph.D. ............... Pennsylvania
Chen, T. T., Ph.D. ......................................... Florida
Church, J. E., Ph.D. ........................................... Sheffield
Handel, Mary Ann (Distinguished Prof.), Ph.D. .............. Kansas State
Hochman, Ben (Emeritus), Ph.D. ........................................ California
Jeon, K. W., Ph.D. .......................................... London
Joshi, J. G. (Emeritus), Ph.D. ..................................... Poona
Kennedy, J. R., Ph.D. ........................................ Iowa
Klages, J. N. (Emeritus), Ph.D. .................................. Ohio State
Macke, B. D., Ph.D. ..................................... California (Davis)
Mckeever, J. G., Ph.D. ........................................ Michigan State
Monty, Kenneth J., Ph.D. ...................................... Rochester
Ritch, L. Evans (Emeritus), Ph.D. .................................. Chicago
Salo, T. P. (Emeritus), Ph.D. ........................................ Michigan
Shivers, C. A., Ph.D. ........................................ Michigan State
Welch, H. G. (Emeritus), Ph.D. .................................... Florida
Whitson, G. L. (Emeritus), Ph.D. .................................... Iowa
Wicks, Wesley D., Ph.D. ......................................... Harvard

Associate Professors:

Ganguly, R., Ph.D. .......................................... Nebraska
Hall, J. C., Ph.D. ............................................ Illinois
Howell, Elizabeth E., Ph.D. ...................................... Lehigh
Koontz, John W. (Liaison), Ph.D. ....................................... Pennsylvania
Peterson, Cynthia B., Ph.D. ......................................... LSU
Prosser, R. A., Ph.D. ........................................... Michigan
Roberts, Daniel M., Ph.D. ........................................ California (Davis)
Sarpersso, Engin H., Ph.D. ......................................... Hacettepe

Assistant Professors:

Bruce, Barry, Ph.D. ........................................... California (Berkeley)
Dealwis, C., Ph.D. .............................................. London
Park, J., Ph.D. ................................................. Texas A&M

Research Professors:

Mezger, Peter, Ph.D. ............................................. Harvard
Rinchik, Eugene, Ph.D. ........................................ Duke

Research Assistant Professor:

Kiebig, Mitch, Ph.D. ........................................... Tennessee

REQUIREMENTS FOR ADMISSION

Applicants for graduate study are expected to have a background equivalent to that required of undergraduate majors in this department. This includes a knowledge of the basic principles of biochemistry, cell biology, genetics and physiology. Requirements for admission are:

1. One year of general biology or the equivalent;

2. A minimum of 8 semester hours of approved biology courses beyond the introductory level and including the subject areas of genetics, cell biology and physiology;

3. Two years of chemistry including one year of general chemistry and one year of Introductory Organic Chemistry with laboratory;

4. At least one semester of biochemistry;

5. One year of calculus;

6. One year of physics;

7. Graduate Record Examination scores;

8. A minimum grade-point average of 3.0 out of 4.0.

Otherwise superior students, deficient in one or more of the above requirements, may be admitted at the discretion of the department's Graduate Recruiting Committee.

THE MASTER'S PROGRAM

1. Biochemistry and Cellular and Molecular Biology 511-12-13, 515-16, and 517.

2. Completion of course requirements as determined by the candidate's faculty committee.

3. Achievement of a 3.0 or better GPA in all courses taken for graduate credit.

4. Participation in 601 and 603 during the entire period of residence. Participation in at least one journal club chosen from among 605-608 for three semesters.

5. Six hours of master's research and a thesis.

6. A final examination that covers both the thesis endeavor and the subject matter of the course requirements.

THE DOCTORAL PROGRAM

1. Biochemistry and Cellular and Molecular Biology 511-12-13, 515-16, and 517.

2. At least two additional approved graduate courses in the life sciences or chemistry, or physics, or other physical science to be determined upon consultation with the mentor and the dissertation committee.

3. At least 6 hours of topics offered in 615 or its equivalent.

4. Participation in 601 and 603 during the entire period of residence. Participation in at least one journal club chosen from among 605-608 for three semesters.

5. Comprehensive examination, taken before the end of the third year of study.

6. A dissertation reporting the results of original and significant research carried out during the term of candidacy.

7. A final oral examination which will be concerned primarily with the student's dissertation.

Petitioning for Master's Degree

Students who have passed the comprehensive examination in the Ph.D. program and have completed at least 30 hours of approved coursework for graduate credit, at least two thirds of which must be at or above the 500 level, may petition the department for award of a master's degree. The additional requirements for such a degree are:

1. The preparation of a research manuscript suitable for submission for
publication in a major scientific journal and oral defense of that manuscript before an examining committee of three faculty members appointed by the head of the department, at least two of whom shall be members of the department; or
2. Publication of at least one full-length paper in a major scientific journal as senior author.

ACADEMIC COMMON MARKET
An agreement among southern states for sharing graduate programs allows legal residents of certain programs at UT on an in-state tuition basis. The M.S. program in Biochemistry and Cellular and Molecular Biology is available to residents of the state of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

401-402 Biochemistry-Molecular Biology I, II (3, 3)
401-Amino acid structure and chemistry, protein structure and chemistry, protein folding, enzyme behavior and regulation, reaction mechanisms, catalysis and energy transfer, synthetic metabolism including photosynthesis, and protein transport. 402-Structure of DNA and RNA, experimental methods of analyzing nucleic acids, mechanisms of RNA and protein synthesis, mechanisms of DNA replication, repair and recombination, chromosome structure and function, regulation of gene expression, genomics, structure and genomics, and mechanisms of biological regulation. Prereq: Biology 240 General Genetics, Chemistry 350-360-369 Organic Chemistry and Lab.

403 Advanced Genetics Laboratory (2) Experiments illustrating modern molecular genetics; techniques in classical, cyto-, molecular and developmental genetics. Model organisms, Drosophila and mouse. Prereq: General Genetics and Organic Chemistry.

410 Cellular and Comparative Biochemistry (4) Electrolyte behavior, chemistry and structure of proteins; enzyme behavior and biological function; catalysis and energy capture; synthetic metabolism; nucleic acid function; protein synthesis, and biochemistry; regulation of biological processes. May not be counted if credit received for 401. Prereq: Chemistry 350-360-369 Organic Chemistry and Lab, Biology 140 or completion of the Cell Biology 240 General Genetics. 3 hrs and 1 discussion. Sp.

419 Cellular and Comparative Biochemistry Lab (2) Experiments with enzymes, nucleic acids, and membranes and organelle function. Techniques in cell isolation, purification, culturing, flow cytometry; sequencing, hybridization, and immunological methods. Prereq or coreq: 401 or 410. F, Sp.

421 Cell and Tissue Structure and Function (4) Study of animal cells and tissues at light and electron micro scope levels. Prereq: Biology 140 Organization and Function of the Cell. 2 hrs and 2 labs.

429 Cell Biology Laboratory (3) Series of open-ended, discovery-based exercises developed to design and test new drugs using modern cell biology and computer technological modules: techniques used in cell isolation, purification, culturing, and electrophysiology, receptor binding and signal transduction, apoptosis, cAMP and Ca2+ signaling, protein and steroid secretion, computer modeling, and state-of-the-art electron microscopy. Exercise design, execution, data analysis, and peer evaluation. Prereq or coreq: 401 or 410. F.


471-81 Biophysical Chemistry (3, 3) Physicochemical principles with applications to biological systems.
Botany

(College of Arts and Sciences)

MAJOR DEGREES

Botany................................................. M.S., Ph.D.

Edward E. Schilling, Head

Professors:
Caponetti, J. D., Ph.D. .......... Harvard
Clebsch, E. C. (Emeritus), Ph.D. Duke
DeSelm, H. R. (Emeritus), Ph.D. Ohio State
Evans, A. M. (Emeritus), Ph.D. Michigan
Gullian, A. E. (Emeritus), Ph.D. Ohio State
Henderson, W. R. (Emeritus), Ph.D. Indiana
Hickox, L. G. (Emeritus), Ph.D. Massachusetts
Holton, R. W. (Emeritus), Ph.D. Michigan
Hughes, W. C., Ph.D. .......... North Carolina State
Petersen, R. H. (Distinguished Professor), Ph.D. Columbia
Schilling, E. E. (Liaison), Ph.D. Indiana
Schwarz, O. J., Ph.D. .......... North Carolina State
Weinle, P. L. (Benwood Distinguished Professor), Ph.D. Texas

Associate Professors:
Amundsen, C. C., Ph.D. .......... Colorado
Pigliucci, M., Ph.D. .......... Connecticut
Smith, D. K., Ph.D. ......... Tennessee
Wolford, B. E. (Curator), Ph.D. Tennessee

Assistant Professors:
Cranz, M., B.C., Ph.D. SUNY (Stony Brook)
Small, R., L., Ph.D. .......... Iowa State
von Anrind, A. G., Ph.D. East Anglia (UK)

Lecturer:
Mcfarland, K. D., Ph.D. Tennessee

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

Graduate service is required of each graduate degree candidate and such service will include teaching and/or ancillary services performed in the department related to the instruction of courses.

For further information, contact the Department Head or the Graduate Coordinator.

ADMISSION REQUIREMENTS

The Botany Department requires scores from the general portion of the Graduate Record Examination, at least three letters of recommendation or standard recommendation forms from academic or professional persons, a short statement describing reasons for interest in graduate education in botany, and the following academic requirements:

1. Bachelor's degree: a B.A. or B.S. from an accredited college or university and a cumulative grade-point average of 2.5 or better on a 4.0 scale, with evidence of ability to do work of graduate quality.
2. General botany or general biology: 8 semester hours.
3. Advanced botany or closely allied biological sciences: 12 semester hours.
4. Physical sciences: general inorganic chemistry: 8 semester hours; organic chemistry: 8 semester hours. Physics highly recommended.
5. College mathematics: 6 semester hours including 1 term of calculus.
6. Evidence of a broad undergraduate background, an ability to do work of graduate quality, and an interest in the study of plant science are considered to be much more important than the particular courses taken as an undergraduate. Accordingly, students lacking specific prerequisite courses but otherwise qualified may be admitted to graduate studies in botany. In such cases, the deficiencies should be removed as soon as possible, typically during the first year of the student's graduate program. The determination of deficiencies and the manner in which they will be removed will be decided upon by the student's pro-tem committee during the first meeting with the student.

THE MASTER'S PROGRAM

The program for the Master of Science is patterned to fit the needs of students who desire a less extensive course of study than the Ph.D. program. However, the applicant must be equally well prepared and display an aptitude and ability for advanced study. The M.S. includes thesis and non-thesis options.

Thesis Option
The thesis program is the usual route taken by botany students for the M.S. It is important that the entering student promptly identify a major professor and a suitable research project. The requirements for the thesis option consist of the following:
1. Satisfactory preparation of a written formulation and an oral defense to the student's committee of a research proposal suitable for a thesis. This must be completed before enrollment in Botany 503.
2. Successful completion of 30 hours of graduate credit, at least two-thirds of which must be at the 500 level or higher.
3. Satisfactory completion of two hours at the 600 level.
5. Presentation of a 30-minute departmental seminar.
6. Educational service in the form of teaching and/or ancillary services; consult major professor and department head.

Non-Thesis Option
1. Satisfactory completion of 34 semester hours of approved graduate courses of which 30 semester hours must be in botany including Botany 503. At least two-thirds of the hours must be at the 500 level or higher.
2. Satisfactory completion of two hours at the 600 level.
3. Educational service in the form of teaching and/or ancillary services; consult major professor and department head.
4. Satisfactory performance on a final written examination on all work offered for the degree. The student's committee may also require that an oral examination follow the written examination.

THE DOCTORAL PROGRAM

The Doctor of Philosophy program is patterned to provide training that involves extensive independent research within the student's area of concentration. Although there is no formal program of coursework, the student's committee may require specific courses for the completion of the degree. Most students spend from three to five years working on their Ph.D.

Requirements for successful completion of the Ph.D. are as follows:
1. Satisfactory presentation of a research problem by means of a written proposal and an oral defense to the student's committee. This must be completed before enrollment in Botany 600.
2. Satisfactory performance on a written comprehensive examination.
3. Presentation of one or more cognate areas outside of the department totaling 6 hours of graduate credit with at least a B average.
4. Satisfactory performance on an examination in one modern foreign language (see Graduate Coordinator) or an A or B in French 302 or German 332.
5. Satisfactory completion of 6 hours at the 600 level (excluding dissertation).
7. Presentation of a departmental seminar near the end of the doctoral program.

Note: The listed requirements for the M.S. and Ph.D. degrees should be interpreted as minimal requirements. Specific stipulations or requirements such as additional foreign languages or an additional oral comprehensive examination may be required by the student's faculty committee.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

GRADUATE COURSES

401 Field Studies in Botany (1-3) Field experience and taxonomy of special plant groups. Topics vary: bryology, lichenology, phytology, agrostology, mycology, physiology, aquatic vascular plants, synanthropes, woody plants, and botanical photography. May be repeated under different topics. Maximum 9 hrs.

403 Plant Evolution (3) Evolutionary biology from plant perspective. Speciation, hybridization, polymorphisms, and modifications of mating systems; historical evolution of animals, plants, and botanical diversity. Organization and function of the plant. (Same as Evolution and Environmental Biology 403.)

404 Plant Molecular Biology (4) Current research in plant molecular biology: techniques and procedures.
412 Plant Anatomy (4) Cells, tissues and organs; development in vegetative and reproductive structures of vascular plants—seed plants. Prereq: General Botany or Biodiversity. Organization and Function of the Cell or equivalent. 3 hrs. 1 lab.

431 Plant Ecology (4) Interactions between individuals, species, communities and their environment. Circulation of energy and matter in ecosystems. Weekly field trips or laboratory periods, and at least two weekend field trips. Prereq: Field Botany or equivalent. (Same as Ecology and Evolutionary Biology 431.) Sp

451 Plant Tissue Culture (3) Methods for culture of cells, tissues, and organs: media preparation and maintenance of cultures. Prereq: General Botany or Biodiversity. Organization and Function of the Cell or equivalent and General Chemistry or equivalent. Recommended prereq: Botany 412. Prereq: Field Botany or equivalent. May not be used toward degree requirements. May be repeated. 3 hrs. N/C only. E

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

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

503 Non-Thesis Research (2) Library, field, or laboratory research under supervision of staff member. Not for thesis candidates. May be repeated. Maximum 4 hrs. E

506 Phyiology (4) Comparative study of major aural phyla, both freshwater and marine: morphological, developmental, ecological, taxonomic and phylogenetic aspects. Field and laboratory studies, identification, classification, experimentation. Prereq: 310 or consent of instructor. 3 hrs and 1 lab. F/A

507 Biological Illustration (3) Principles and applications of photography (BW and Color) in macro- and plant illustration. Techniques of photography and video for recording and presentation for research and publication of data in pictorial and graphic form. F

510 Introduction to Electron Microscopy - Transmission Electron Microscopy (4) (Same as Biochemistry and Cellular and Molecular Biology 526.)

521-22 Advanced Plant Physiology I, II (3, 3) Plant biochemistry and metabolism: respiration, photosynthesis, carbon partitioning, and biosynthesis of specialized plant products: terpenoids, alkaloids, phytosterols and plant growth regulators. Growth and differentiation of plants at molecular, cellular and organic levels. Hormonal regulation of development, macromolecular interpretation of differentiation, dormancy, germination, flowering and senescence. Prereq: 410 and permission of instructor. Prereq: Introduction to Biochemistry or Biochemistry and Cellular and Molecular Biology 526. Prereq: 410 and permission of instructor. 3 hrs and 1 lab. F/A

530 Advanced Taxonomy of Flowering Plants (3) Evolution and classification of families of angiosperms, local flora. Prereq: 330 or equivalent. 2 hrs and 1 lab. F/A

531-32 Special Problems in Botany (1-4, 1-4) May be repeated. Maximum 12 hrs. N/C only.

544 Seminar in Botany (1) Readings and discussions of current literature and/or selected topics in botanical research. May be repeated. Maximum 8 hrs. N/C only.

555 Methods and Instrumentation in Field Investigation (1) Appropriate methods and instrumentation. Topics vary. May be repeated with consent of instructor. Maximum 5 hrs. N/C only.

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


635 Environmental Assessment and Sustainable Development in the Third World Countries (3) (Same as Ecology and Evolutionary Biology 635 and Planning 655.)

662 Seminar in the History of Botany (2) History of botanical exploration and advances from early civilization to modern periods. May be repeated. Maximum 4 hrs.

Broadcasting

(College of Communications)

MAJOR

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

Barbara A. Moore, Head

Professors:

Holt, Darrel W. (Emeritus), Ph.D. (Emphasis), Northwestern University.

Howard, Herbert H. (Emeritus), Ph.D. (Emphasis), Ohio State University.

Moore, Barbara A., Ph.D. (Emphasis), Ohio State University.

Swan, Norman R., Ph.D. (Emphasis), Missouri University.

Associate Professors:

Bates, Benjamin J., Ph.D. (Emphasis), Michigan State University.

Wilkinson, Jeffrey, Ph.D. (Emphasis), Georgia State University.

Assistant Professors:

Harmon, Mark, Ph.D. (Emphasis), Ohio State University.

Luther, Catherine, Ph.D. (Emphasis), Minnesota State University.

The Department of Broadcasting offers a concentration area for the master's with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

GRADUATE COURSES

440 Corporate Video (3) Special requirements of business, industrial, educational, and medical uses of video. Management, budgeting, planning, producing, and evaluating projects. Prereq: 450 or consent of instructor.


450 Broadcast News Operations (3) Production of news programs for broadcast on television stations. Electronic news gathering, editing and writing news packages and studio production. Prereq: 410 or consent of instructor.

470 Cable Television and Emerging Technologies (3) History and structure of cable television industry. Cable regulations and programming. Entry of telephone companies in distribution video. Analysis of all relevant technologies: direct broadcast satellite, cable television, new technologies, fiber optic cable, high definition television, and others. Prereq: Introduction to Radio and Television or consent of instructor.


550 International Broadcasting (3) Broadcasting systems in other countries. Analysis of international broadcasting organizations. Intercultural communication and international broadcasting; Development of communication and international broadcasting. Prereq: Consent of instructor.

560 Radio and Television Law and Regulations (3) Legal problems faced by broadcast managers. Philosophy of regulatory policy formation. Efforts at deregulation. Sociopolitical constraints, effects of laws and regulations, and public pressure on stations, networks, cable and new technologies. Unique situation of broadcasting among media in terms of regulations. Prereq: Consent of instructor or admission to program.

570 Radio and Television Research (3) Various techniques used by stations and consultants in broadcast research. Applied audience research. Deciding which method to use, interpreting results, and applying research to management decision making. Prereq: Communications 512 or 513, or consent of instructor.

580 Seminar in Radio and Television (3) Salient issues in broadcast. Topics vary. International broadcasting, corporate television, educational and public broadcasting, broadcasting and society. Prereq: Consent of instructor or admission to program. May be repeated. Maximum 6 hrs. (Same as Journalism 541) F

590 Advanced Radio and Television Management (3) Financial management of broadcasting operations, budgeting, financial planning, accounting, and related techniques. Theoretical perspectives in broadcast management, organization, and management of commercial and non-commercial operations from perspective of general manager. Prereq: 490. Sp

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

598 Internship (3) Full-time (30-40 hrs per week) work experience in news, production, or sales and management with non-university professional organization. Educational experience beyond that available at university. Final term paper. No retroactive credit for previous work experience. Prereq: Senior or graduate standing. Completion of at least 15 hrs of broadcasting courses, GPA 3.0 or better, and consent of department head.

Business Administration

(College of Business Administration)

MAJOR

Business Administration................................M.B.A., J.D.-M.B.A., M.S.-M.B.A., Ph.D.

The College of Business Administration offers two college-wide programs, the MBA and the Ph.D. with a major in Business Administration. Two tracks are available for the MBA: the regular, full-time program and the executive program.

The full-time MBA is for students seeking a full-time, weekday program that follows the traditional academic format. The nature of this program precludes students from simultaneously working full-time outside of school. In addition to the regular full-time program, there are two full-time dual-degree programs: the J.D.-M.B.A, the College of Law and the M.S.-M.B.A with the College of Engineering. Descriptions of these dual-degree programs follow the description of the regular, full-time program.

For students who wish to continue working full-time while they earn their MBA degree, there are four programs within the
executive track of the MBA. In these programs, students carry a full academic course load in addition to their full-time jobs. Each of these programs is designed to serve a different group of students. Descriptions of the MBA programs in the executive track follow the description of the dual-degree programs.

To obtain an MBA application, contact the MBA Program Office, 527 Stokely Management Center, College of Business Administration, The University of Tennessee, Knoxville, TN 37996-0552, Tel: (865) 974-5033, Email: mba@utk.edu. The application may also be downloaded from the website at http://mbe.bus.utk.edu. For the executive or professional program, contact the Executive MBA Program Office, 704 Stokely Management Center, College of Business Administration, The University of Tennessee, Knoxville, TN 37996-0575, Tel: (865) 974-1660.

THE MBA PROGRAM

The full-time MBA program is designed for students with undergraduate degrees in the social and natural sciences, the humanities, and professional fields such as engineering, business, agriculture, and architecture. The MBA program is a two-year program with students beginning in the fall of each year and graduating in the spring, two years hence. During the summer between the first and second year, students must complete an internship with a company using those skills acquired during the first year of the MBA program.

The MBA program consists of a common first-year core and a wide selection of second year concentration/elective courses. The first-year core develops a general management foundation upon which specialization is developed in the second year electives. The objective of the program is to develop leaders able to enhance the success of their organizations.

The program consists of two 15-credit-hour MBA core courses in the first year and 24 credit hours of concentration/elective courses in the second.

Admission Requirements

Applications are accepted for fall semester only. The application deadline for fall semester is March 1. Applications by U.S. citizens and permanent residents received after March 1 will be considered as space allows.

To be considered for admission, the applicant's file must be complete. A complete file includes the Graduate School Application, transcripts of prior college work, the MBA program application, two completed recommendation forms, and the Graduate Management Admission Test (GMAT) score report. The first items should reach The Graduate School one month before the MBA application deadline to allow for processing. Additional information is required by The Graduate School for international students.

For admission to the MBA program, consideration is given to (1) applicant's academic record with particular attention to the last two years of undergraduate work and previous graduate studies, (2) scores on the GMAT and the Test of English as a Foreign Language (TOEFL) for those whose native language is not English, (3) work experience and other activities that demonstrate potential for leadership, and (4) recommendations from professors and work supervisors. The admission decision is based on all factors which make up the total application; therefore, there is no automatic cut-off for either grade point averages or GMAT scores. However, admission preference will be given to applicants with full-time work experience after obtaining the undergraduate degree.

Prerequisites

There are no specific course prerequisites for admission. However, undergraduate courses and work experience should demonstrate ability with both qualitative and quantitative work. Those electing the management science or statistics concentration must have completed two years of college-level calculus.

MBA Core

The MBA core consists of two 15-hour courses, one taken each semester. The courses are taught by the MBA core faculty in an integrated fashion and through a year-long simulation required of students to learn the functional fundamentals (accounting, finance, management, marketing) when they need to apply them to solving a specific business problem. The topics introduced within this course follow three major themes: (1) the functional fundamentals (learned within a cross-functional framework); the role of the firm in society (with attention to stakeholder value, economics, and the ethical/global legal environment of the firm); and personal and team development. Students will be exposed to the assessment and delivery of customer value, statistical process control, continuous systems improvement, and the role of quality in competitive organizations.

Students in the first-year core undertake active learning within a team-based environment. Many core requirements are experiential exercises in which self discovery within a team setting is an important element of the learning process. Individualized support is provided for developing both written and oral communication skills.

Concentration and Electives

A concentration area may be indicated on the MBA Program Application. This declaration may be deferred until after matriculation. In any event, selection must be made after completion of the first year. Requests for changes in concentration area must be submitted for approval to the MBA Program Office.

Among the 24 credit hours in the concentration/electives block, at least 9 but not more than 12 must be in one of the following concentration areas. For specific courses required in concentration areas, see the appropriate field of instruction.

Economics
Environmental Management
Finance
Forest Industries Management
Global Business
Logistics and Transportation Management
Manufacturing Management
Marketing

New Venture Analysis and Entrepreneurship
Statistics

The remaining elective courses must be in fields outside the concentration area, normally selected from MBA courses offered in other departments of the college. Courses outside the College of Business Administration as well as courses listed in the Graduate Catalog numbered below 500 may be included in this block only with written prior permission via formal petition to the MBA Program Office.

Transfer Credits

Graduate level courses taken at other institutions accredited by the American Assembly of Collegiate Schools of Business that otherwise conform to University policy may be credited toward MBA degree requirements within the following limits:

Concentration Area: 3 hours (provided at least 6 hours of work at this institution are included in the concentration area).

Elective Area: 3 hours

Because of the fully integrated nature of the first-year curriculum, no credit hours are transferred into this core curriculum. The maximum number of hours that may be transferred to elective and concentration areas is 6 semester hours. Transfer credit will be considered upon formal petition to the Dean of the MBA Program.

Other Requirements

The Application for Admission to Candidacy must be approved by two faculty members and the department head in the student's area of concentration and the Associate Dean in the College of Business Administration. It should be submitted to the Graduate Office at least one full semester prior to the date the degree is conferred. (Admission to candidacy in the fall semester permits graduation in the following spring semester.)

To qualify for the degree, the student must achieve a B average (3.0) or above in MBA core courses required in their full-time program, a B average or higher in courses comprising the concentration area, and a B average or higher in the overall program. Each student must write a satisfactory analysis of a comprehensive case administered at the end of the first year.

BUSINESS ADMINISTRATION CONCENTRATIONS

For complete listing of MBA program requirements, see above.

MBA Concentrations: Global Business, New Venture Analysis and Entrepreneurship,

In recognition of the growing globalization of business activity and the importance of the international environment to successful management of every firm, the MBA program offers a concentration in global business. The concentration comprises at least two courses taken from Economics 424, Logistics 507, Management 571, and departmental special topics courses with international content; and at least one but not more than two additional courses from the previous list, or from a list of electives as approved by the Dean of the MBA Program. Students pursuing a concentration in global business are
strongly encouraged to pursue it as a second concentration in addition to one of the traditional departmental concentrations. Students pursuing this concentration are also strongly encouraged to pursue an international or internationally related internship for the summer between their first and second years in the MBA program. Students are expected to participate in a foreign exchange or field experience if at all possible, especially for those with no previous foreign experience. Language training is advised but not required, and beginning language courses are not typically available for graduate credit.

The concentration in new venture analysis and entrepreneurship is comprised of three specifically designed courses which are interdisciplinary in nature. This concentration strives to build a strong academic foundation for both entrepreneurial and intrapreneurial activities. The new venture analysis and entrepreneurship concentration courses may be combined with two elective courses in another area (management or marketing) to achieve a dual concentration.

Minimum course requirements are Finance 551, Management 551, and Marketing 550. These course descriptions are listed under their fields of instruction.

THE EXECUTIVE MBA PROGRAM

Each of the four programs of the executive track is designed to serve the needs of a different student group. The programs share a common course structure of 36 credit hours of classroom learning (BA 551, 552, 553) and 9 credit hours of project work within the student's business organization (BA 561, 562 and 563). Students carry a full, 15-credit-hour load each semester. In each program, all participants begin and complete the program together. The courses are functionally integrated, and the broad curriculum objectives are similar in each of the executive track programs. All are oriented toward applied learning and are highly interactive, making extensive use of experiential learning techniques. Emphasis and depth of subject material within the curriculum varies somewhat from program to program depending on the intended student group. All programs in the executive track result in the same Master of Business Administration degree as the full-time MBA.

Applications: Primary consideration is given to the applicant's professional achievements and recommendations from the applicant's organization. Applicants must meet the minimum requirements of The Graduate School and submit transcripts of all undergraduate and graduate work. Applicants must graduate Management Admission Test (GMAT) (some exceptions are noted within the specific program descriptions). No specific cut-off score exists for either grade-point averages or GMAT scores; however, admission is competitive, and applicants will be evaluated on their ability to operate on a par with other high achieving participants. Students whose native language is not English must take the Test of English as a Foreign Language (TOEFL) unless they are U.S. citizens or have a degree from an accredited U.S. college or university. A minimum TOEFL score of 213 on the computer-based test is required for admission to The Graduate School.

Prerequisites: Although the program requires no specific course prerequisites for admission, undergraduate studies and professional experience should demonstrate ability with both qualitative and quantitative work.

Transfer Credits: Because of the nature of the executive track curriculum, no credit hours may be transferred as substitutes for program curriculum.

Other Requirements: Other requirements are the same as those for the full-time MBA program.

Professional MBA Program

The professional MBA is provided for fully-employed managers within commuting distance of the University of Tennessee. The group of students for whom this program is designed has at least five years of work experience. The emphasis in this program is to provide a good grounding in the quantitative and qualitative tools of various business functions and a good basis in strategic thinking. Learning is expanded through applying these tools within the student's own organization through a structured project each semester. Each student project works with a team of faculty advisors. The Professional MBA is the right choice for individuals who wish to enhance their position within their organization by broadening their business knowledge beyond the functional area in which they are currently employed.

The professional program is three consecutive semesters completed in 16 months. Classes meet all day on Saturdays and occasionally on Friday evening and/or Sunday afternoon. The program begins in August with an intensive week of classes, then continues with weekend classes. The final fall semester also includes an intensive week of courses in addition to weekend classes. Graduation is in December.

Applications are accepted for fall semester only. The application deadline is April 15.

Executive MBA Program

The executive MBA is provided for a national audience of managers holding middle and upper level positions in organizations that support their attainment of an MBA degree. The students for whom this program is designed have at least 10 years of work experience and are currently in management positions. Typical students bring a greater knowledge of business fundamentals than is true of other MBA programs. The executive MBA places considerable emphasis on global business and on individual skills of leadership. The executive MBA also has a heavy emphasis on strategic thinking and leadership management concepts. The executive MBA is the right choice for individuals who are in positions of broad responsibility or who have been designated to fulfill such roles within their organizations.

The executive MBA is three consecutive semesters completed in 12 months. The class meets in Knoxville for 8- day residence periods in January, April, August and December. The alternate residence periods, synchronous computer classes are held each Saturday morning, and there are asynchronous internet learning sessions each week.

Applications are accepted for January entry only. The early application deadline is January 15, and the final application deadline is March 15. Applicants to the executive MBA are not required to take the GMAT test.

Taiwan Executive MBA

The Taiwan executive MBA is provided for managers in Taiwan and East Asia holding middle and upper-level management positions. Classroom work and reading materials are in the English language. The students for whom this program is designed have a minimum of 10 years of work experience and are currently in management positions. The emphasis in the Taiwan executive MBA is to provide a good grounding in the fundamentals of various business functions and the process of strategic thinking. Learning is expanded through applying these tools within the student's own organization through structured projects each semester. The Taiwan executive MBA is the right choice for individuals in positions of broad responsibility who wish to have a...
knowledge of Western business practices and to improve their ability to think and carry out business activities in English.

The Taiwan executive MBA is a three-year program completed in 19 months. Teams of UT faculty travel to Taipei for five 3-day residence periods beginning in May of the first year. The sixth and final residence period is two weeks in length and is held in Knoxville. Between residence periods, students meet in regularly scheduled study classes to discuss project work and readings assigned for the next residence period. Some project work in the Taiwan executive MBA is tied to the subject matter of each residence period.

Applications are accepted for May entry only. Taiwan executive MBA applicants are not required to take the GMAT. The application deadline is April 1. Students accepted into the program will receive materials for studying the May start date.

An applicant who has not taken the Test of English as a Foreign Language (TOEFL) within the previous two months must take and pass it with a score of 710 or higher on the computer-based test. The test may be taken after enrollment in the program but must be successfully completed prior to the final residence period in Knoxville. To allow for registration, delivery of scores and receipt of the I-20 visa, participants should arrange to take the TOEFL at least 5 months before the Knoxville residence period.

**PRE-MBA PROGRAM**

The College offers a joint BA/MBA program with the College of Arts and Sciences. Students in this program take their first three years of coursework in Arts and Sciences, and their last two years in the College of Business Administration. Within their first three years, students fulfill all general education requirements for the BA degree, both upper and lower division along with a minor offered by one of the Arts and Sciences departments. They may use one Economics course only to fulfill distribution requirements, and they are required to take a year of calculus as the only prerequisite to the MBA.

Admission requirements are higher than those normally expected of MBA applicants. Desired qualifications include a minimum 3.4 GPA and a GMAT score of 600 or higher.

Students interested in the program are counseled initially in the Arts and Sciences Advising Center regarding admission standards and Arts and Sciences requirements. At the end of their second year, they have a conference with the Dean of the MBA Program and are advised of their prospects for formal admission. Students who are likely candidates are advised to take the Graduate Management Admission Test in October of the third year, and to submit an application to the MBA program. The admission decision is made by January of the third year.

Upon admission, students begin MBA coursework in the fourth year and are awarded a BA degree at the end of that year. Upon successful completion of the fifth year (minimum of 30 semester hours of graduate credit), the student receives the MBA degree.

**DUAL J.D.-MBA PROGRAM**

The College of Business Administration and the College of Law offer a coordinated dual program leading to the conferral of both the Doctor of Jurisprudence and the Master of Business Administration. The dual program saves the student approximately one semester over the time that would be required to earn both degrees independently.

The establishment of the dual program recognizes the increasingly complex body of knowledge necessary to the creative and conduct of business and business-related law practice, the complementary nature of many aspects of the graduate programs of the College of Law and the College of Business Administration, and the intellectual benefits inherent in the concurrent study of both business and business-related law. The program is designed to accommodate the interests of students who (a) contemplate a career in public service and want to acquire the skills and perspective of the lawyer and business-oriented manager, (b) contemplate a career in business management and want to acquire the skills and perspective of a lawyer, or (c) contemplate a career as a lawyer specializing in business-related law and want to acquire the skills and perspectives of the business-oriented manager.

**Admission Requirements**

Applicants for the J.D.-MBA program must make separate application to, and be competitively and independently accepted by, the College of Law for the J.D., The Graduate School and College of Business Administration for the MBA degree, and the Dual Program Committee.

Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both colleges. Such approval will be granted, provided that dual program studies be started prior to entry into the last 28 semester hours of J.D. coursework and prior to entry into the second year of the MBA program. Students interested in entering the dual degree program should submit a letter of application to the Dual Program Committee.

Upon receipt of the application, the Dual Program Committee will determine eligibility and assign students to advisors who will be responsible for course approval and supervision of the student's progress through the dual program.

**Curriculum**

A dual program candidate must satisfy the graduation requirements of each college. Students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual program.

The College of Law will award up to 9 semester hours of credit toward the J.D. for acceptable performance in approved graduate-level courses offered by the College of Business Administration. The College of Business Administration will award up to 9 semester hours of credit toward the MBA for acceptable performance in approved courses offered in the College of Law. The approval of courses is the responsibility of the Dual Program Committee and the student's assigned advisor.

Students may begin their studies in either the J.D. or the MBA program. Students may not enroll in MBA coursework while completing the first year of the law curriculum and may not enroll in J.D. coursework while completing the first year of the business curriculum. During the first year of the J.D. program, students register through the College of Law. For any term in which students take MBA courses, even though they are also taking law courses, they must register through The Graduate School. The Graduate School registration form must be approved by the Dean of the MBA Program.

**Awarding of Grades**

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

**Approved Dual Credit**

MBA courses to be counted toward the J.D. program must include 9 semester hours approved by the College of Law. Law courses to be counted toward the MBA must be selected from those approved by the Dean of the MBA Program.

**DUAL M.S.-MBA PROGRAM**

The College of Business Administration and the College of Engineering offer a coordinated program leading to the conferral of the Master of Business Administration degree (concentration in manufacturing management) and the Master of Science degree with a major in Industrial Engineering (concentration in manufacturing systems engineering). The dual program leaves the student one or two semesters over the time that would be required to earn both degrees independently.

The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate this increasingly complex body of knowledge in achieving the efficient operation of manufacturing and production firms. The program is designed to accommodate the interests of student who desire a career leading to a leadership position in a manufacturing organization.
Admission Requirements
Applications are accepted for fall semester only. Applicants for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, The Graduate School for the Master of Business Administration degree program and the Master of Science degree program with a major in Industrial Engineering, and by the Dual Program Committee. Students will initially apply for the MBA program, indicating on that application the intent to pursue the dual M.S.-MBA program in manufacturing systems engineering (refer to the MBA program for separate instructions). During the second semester of the first year, students will revise through The Graduate School to the M.S. program with a major in Industrial Engineering beginning Fall semester of the second academic year. Students accepted for both degree programs will be assigned by the Dual Program Committee advisors who will be responsible for course approval and supervision of the student’s progress through the dual program. Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required, and different application dates are established by The Graduate School for international students.

Curriculum
The curriculum in the first academic year of the dual M.S.-MBA program is the two-semester core of the MBA program (two 15-hour courses, one each semester). In addition to the MBA core, three credit hours of a survey course in manufacturing systems engineering (IE 503) will also be taken during the first year (1 hour Fall semester and 2 hours Spring semester). A summer internship in industry will be accomplished between the two academic years.

During the second year, 27 hours of coursework will be completed in the manufacturing systems engineering concentration in Industrial Engineering plus an additional 9 hours of graduate courses in the College of Business Administration acceptable in meeting the requirements of the MBA program. Fifteen hours will be taken during each of the first two semesters of the second academic year. A culminating 6-hour integrated case study requiring use of most previous material, and a final examination as required by the Dual Program Committee, will be taken during the first session of summer term of the second year.

The dual degree candidate must satisfy the curriculum and graduation requirements of the Department of Industrial Engineering and the College of Business Administration. Dual degree students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation in either degree program for courses in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The M.S. and the MBA degrees will be awarded upon successful completion of the requirements of the dual program.

Approved Dual Credit
A maximum of 6 semester hours of approved graduate-level courses completed in the College of Business Administration may be counted toward the M.S. degree program with a major in Industrial Engineering. A maximum of 15 semester hours of approved graduate-level courses completed in the Department of Industrial Engineering may be counted toward the MBA degree program. The approval of courses is the responsibility of the Dual Program Committee and the student’s assigned advisor.

The Doctoral Program
The primary objective of the Ph.D. in Business Administration is to prepare a select number of qualified students for careers in university-level teaching and research and for responsible positions in business and government.

Admission Requirements
Students seeking a Ph.D. degree must be recommended to the College of Business Administration to The Graduate School. Actual admission is based on the applicant’s overall standing compared with other applicants and with the number of vacancies in each department. The Graduate School requires the College of Business Administration not later than March 1. Late applications are considered only if space is available.

Under exceptional circumstances, a student may be considered for acceptance into the Ph.D. program without having a master’s degree. An applicant in this situation should have an outstanding undergraduate background and should represent a deep and sincere commitment to the pursuit of a career in research and instruction.

Program of Study
The Ph.D. normally requires four years of intensive study and research beyond the master’s degree. Typically, the first two years of a student’s program consist of coursework, writing, and research. The third and fourth years require completion of courses, the comprehensive exam, and completion of the dissertation. It is emphasized that the Ph.D. program of study is structured for full-time students only. Upon acceptance of a student by a particular departmental faculty, the student is expected to remain in residence until the dissertation has been completed and all requirements are met for completion of the Ph.D.

Since the program focuses on the development of competent scholars, heavy emphasis is placed on both teaching and research skills. As such, the doctoral program, each student is required to serve as a teaching assistant in an undergraduate business class or as a research assistant to a senior faculty member. Students with strong teaching skills may be assigned their own classes. Typically, the College of Business Administration offers financial support for doctoral students during their tenure in the program.

The Ph.D. program is highly flexible, offering a wide array of concentrations and cognates. Moreover, heavy emphasis is placed on individualized instruction and close student-faculty interaction. Instruction takes the form of regular classes, doctoral seminars, and independent study and research. Students are encouraged to attend lectures and discussions by visiting scholars throughout the year.

There are six concentrations offered in the Ph.D. program:
- Accounting
- Finance
- Logistics and Transportation
- Management (Operations Management and Strategic Management)
- Marketing
- Statistics

More detailed information concerning these specific areas is available by writing directly to each department or by accessing the College of Business Administration web page.

Degree Requirements
Doctoral students must file a program of study that has been approved by their doctoral committee within one year of completing their first year of doctoral studies. This committee is nominated by the department chairperson in a student’s intended area of concentration, subject to the Graduate Council’s policies and procedures. Following are specific degree requirements:

1. Students must complete at least three years of full-time coursework beyond the baccalaureate degree, with two years of residence on the Knoxville campus.

2. Students are required to have a sound and broad base on which to build their Ph.D. coursework. The departmental doctoral advisor will work with the student to determine what, if any, courses need to be completed. All such work is subject to approval by the temporary doctoral advisory committee and the Dean of the MBA Program. Specific concentrations may have prerequisites.

3. Research Tools: A minimum of 9 semester hours of graduate research methods must be completed. At least 6 semester hours in statistics courses beyond Statistics 531 are required. The remaining 3 semester hours may be completed in additional statistics courses (not to include Statistics 531) or in other areas such as research methodology, management science, computer science, econometrics, and psychometrics.

4. Concentrations: The concentration is the focal point of the Ph.D. program. Students are expected to master the literature and research techniques in the concentration area and to do quality research as evidenced by the preparation of an acceptable dissertation. A minimum of 12 semester hours of coursework is required, including at least 9 hours of doctoral seminars. Graduate work taken in the concentration area at other institutions is considered by the temporary doctoral advisory committee in approving the specific coursework required. Available concentrations are: accounting, finance, logistics/transportation, management (operations management and strategic
management), marketing, and statistics. See the appropriate fields of instruction for specific course requirements.

5. A minimum of 9 semester hours of graduate coursework is required in an area outside, but complementary to, the concentration. The student may choose the cognate from one of the following: one of the six concentration business areas listed above, economics, or a related area in another school or college of the University.

Comprehensive Examinations

Comprehensive written examinations over the concentration area are required of each person seeking candidacy for the Ph.D. degree. This examination is administered in two sessions of approximately four hours each. Students qualify in the cognate area by completing a one-session, four-hour examination or an equivalent jointly approved by the student’s major professor and the student’s advisor in the cognate area. Comprehensive examinations are generally offered during the fall and spring terms. Comprehensive examinations must be taken within five years of matriculation.

When either the concentration or cognate area examination is passed, the remaining examination must be passed within the next 13 months.

Doctoral Committee

A doctoral student is advised to give serious attention early in the program to the composition of his/her doctoral committee. In accordance with Graduate School policy, the student and the major professor identify a doctoral committee composed of at least four faculty members, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. When the doctoral committee has been formed, the temporary doctoral advisory committee ceases to exist.

Admission to Candidacy

Students may apply for admission to candidacy for the Ph.D. after maintaining at least a B average in coursework, successful completion of comprehensive examinations, and acceptance of a research proposal for the dissertation by the student’s doctoral committee. Admission to candidacy must be approved at least one full semester prior to the date the degree is conferred. (Admission in the fall permits graduation in the following spring semester.)

Application for admission to candidacy must include a listing of all courses taken in each of the fields required for the degree (business functional areas, basic disciplines, concentration and cognate area). Graduate courses accepted from other institutions must be included. Under “Other Requirements,” the date of acceptance of the research proposal by the doctoral committee should be indicated. The application must be approved by the student’s doctoral committee and the Associate Dean before submission to The Graduate School.

Dissertation

Minimum of 24 semester hours: The student must complete a dissertation embodying the results of original research demonstrating the ability to do scholarly writing. The dissertation is supervised by the candidate’s doctoral committee, which must certify its completion and acceptability after oral defense of the candidate’s research effort.

The dissertation normally must be completed within three years of the student’s advancement to candidacy.

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 basis. The Ph.D. in Business Administration is available to residents of Alabama, Florida, Kentucky, or West Virginia; the MBA is available to residents of Alabama, Florida, Kentucky, Louisiana, Texas, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

ACADEMIC STANDARDS

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

GRADUATE COURSES

502-03 Business Core for Master of Accountancy I, II, III (9) Development of role and responsibility of accountant as business advisor. Assessment and delivery of customer value, continuous system improvement, statistical process control, human resource management, role of quality in competitive organizations, performance measurement, financing, and overall corporate strategy. Prereq: Admission to M.Acc. program.

504 Core I (15) Development of roles and responsibilities of business manager. Functional fundamentals (accounting, finance, marketing, operations, human resource management) and year-long case in which knowledge is applied to simulation of real-world enterprise. Continuous systems improvement and delivery of customer value; role of firm in society (with attention to stakeholders, environment, ethical and legal issues). Coreq: 505.

505 Core II (15) Continuation of 504. Functional fundamentals through year-long case. Case-study work on organizational reality, global competition, management technology, ethics and social responsibility, and strategic planning. Capstone integrated business simulation. Prereq: 504 or consent of Dean of the MBA Program.

506 Information Infrastructure Strategy and Design (3) Information strategy involving structured and unstructured systems, using Internet and Internet networks. Design of structured systems using CASE tools and unstructured system using groupware which is Internet accessible with access control.

510 Customer Responsive Management (3) Management methods that provide flexibility required to respond to diverse customer needs and to adapt to competitive, technological, and operational change. Customer communication, relationship marketing, capacity management, and relationship management for industries: health care, consulting, temporary services, professional services, repair services, truckload transportation, emergency response organiztions, customer service centers and other responsive organizations.

551 Executive Core I (12) Integrated course with substantial reading, study and analyses of off-site period. Development of business functions through strategic and business process perspective. Application of functional knowledge to strategic and strategic issues. Development of business functions through strategic and business process


561 Management Project I (3) Company project: Preliminary investigation of significant strategic issue, (new initiative, program or significant organizational change to enhance organizational effectiveness) in sponsoring organization. Work within firm under guidance of faculty member to develop proposal which defines issue and scope of project. Proposal to be approved by company and faculty. Prereq: Admission to executive program of MBA and cooperation of sponsoring organization. Coreq: 551.


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

599 Executive-In-Residence (3) Interaction with corporate executives from wide spectrum of business disciplines and discussion of domestic and international strategic planning as applied in major corporations. Prereq: MBA core and consent of instructor.

Chemical Engineering

(Graduate Program of the College of Engineering)

Associate Professors: Brune, Duane D., Ph.D. .................. Houston Wang, Tse-Wei, Ph.D. .................. MIT Weber, Frederick E., Ph.D. .................. Minnesota

Assistant Professors: Frymier, Paul D. (Liaison), Ph.D. .................. Virginia Keffer, David J., Ph.D. .................. Minnesota

Graduate programs lead to the degrees of Master of Science and Doctor of Philosophy in Chemical Engineering with concentrations in chemical engineering, chemical biotechnology, advanced control systems, and polymer science and engineering.

THE MASTER'S PROGRAM

Thesis Option: The standard master's program includes a thesis and leads to the Master of Science. Minimum departmental requirements are as follows:

1. A total of at least 21 hours in graduate coursework in chemical engineering and related areas excluding thesis. The minimum requirements are 15 hours in chemical engineering; 3 hours in other engineering, scientific, or business areas (as approved by the departmental faculty); and 3 hours chosen from either of these two categories.
3. Active participation in graduate seminars conducted by the department. Resident students must register for ChE 501 every semester it is offered.
4. A final oral examination covering the thesis, related fields and graduate coursework.

Non-Thesis Option: Under certain conditions, a candidate may apply for a non-thesis program. To be eligible, a candidate must show evidence of significant professional experience after the bachelor's degree; at least five years of industrial experience or research publications would be examples of such evidence. The departmental faculty will consider each application individually. Upon a candidate's acceptance, the requirements for completion of the non-thesis option are as follows:

1. A total of at least 33 hours in graduate courses in chemical engineering and related areas. The minimum requirements are 18 hours in chemical engineering; 6 hours in other engineering, scientific, or business areas (as approved by the departmental faculty); and 9 hours chosen from either of these two categories.
2. Completion of a critical review of the literature and other sources in an area related to chemical engineering (ChE 580).
3. A written comprehensive examination covering the major field and an oral examination covering the review paper and related areas.

THE DOCTORAL PROGRAM

Students applying for entrance into the doctoral program must submit evidence of ability to perform and report independent research to the satisfaction of the department. The master's thesis may be offered as such evidence.

Department requirements consist of the satisfactory completion of:

1. Graduate courses in chemical engineering, amounting to approximately 24 semester hours, at least 9 of which must be in 600 series courses.
2. Supporting courses in related scientific and engineering fields amounting to approximately 24 semester hours, subject to approval by the student's faculty committee.
3. The comprehensive examination, consisting of a written and an oral part.
4. Active participation in graduate seminars conducted by the department.

Graduate residents must register for ChE 501 every semester offered.

GRADUATE COURSES

403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical process design; unconstrained and equality constrained optimizations, linear programming, dynamic programming, and geometric programming. Prereq: Mathematics 241.

415 Computer Applications in Chemical Engineering (3) Computer solution of chemical engineering problems. Application of existing personal computer programs to chemical engineering applications. Use of statistics, spreadsheets, graphics and process modeling languages. Prereq: Consent of instructor.


467 Honors: Engineering Internship in Process Control (4) Selected students work in small groups on industrial problems in process dynamics and control. Directed by faculty and engineer from host company. Prereq: Process Dynamics and Control and consent of instructor.

477 Honors: Applied Process Automation Laboratory (3) Interfacing flexible batch continuous processes to automation systems. Top down analysis with bottom up implementation, hierarchical structures and object oriented concepts used to design automation solutions: human-machine-interfaces. Workstations with modern industrial equipment, interactive graphics and virtual instrumentation. Prereq: Consent of instructor.


485 Hydrocarbon Processing (3) Chemical and physical properties of selected petroleum and natural gas processes utilized in conversion of raw material into various fuels and selected chemical feedstocks. Prereq: Thermodynamics and Separation Processes, Organic Chemistry.

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

501 Graduate Seminar (1) Prereq: Admission to graduate program. May be repeated. S/NP only. F, Sp

502 Registration for Use of Facilities (3-15) Prereq: Admission to graduate program. May be repeated. S/NP only. E

505 Engineering Analysis (3) Solution and formulation of problems in chemical engineering and materials areas, ordinary and partial differential equations; types of ODE, PDE and solution techniques; transform methods; conformal mapping; variational methods; introduction to numerical methods. (Same as Materials Science and Engineering 505.)

507 Application of Linear Algebra in Engineering Systems (3) Fundamental concepts of linear algebra to problems in engineering systems; steady state and dynamic systems; Geometric and physical interpretations of relevant concepts: least square problems, LU, QR, and SVD decompositions of system matrix, eigenvalues and eigenvectors. Solving difference and differential equations; numerical stability aspects of various algorithms; application of linear algebra concepts to control and optimization studies; introduction to linear programming and computer projects. Prereq: Graduate standing or consent of instructor. (Same as Electrical Engineering 507 and Mechanical Engineering 507.)

531 Advanced Chemical Engineering Thermodynamics (3) Phase equilibrium in ideal and nonideal solution; composition relationship between phases, solution behavior and application to macromolecules; introduction to microscopic approach to thermodynamics. F


541 Fluid Mechanics and Polymer Processing (3) (Same as Materials Science and Engineering 541.)

542 Diffusive and Stagewise Mass Transfer Operations (3) Analysis of mass transfer phenomena, coupled mass transfer and reaction, mass transfer operations in packed towers and agitated vessels, membrane separations. Engineering concepts applied to mass transfer operation, emphasizing nonisothermal and multiphase systems.

547 Introduction to Transport Phenomena (3) Unified treatment of mass, momentum, and heat transfer. Differential and macroscopic balances in deriving governing equations. Analogies between processes. Use of dimensionless approach in scaling systems up or down. Applications involving transfer, and simultaneous chemical reactions. F

551 Chemical Reactor Analysis (3) Rate models for heterogeneous reactions, properties of porous catalysts, resin deactivation, fluid-fluid and fluid-solid reactor analysis.

561 Process Modeling and Simulation (3) Thetheries and structures of models and concepts of simulation. Model development from basic principles. Model development from plant test. Use of models in operation, optimization and control. Prereq: Consent of instructor.

575 Applied Microbiology and Bioengineering (3) Course covers basic concepts of microbiology, chemical, biochemical, and environmental engineering. Fundamental laboratory techniques, biogeochemical processes and wastewater treatment, analysis of bioreactor systems, biosensors, and immobilization methods. Prerequisites: Fundamental laboratory techniques, biogeochemical processes and wastewater treatment, analysis of bioreactor systems, biosensors, and immobilization methods. (Same as Environmental Engineering 575, Biosystems Engineering 575 and Microbiology 575.)

580 Technical Review and Assessment (3) Preparation of critical review of literature in area related to
Chemical engineering. Limited to candidates in nonthesis option. Prereq: Consent of advisor.

581 Industrial Pollution Prevention (3) Principles and practical aspects of industrial waste minimization. Regulatory environment, waste minimization strategies, economic analysis, process safety, case study, analysis of alternative waste minimization and management technologies. Prereq: Graduate standing in engineering or consent of instructor. (Same as Environmental Engineering 581 and Engineering Science 585.)

585 Process System Reliability and Safety (3) (Same as Nuclear Engineering 585.)

590 Special Topics in Chemical Engineering (3) May be repeated. Maximum 6 hrs.

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

581 Advanced Topics in Statistical Thermodynamics and Molecular Dynamics (3) Statistical thermodynamics, molecular-based computer simulations, Monte Carlo and molecular dynamics calculations; applications to supercritical fluids, macromolecules and biological systems. Prereq: 582.


642 Advanced Topics in Polymer Processing (3) (Same as Materials Science and Engineering 642.)

647 Advanced Transport Phenomena (3) Theory of mass, momentum, and energy transport in reactive and non-reactive systems. Formulation of transport models useful for application to analysis and design of separation processes, and chemical and biochemical reactors. Prereq: 505, 547.


661 Advanced Topics in Process Dynamics and Control (3) May be repeated. Maximum 6 hrs.

675 Microbial Systems Analysis (3) Identification and analysis of complex microbial systems using perturbation-response methods. Structuring of important mechanistic processes, interactions, and regulation at several scales: species composition; environmental factors; cellular physiological and molecular. Experimental methods for data analysis, signal resolution, and processing, biological signal analysis, model development (deterministic, stochastic, phenomenological) and utility and limitations of approach. Prereq: 575 or consent of instructor.

691 Advanced Topics in Chemical Engineering (3) May be repeated. Maximum 6 hrs.

Chemistry

(College of Arts and Sciences)

MAJOR DEGREES

Chemistry ........................................ M.S., Ph.D.

Michael Sepaniak, Head

Professors:

Adcock, J. L., Ph.D. ................. Texas A & M University
Alexandrotos, S. D. (Hoechst-Celanese) Prof. of Polymer Science), Ph.D. California
Baker, D. C. (Paul and Wilma Ziegler Prof.), Ph.D. ................. Ohio State
Bartness, J. E., Ph.D. ............... Northwestern
Bloor, J. E. (Emeritus), Ph.D. ........ Manchester
Bull, W. E. (Emeritus), Ph.D. ........ Illinois
Chambers, J. Q., Ph.D. ............... Kansas
Compion, R. N., Ph.D. ............... Tennessee
Cook, K. D., Ph.D. ................. Wisconsin
Dean, J. A. (Emeritus), Ph.D. ........ Michigan
Eastham, J. F. (Emeritus), Ph.D. ........ California
Feigl, C. S., Ph.D. .............. Colorado

Fletcher, W. H. (Emeritus), Ph.D. ........... Minnesota
Grimm, F. A. (Emeritus), Ph.D. ........ Cornell
Guichon, G. (Distinguished Scientist), Ph.D. ........... Ecolab Polytechnic and Paris VI
Kabalga, G. W. (Robert H. Cole Prof., Distinguished Prof.), Ph.D. ........ Purdue
Kleinfehler, D. C. (Emeritus), Ph.D. ........ Princeton
Kok, J. D., Ph.D. ............... Pennsylvania
Lietzke, M. H. (Emeritus), Ph.D. ........ Wisconsin
Magid, L. J., Ph.D. ............... Illinois
Magid, R. M., Ph.D. ............... Wisconsin
Pagni, R. M., Ph.D. ............... Wisconsin
Peaterson, J. R. (Emeritus), Ph.D. ........ California
Schweitzer, G. K. (Distinguished Prof.), Ph.D. ........ Illinois
Sepaniak, M. J., Ph.D. ........ Iowa State
Van Hoolck, W. A. (Paul and Wilma Ziegler Prof.), Ph.D. ........ Johns Hopkins
Wehrly, E. L. (Emeritus), Ph.D. ........ Purdue
Williams, T. F. (Distinguished Prof.), Ph.D. ........ London
Woods, C. III, Ph.D. .............. NC State
Wunderlich, B. (Distinguished Scientist), Ph.D. ........ Northwestern

Associate Professors:

Barnes, C. E., Ph.D. ............... Stanford
Schell, F. M., Ph.D. ............... Indiana
Xue, Z. B., Ph.D. ............... California

Assistant Professor:

Dadmun, M. D., Ph.D. ........ Massachusetts
Gilman, S. C., Ph.D. ............... Penn State
Hinde, Robert J., Ph.D. ........... Chicago
Tumer, J. P., Ph.D. ............... Oxford
Young, D. G., Ph.D. ............... Ohio State

Students majoring in Chemistry for the master's or doctoral degree are required to present as a prerequisite one year each of general, analytical, organic, and physical chemistry with a satisfactory record. At least one and a half years of inorganic chemistry is also recommended. Students lacking any of these prerequisites may be admitted with appropriate deficiencies that must be removed without graduate credit. Applicants are required to take the general Graduate Record Examination. Students minoring in Chemistry are required to present as a prerequisite two years of chemistry including quantitative analysis.

THE MASTER'S PROGRAM

The department offers concentrations in six areas for the M.S.: analytical chemistry, environmental chemistry, inorganic chemistry, organic chemistry, polymer chemistry, and physical chemistry. Prereq: 230 Inorganic Chemistry. Sp


471-81 Biophysical Chemistry (3,3) (Same as Biochemistry and Cellular and Molecular Biology 471-81.)

473-83 Physical Chemistry (3,3) Students may not receive credit for both 473 and 474 for both 481 and 483. 473-83 Properties of gases; first, second, and third laws of thermodynamics; chemical equilibria; simple phase diagrams; solutions; introduction to statistical thermodynamics. 483-83 Kinetics of chemical reaction; introduction to quantum mechanics and applications to elementary electronic structure of atoms and molecules; molecular spectroscopy. Prereq: General Chemistry; Elements of Physics or Fundamentals of Physics; Electricity and Magnetism, and Calculus III. F, Sp

479-89 Physical Chemistry Laboratory (2,2) Experiments on topics discussed in 471-81 or 473-83.

GRADUATE COURSES

430 Advanced Inorganic Chemistry (3) Atomic and molecular structure, bonding theories, descriptive chemistry of elements, kinetics and mechanism of inorganic reactions, applications of modern techniques for characterization, coordination and organometallic chemistry. Prereq: 230 Inorganic Chemistry. Sp


471-81 Biophysical Chemistry (3,3) (Same as Biochemistry and Cellular and Molecular Biology 471-81.)

473-83 Physical Chemistry (3,3) Students may not receive credit for both 473 and 474 for both 481 and 483. 473-83 Properties of gases; first, second, and third laws of thermodynamics; chemical equilibria; simple phase diagrams; solutions; introduction to statistical thermodynamics. 483-83 Kinetics of chemical reaction; introduction to quantum mechanics and applications to elementary electronic structure of atoms and molecules; molecular spectroscopy. Prereq: General Chemistry; Elements of Physics or Fundamentals of Physics; Electricity and Magnetism, and Calculus III. F, Sp

479-89 Physical Chemistry Laboratory (2,2) Experiments on topics discussed in 471-81 or 473-83.
544 Advanced Physical Chemistry (3) Chemical dynamics, statistical thermodynamics, quantum mechanics of atoms and molecules, and solid state physics. Prerequisites: 484 or equivalent. 6 E, 488-Sp

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

501 Chemistry Seminar (1) Lectures and discussions on current research. May be repeated. Continuous registration required for graduate students. S/NC only. F, Sp

502 Registration for Use of Facilities (3-15) Required for student use of University facilities for the quarter except when student uses University facilities in the same semester for course work experience. May be repeated. S/NC only. Sp

505 Special Problems (3) Special assignment theoretical or experimental work on problems not covered in other courses. Prerequisites: Consent of department. May be repeated. Maximum 6 hrs. S/NC only.

510 Analytical Spectrometry (3) Principles and practice of optical and mass spectrometric techniques in quantitative chemical analysis. Required background: Two semesters of physical chemistry.

511 Analytical Separations (3) Principles and practice of chemical separations based on extraction, chromatographic, and electrophoretic phenomena. Required background: Two semesters of physical chemistry.

512 Electroanalytical Chemistry (3) Fundamentals of electrochemical processes; principles and practice of electroanalytical techniques in quantitative chemical analysis and application to structure of chemical systems. Required background: Two semesters of physical chemistry.

520 Chemical Instrumentation (3) Principles of analog and digital systems in chemical instrumentation: practice in design and construction of chemical instruments. Prerequisites: Consent of instructor.

530 Chemical Bonding (3) Wave mechanical atom, group theory, quantum approaches to molecular orbital theory, covalent, ionic, and metallic bonding, ligand field theories, solid state. Required background: One semester of inorganic chemistry.

531 Characteristics of Inorganic Compounds (3) Descriptive chemistry of elements; structure, reactions, kinetics, mechanisms, equilibria, and spectra of coordination, organometallic, and organoionic compounds. Required background: One semester of inorganic chemistry.

532 Experimental Methods of Inorganic Chemistry (3) Electronic, infrared, Raman, microwave, NMR, ESR, nuclear, Mössbauer, mass, and electron spectroscopies for characterization of inorganic compounds. Required background: One semester of inorganic chemistry.

540 Nuclear and Radiochemistry (3) Nuclear properties, radioactivity, radioactive decay processes, nuclear structure and models, nuclear reactions, radioactivity and radiation detection. Required background: Two semesters of physical chemistry.

550 Structure and Reactivity in Organic Chemistry (3) Structure and reactivity of organic compounds; molecular orbital theory, stereochemistry, conformational analysis, and molecular mechanics; substrate effects on addition and elimination; introduction to reaction mechanisms. Required background: Two semesters of organic chemistry.

551 Organic Reactions (3) Organic transformations of use in synthesis; carbonyl chemistry and carbon-bond formation; stereochemistry and reactivity of synthetic processes. Prerequisites: 550. 6 E

552 Organic Reaction Mechanisms (3) Techniques and principles in study of organic reaction mechanisms; applications and interpretations in polar, radical, and pericyclic reactions; reactivity of organic compounds. Prerequisites: 550. 6 Sp


554 Organic Spectroscopy Laboratory (1) Use of IR, UV, MS, and multinuclear solid-state NMR spectrometers. Development of problem-solving ability in area of spectroscopic characterization of organic molecules. Prerequisites: 550 or equivalent. Coreq: 553. F

570 Quantum Chemistry and Spectroscopy (3) Basic principles of quantum mechanics and their applications to molecular orbital theory, molecular structure, and spectroscopy; introduction to group theory. Required background: Two semesters of physical chemistry.

571 Advanced Quantum Chemistry and Spectroscopy (3) Prerequisites: 570 or consent of instructor. Sp

572 Thermodynamics and Statistical Mechanics (3) Microscopic and macroscopic description of equilibrium and nonequilibrium systems. Basic principles of thermodynamics and statistical mechanics, and application to selected chemical systems. Required background: Two semesters of physical chemistry.

573 Chemical Kinetics and Transport (3) Time-dependent phenomena in chemistry; chemical kinetics, chemical dynamics, transport theory. Required background: Two semesters of physical chemistry.

580 Polymer Chemistry (3) Fundamentals of polymer synthesis and characterization through applications of organic and physical chemical principles. Required background: Two semesters each of organic and physical chemistry.

584 Organic Chemistry of Polymers (3) Synthesis of monomers, mechanism, stereochemistry, sequence distributions, and kinetics of polymerization. Formation of block, graft, and network polymers. Reactions on polymers. Prerequisites: 590 or equivalent. Sp

590 Polymer Chemistry (3) Conformation, interactions, rubber elasticity, kinetics of polymerization, polymer thermodynamics. Prerequisites: 590 or equivalent. Sp

599 Physical Chemistry of Polymers (3) Conformation of macromolecules, solution and bulk properties, rubber elasticity, kinetics of polymerization, polymer thermodynamics. Prerequisites: 590 or equivalent. Sp

900 Doctoral Research and Dissertation (3-15) Prerequisites: Consent of instructor. S/NC only.

595 Physical Chemistry of Polymers (3) Conformation of macromolecules, solution and bulk properties, rubber elasticity, kinetics of polymerization, polymer thermodynamics. Prerequisites: 590 or equivalent. Sp

601 Chemistry Research Proposal (2) Preparation and oral defense of written research proposal based on thorough survey of chemical literature. Prerequisites: Consent of department head. S/NC only. E

510 Selected Topics in Analytical Chemistry (3) Topics of current significance. Prerequisites: 510-11-13 or consent of instructor. May be repeated. Maximum 12 hrs.

530 Selected Topics in Inorganic Chemistry (3) Topics of current significance. Prerequisites: 530-31-32 or consent of instructor. May be repeated. Maximum 12 hrs.

550 Selected Topics in Organic Chemistry (3) Topics of current significance. Prerequisites: 550-51-52 or consent of instructor. May be repeated. Maximum 12 hrs.

570 Selected Topics in Physical Chemistry (3) Topics of current significance. Prerequisites: 570-71-72 or consent of instructor. Maximum 12 hrs.

590 Selected Topics in Polymer Chemistry (3) Topics of current significance. Prerequisites: Consent of instructor. May be repeated. Maximum 12 hrs.

Child and Family Studies (College of Human Ecology)

MAJORS


Ernest W. Brewer, Head

DEGREES

Professors:
Blanton, Priscilla, Ed.D. .......... Tennessee
Buehlker, Cheryl, Ph.D. .......... Minnesota
Cunningham, Jo Lynn, Ph.D. ... Michigan State
Fox, Greer Litton, Ph.D. .......... Michigan
Morrow, James D., Ph.D. .......... Oklahoma State
Nordquist, V. Mick, Ph.D. ...... Tennessee
Steele, Connie (Emeritus), Ed.D., Texas Tech
Twardosz, Sandra, Ph.D. ......... Kansas

Associate Professors:
Allen, Jan, Ph.D. .......... Purdue
Malia, Julia, Ph.D. .......... Iowa State
Morris, Lane, Ph.D. .......... Tennessee
Smith, Delores, Ph.D. .......... Oklahoma State
Tegaro, Deborah, Ph.D. .......... Virginia Tech

Assistant Professors:
Catoni, Carol, Ph.D. .......... Grove, Melissa, Ph.D. .......... Virginia Tech

The Department of Child and Family Studies provides coursework in human development and family studies. Integration of these areas creates a unique perspective for the study of individuals and families. Each graduate student's program of study is carefully planned in conjunction with a faculty committee to establish a program consistent with program requirements and a student's individual goals. All programs are characterized by a broad array of coursework, varied research experiences, and opportunities for experiences in applied settings.

ADMISSION REQUIREMENTS

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

Admission to the program is contingent upon faculty evaluation of GRE scores, undergraduate/graduate GPA, rating forms, work experience, and the match between student's goals and department's focus. Prerequisites for admission to the master's program are 9 semester hours of upper division undergraduate social science. Prerequisites to the doctoral program are a master's degree from a regionally accredited institution or equivalent, completion of the 18 hour core in the CFS master's program (or equivalent substitutions), 3 hours of computationally-based, graduate-level research methods, and completion of a thesis as part of the master's degree. The department provides a remedial mechanism for doctoral students who have earned a master's degree but have not met the other prerequisite requirements.

THE MASTER'S PROGRAM

The Master of Science degree with a major in Child and Family Studies provides a broad foundation in the understanding of how children develop and how families function in today's society. Two concentra-
tions are available in child and family studies or in early childhood education.

Child and family studies requires a minimum of 36 credits of coursework: 18 credits in core coursework and 18 credits in specialization. Core requirements are: 510, 511, 540, 550, 552, and 562. Students then choose either the thesis option (research) or the non-thesis option (practice; internship and comprehensive exam required). Students who plan to pursue a doctoral degree are encouraged by selecting the thesis option. The following are required in the thesis option: 570, Statistics 531 or 537, and 6 credits of Thesis 500. Students who plan to work with children and families in the community are best served by selecting the non-thesis option. Specializations within the practice option include: child and family life practice, family mediation, gerontology, child and family policy, families of children with disabilities, and child and family program administration. Each of these specializations includes 6 credits of specified relevant coursework. Specific core coursework within each specialization is on file in the Department of Child and Family Studies. Interested students should contact the Graduate Coordinator in Child and Family Studies.

The early childhood education concentration is designed for students seeking initial teacher licensure in early childhood education (Pre-K through Grade 3). This program is based on an undergraduate degree in early childhood education or equivalent coursework. A non-thesis option only is available. All students in the early childhood education licensure program must enroll in Human Ecology 574, 575, 591, and Holistic Teaching/Learning 505 (or equivalent Child and Family Studies course). Students select 3 hours from 510, 511 or 512; three courses from 511, 520, 521, 522, 525, 540, 590; 3 hours of 500-level statistical methods or interpretation of statistics or research methods (requirement may be met with 568); and written comprehensive examination (36 credits).

Graduate students seeking the M.S. with a major in Child and Family Studies must file a plan of study with the department head after 12 hours of graduate credit.

THE PH.D. CONCENTRATION

The department participates in the doctoral program with a major in Human Ecology, concentration in child and family studies. Two themes are highlighted: the integration of human development and family studies and concentration in child and family configuration. A doctoral program that is concurrently specialized and integrative in nature reflects the complexity of the disciplinary subject matter, provides a broader context to interpreting and supervising of family configurations and educational environments for children from infancy through middle childhood. Implications for programs and policy. 520 Curriculum and Program Development in Early Childhood Education (3) Current programming and evaluation issues in early childhood education: description, analysis, and evaluation of curriculum models, teaching methods, administrative structures, and supervision of personnel. Experience in designing and evaluating early childhood programs for young children: special needs, infancy-age 8. Required background: 6 hrs graduate-level coursework in early childhood education or child development.

521 Organizational Management in Early Childhood Education (3) Designing, implementing, and evaluating physical and human resources in educational environments. Emphasis on interpersonal, organizational, and supervisory leadership, budgeting and evaluation of programs. Corequisite: 6 hrs graduate-level coursework in early childhood education.
Civil and Environmental Engineering

(College of Engineering)

MAJORS

Civil Engineering

ENVIRONMENTAL ENGINEERING

DEGREES

M.S., Ph.D.

(Ph.D. through Civil Engineering)

Gregory D. Reed, Head

Professors:

Bennett, R. M., PE, Ph.D....................... Illinois
Burdeau, E. G. (Fred N. Peebles Prof.), PE,
Ph.D................................................ Illinois
Chatterjee, A., PE, Ph.D..................... NC State
Davis, W. R., Ph.D............................... Tennessee
Deatherage, J. H., PE, Ph.D............ Tennessee
Drumm, E. C., PE, Ph.D.......................... Arizona
Goodpasture, D. W., PE, Ph.D............. Illinois
Grecco, W. L. (Emeritus), Ph.D............. Michigan State
Heathington, K. W. (Emeritus), Ph.D........ Western State
Humphreys, J. B. (Emeritus), Ph.D........ Texas A&M
Johnson, H. L. (Emeritus), M.S.............. Tennessee
Miller, W. A. (Granger Prof.), PE,
Ph.D................................................... Georgia Tech
Reed, G. D. (Liaison), PE, Ph.D........... Arkansas
Robinson, R. B. (Fisher Prof.), PE,
Ph.D................................................... Iowa State
Smoot, J. L., PE, Ph.D......................... VPI
Tschantz, B. A. (Condra Prof.), PE,
So.D............................................. New Mexico State
Walker, C. R. (Emeritus), M.S............ MIT
Wegmann, F. J., Ph.D., Ph.D.............. Northwestern

Associate Professors:

Chou, K. G., Ph.D............................. Northwestern
Cox, C. D., Ph.D............................... Penn State
Han, L. D., Ph.D.................................. California
Mauldon, M., Ph.D............................. California
Miller, T. L., PE, Ph.D...................... Tennessee
Richards, S. H., PE, Ph.D............... Tennessee
Robinson, K. G., Ph.D....................... VPI

Assistant Professor:

Jackson, N. M., PE, Ph.D..................... Oregon State

The Department of Civil & Environmental Engineering offers degrees leading to the Master of Science and Doctor of Philosophy with a major in Civil Engineering concentrating in construction engineering, environmental engineering, geotechnical/materials engineering, public works engineering, structural engineering, and transportation engineering; to the Master of Science in Environmental Engineering with concentrations in water quality, water resources, air quality, mixed waste management, waste management, and environmental risk assessment.

THE MASTER'S PROGRAM

The Master of Science programs in Civil Engineering and Environmental Engineering are offered to graduates of recognized undergraduate curricula.

Departmental requirements provide that for a major in Civil Engineering, the Bachelor's degree must be in civil engineering, or certain undergraduate prerequisite courses must be taken before admission to candidacy for the Master of Science in Civil Engineering.

Civil Engineering

The Department of Civil and Environmental Engineering offers two options for the Master of Science with a major in Civil Engineering.

Thesis Option: A minimum of 30 semester hours, including 6 hours of thesis, is required.

Non-Thesis Option: A minimum of 33 semester hours, including a 3-hour special problems is required. The special problem will culminate in a written report which must be approved by the student’s major professor.

Environmental Engineering

For a Master of Science with a major in Environmental Engineering, normally a Bachelor’s degree in a field of engineering is required. For a student who does not have an engineering background, the following minimum prerequisite courses are required: Engineering Fundamentals 101, 102; Nuclear Engineering 203 or Mechanical Engineering 331; Basic Engineering 121, 131; Engineering Science and Mechanics 231; Statistics 251; Civil Engineering 380, 395, 380; Mathematics 141, 142, 231, 241; and Chemistry 120, 130. In general, these must be completed with a B average before courses for graduate credit can be taken.

The Department of Civil and Environmental Engineering offers both thesis and non-thesis options for work toward the Master of Science degree in Environmental Engineering.

Thesis Option: The student must present a minimum of 30 semester hours of approved graduate courses. The major shall include 6 semester hours of thesis and a minimum of 12 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Non-Thesis Option: The student must present a minimum of 33 semester hours of approved graduate courses. The major shall include a minimum of 16 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Either option must be approved by the student’s major professor. A student's program must include a minimum of 9 semester hours of advanced engineering design courses selected from a list provided by the student's committee.

Normally, the graduate program of study will be adjusted by the head of the department and the student’s committee to suit the individual academic objectives.

THE DOCTORAL PROGRAM

A graduate program leading to the Doctor of Philosophy is offered in Civil Engineering.

Specific departmental requirements for the Ph.D. degree include the following:

1. A minimum of 72 semester hours beyond the Bachelor’s degree, exclusive of credit for the M.S. thesis. Of this number, a
490 Water Resources Project Design (3) Coherent development of multiple reservoirs; reservoir and dam project; data acquisition; spillway; and outlet works design; earth and gravity dam stability analyses; dams and spillways; evaluation and operation; and dam safety concept, dam break analyses. Prereq: 390, 395.

495 Water Resources Development and Management (3) Principles of water resources project development and management. Institutional framework: water law, federal and state; procedures for competing and selecting among water resources development alternatives; multi-objective planning; principles of engineering economics; benefit-cost analysis; and cost allocation methods; environmental impact assessment procedures; decisions using risk-based methods; case studies. Prereq: Senior standing.

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

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

510 Urban Systems: Engineering and Management (3) Various urban systems usually under responsibility of city manager and/or city engineer: streets, lighting, water, sewage, refuse, collection, personal management, finance, public relations. Prereq: Graduate standing or consent of instructor.

512 Pavement Design (3) Empirical and theoretical bases of pavement design and analysis, strengthening existing pavements, pavement distress, and economical design alternatives. Prereq: 521 and 330.

522 Asphalt Concrete Mix Design and Analysis (3) Aggregate properties and tests, tests of asphalt and asphalt concrete, mix design methods for asphalt concrete, production and specification of hot mix asphalt. Prereq: Materials of Construction. 2 hrs and 1 lab.


531 Soil Stabilization (3) Mechanical stabilization of soils by compaction, drainage, and blending; chemical stabilization of soils with admixtures, waterproofing, and modifying soils and additives. Reinforced earth and stabilization with geosynthetics. Prereq: Introduction to Soil Behavior.

532 Rock Mechanics and Rock Engineering (3) Engineering properties and characterization of rock and rock masses. Discontinuity analysis, stress and strain, keyblock theory. Applications to rock slopes, underground excavations, foundations and groundwater. Prereq: Introduction to Soil Behavior or consent of instructor.

534 Geological Engineering (3) Influence of geologic origin and history on engineering characteristics of rocks and soils: applications of geology in planning, design and construction of civil engineering projects. Prereq: Introduction to Soil Behavior 2 hrs and 1 lab.


537 Issues in Geotechnical Engineering (1-3) Special readings, problems, discussions, and presentations in the field of geotechnical engineering. Prereq: Graduate standing or consent of instructor. May be repeated.

538 Finite Element Applications in Geotechnical Engineering (3) Applications of finite element method to problems in geotechnical engineering. Constrained and unconfined flow through porous media; stresses and strains in elastic halfspace; representation of nonlinear soil behavior with elastic and elastoplastic models; soil structure interaction effects. Prereq: Introduction to Soil Behavior and 551.

539 Geotechnology Seminar (1) Seminar topics in geotechnology and geology. Research contributions and case histories by graduate students and engineers from surrounding community. Prereq: Grad standing and consent of advisor. May not apply toward degree. May be repeated. S/NC only.

540 Construction Management I (3) Management and organization of heavy and building construction projects. Prereq: Construction Methods and Equipment.

541 Construction Management II (3) Management organization of heavy and building construction projects. Prereq: Construction Methods and Equipment.

543 Construction Estimating (3) Project costs, estimation techniques, overhead, and market cost conditions, and feasibility of design and cost. Prereq: Construction Methods and Equipment.

551 Traffic Engineering-Characteristics (3) Driver vehicle-roadway system; traffic flow modeling; elements of transportation/ highway safety. Prereq: Graduate standing.

552 Traffic Engineering-Operations (3) Signs, signals and marketing, short-term operations, controllers, signal timing/ phasing; one way reversible flow; systems approaches; identification and correction of high accident locations and system deficiencies. Prereq: 545 or 542.

553 Geometric Design and Layout of Roadways and Community Facilities (3) Functional and geometric design of roads and urban roads; subdivision layout; configuration of urban roads; design for access control; freeway interchange and signal design. Prereq: 545 or consent of instructor.

555 Public Transit Planning (3) Characteristics of transit modes conventional and paratransit; operational design of transit services; route planning and vehicle scheduling; performance evaluation; transit surveys; organization and financing. Prereq: 554 or graduate standing.

556 Traffic Accident Reconstruction (3) Data collection and analysis as basis for accident prevention on control programs; roadway operations; introduction to micro computing. Prereq: 452 or graduate standing.

557 Transportation Planning and Operations with Micro-Computer Applications (3) Transportation system management techniques and application of micro-computer methods to analysis of transportation actions. Prereq: 551 and 556.

558 and Transportation (3) Preparation of transportation as elements of comprehensive development plans. Analysis of transportation systems demand, proposing transportation and community factors. Use of planning process to establish existing travel patterns, models, and development plans. Prereq: 558 or graduate standing.

561 Computer-Aided Structural Analysis (3) Fundamental concepts of computational methods used in structural analysis; matrix and finite element methods; practical application of computer software. Prereq: Structural Analysis and Matrix Computation or equivalent.

562 Structural Systems (3) Structural system analysis and design; earthquake loads on buildings; vertical and lateral load resisting systems; analysis of buildings frames. Prereq: Structural Engineering.

563 Statical Indeterminate Structures (3) Elastic analysis of indeterminate and rigid frames with semi-rigid members; statics, statically indeterminate; moment distribution methods; plastic analysis of rigid frames; and stability analysis of composite members and portal frames. Prereq: Structural Analysis II.

565 Structural Dynamics (3) Analysis of only free and forced vibrations and transient response of structures with respect to any degree of freedom; elasto-plastic behavior considered for structural systems; earthquake
508 Seminar (1) Reports on current research in environmental engineering at UT. Prereq: Graduate standing.

510 Environmental Protection (3) Managing of water resources, wastewater, air quality, solid waste, and hazardous materials to promote efficiency and comfort and to safeguard balances in natural ecosystems. Prereq: Consent of instructor.

520 Open Channel Hydraulics (3) Open channel flow principles, properties, and classifications; uniform and gradually varied flow theory and applications; open channel design; unsteady flow theory and analysis: dynamic routing; steady varied flow; non-linear alignment; microcomputer applications, featuring HEC-2 model. Prereq: Hydraulics.

522 Floodplain and Urban Flood Management (3) Review of national, regional, and local flood problems; state of the art flood damage reduction alternatives; technical and social approaches; institutional responses: policies, programs, organizations, regulations, and legal aspects: floodplain hydraulics and hydrology: HEC-1, HEC-2: floodway; flood zone; common computer models. Prereq: Hydraulics.

525 Soil Erosion and Sediment Yield (3) Theory of soil erosion and sediment yield processes from disturbed land; methods and computer models for estimating sediment yield. Erosion and sediment control theory and management practices. Local and state regulations. Prereq: Civil Engineering 356. (Same as Biosystems Engineering 525.)

530 Urban Hydrology and Stormwater Engineering (3) Planning, design, modeling, operation, and maintenance of urban stormwater systems. Theory and application of hydraulic and hydrologic principles to design stormwater management systems; design of urban stormwater systems; surface runoff and conveyance systems; detention and retention basins; and appurtenant structures. Prereq: Calculus II or consent of instructor.

535 Ground Water Hydrology (3) Dynamics of flow and contamination in porous media: hydrodynamics, dispersion, heat transfer, layered soils, unsaturated flow, and groundwater contaminant transport phenomena. Analytical and numerical solution of flow and transport equations. Prereq: Hydraulics and Hydrology or Civil Engineering 485 for geology majors. (Same as Geological Sciences 535.)

540 Remote Sensing for Transportation and Facilities Siting (3) Principles of remote sensing; sensors, data from environmental monitoring systems; interpretation, analysis and digital techniques for analysis of aerial and terrestrial photos, radar, and thermal imagery with application to transportation and facilities planning, construction, and operations. Prereq: Consent of instructor.

543 Instrumentation and Measurement (3) Same as Biosystems Engineering 543.

545 Monitoring Hydrologic Phenomena (3) Same as Biosystems Engineering 545.

551 Physicochemical Unit Processes (3) Theory and design application in water and wastewater treatment. Prereq: Water and Waste Treatment, and Hydraulics.

552 Biological Treatment Theory (3) Theory and design applications of biological processes to treatment of wastewater and solid wastes. Prereq: Water and Waste Treatment. 2 hrs and 1 lab. (Same as Biosystems Engineering 552.)

553 Aquatic Chemistry (3) Theoretical and analytical chemistry related to generation, measurement, and treatment of aquatic systems. Prereq: General Chemistry. 2 hrs and 1 lab.

554 Environmental Engineering Chemistry (3) Application of chemical principles in analyzing physical, chemical, or biological interactions of chemical contaminants in various environmental compartments: atmosphere, hydrosphere, and lithosphere. Prereq: One year of chemistry and consent of instructor.

555 Solid Waste Management (3) Magnitude and characteristics of solid waste problems; collection systems; design of disposal systems: landfill, incineration, and composting, design of resource recovery systems; current and future regulations. Prereq: Senior standing.

556 Hazardous Waste Management (3) Analysis and design of operations and processes for hazardous waste disposal and processing; regulations analysis; industrial applications. Prereq: Graduate standing or consent of instructor.

571 Design of Air Pollution Control Systems (3) Design and evaluation of systems used to control emission of gaseous and particle air pollutants. Comprehensive design of specific devices and systems. Prereq: 570.

572 Air Quality Dispersion Modeling (3) Diffusion in atmosphere; application of atmospheric dispersion models and evaluation of meteorological and air quality data. Prereq: 570.

573 Sampling of Air Pollutants (3) Standard sampling methods for particulate and gaseous air pollutant emissions from industrial processes; ambient air monitoring instrumentation/techniques. Prereq: 570.

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

581 Industrial Pollution Prevention (3) (Same as Chemical Engineering 581 and Engineering Science 585.)

590 Special Problems in Environmental Engineering (1-6) Enrollment limited to environmental engineering students in non-thesis programs. May be repeated. Maximum 6 hrs. S/NC only.

595 Special Topics (1-4) Problems and topics related to current developments in field. May be repeated. Prereq: Consent of instructor.

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

651 Analysis Techniques for Transportation Systems I (3) Analysis of trip generation, trip distribution, modal split and traffic assignment, employing mathematical, statistical, and computer science techniques. State of the art and new modeling techniques. Prereq: 554 or 556.

652 Analysis Techniques for Transportation Systems II (3) Advanced topics of application of mathematical, statistical and computer science techniques in modeling and analysis of transportation systems. Prereq: 651.

671 Behavior of Steel Bridges and Buildings (3) Behavior, analysis and design of plate girders, columns, and composite members subjected to static and dynamic loading. Prereq: 571.

674 Behavior of Reinforced Concrete Beams and Slabs (3) Strength and behavior of statically indeterminate reinforced concrete beams and frames; limit analysis; behavior, analysis, and design of reinforced concrete slabs; yield-line theory, finite element solutions, and AIC Code Method. Prereq: 574.

680 Reliability of Constructed Systems (3) Development of safety factors and probability based design codes; Monte Carlo methods; constructed system reliability; evaluation of existing infrastructures. Prereq: 580. Introduction to Structural Design or consent of instructor.

691 Special Topics in Civil Engineering (3) Selected advanced problems of current interest. Prereq: Consent of instructor. May be repeated.

Environmental Engineering

GRADUATE COURSES

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

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

571 Behavior of Steel Structures (3) Behavior of structural steel members due to static and fatigue loading; relation between research results and current specifications for design. Prereq: 471.

572 Fracture Analysis (3) Same as Geology 572.

573 Prestressed Concrete (3) Properties of pre-stressing materials; methods of pre-stressing and post-tensioning; analysis and design of simple and continuous beams and slabs. Prereq: 471.

574 Behavior of Reinforced Concrete Members (3) Moment-curvature and load-deflection relationships for reinforced concrete beams; combined bending and axial load; shear and torsion; relation between research results and specifications for design. Prereq: 471.

576 Masonry Design (3) Clay and concrete masonry materials; unreinforced masonry design; reinforced masonry design; seismic behavior of masonry structures. Prereq: Introduction to Structural Design.

580 Risk Analysis in Civil and Environmental Engineering (3) Applications of probability theory and statistics in civil engineering disciplines: structural geotechnology, water resources, transportation, and environmental engineering. Prereq: Calculus II or consent of instructor.

590 Special Problems in Civil Engineering (1-6) Enrollment limited to civil engineering students in non-thesis programs. May be repeated. Maximum 6 hrs. S/NC only.

595 Special Topics (1-4) Problems and topics related to current developments in field. May be repeated. Prereq: Consent of instructor.

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

651 Analysis Techniques for Transportation Systems I (3) Analysis of trip generation, trip distribution, modal split and traffic assignment, employing mathematical, statistical, and computer science techniques. State of the art and new modeling techniques. Prereq: 554 or 556.

652 Analysis Techniques for Transportation Systems II (3) Advanced topics of application of mathematical, statistical and computer science techniques in modeling and analysis of transportation systems. Prereq: 651.

671 Behavior of Steel Bridges and Buildings (3) Behavior, analysis and design of plate girders, columns, and composite members subjected to static and dynamic loading. Prereq: 571.

674 Behavior of Reinforced Concrete Beams and Slabs (3) Strength and behavior of statically indeterminate reinforced concrete beams and frames; limit analysis; behavior, analysis, and design of reinforced concrete slabs; yield-line theory, finite element solutions, and AIC Code Method. Prereq: 574.

680 Reliability of Constructed Systems (3) Development of safety factors and probability based design codes; Monte Carlo methods; constructed system reliability; evaluation of existing infrastructures. Prereq: 580. Introduction to Structural Design or consent of instructor.

691 Special Topics in Civil Engineering (3) Selected advanced problems of current interest. Prereq: Consent of instructor. May be repeated.

Classics

(College of Arts and Sciences)

Susan D. Martin, Head

Professors:

Gosell, G. C. (Lindsay Young Prof.), Ph.D. .................. North Carolina
Rutledge, H. C. (Emeritus), Ph.D. ... Ohio State University.

Tandy, D. W. (Distinguished Prof.), Ph.D. Yale University.

Associate Professors:

Craig, C. P., Ph.D. ................. North Carolina State University.

Martin, S. D., Ph.D. ................. Michigan State University.

Shelton, J. E., Ph.D. ............... Vanderbilt University.

Assistant Professor:

Sutherland, E. H., Ph.D. ........ UC Berkeley

The graduate courses in the Classics include the wider reading of Greek and Latin authors in a selected field, a more detailed study of one of the great genres of classical literature, and the development of background for the appreciation of Greek or Roman life and literature.

GRADUATE COURSES


405-06 Selected Readings from Greek Literature (3,3) For advanced students in Greek. Prereq: 401-402 or consent of instructor. May be repeated. Maximum 9 hrs.

414 Cicero and Techniques of Latin Prose Composition (3) For advanced study of Cicero's style. Prereq: 351-352 or consent of instructor.

431-32 Special Topics in Latin Literature (3,3) For advanced students in Latin. Prereq: 351-352 or consent of instructor. May be repeated. Maximum 9 hrs.

435 Medieval Latin (3) Readings from medieval Latin literature. Prereq: Consent of instructor.

441 Special Topics in Classical Civilization (1-3) Art, literature, religion, and society of Greece and Rome. May be repeated with consent of department. Maximum 9 hrs.

461 Studies in Classical Archaeology (3) Variable content course offering subject matter not taught in an existing course, or concentrating on one aspect of existing survey. Prereq: According to topic. May be repeated. Maximum 9 hrs.

561 Special Topics in Classical Civilization (1-3) Advanced tutorial work in Greek and Roman authors in English translation; problems in cultures of Greece and Rome. May be repeated. Maximum 9 hrs. Letter grade or S/N only.

562 Problems in Old World Archaeology (3) Selected topics and research problems in European, Asian, and African prehistory. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

Communications

(College of Communications)

MAJOR DEGREES

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

The College of Communications offers the Master of Science and the Doctor of Philosophy degrees with a major in Communications. In addition to the full-time program, the M.S. degree program is offered on an evening basis in Knoxville, and via distance education, at Chattanooga on the University of Tennessee at Chattanooga campus and at Martin on the University of Tennessee at Martin campus.

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

ADMISSION REQUIREMENTS

Applicants must meet admission requirements of The Graduate School. In addition, they must complete the Graduate Record Examination, rating forms, and application forms as required by the College of Communications.

Minimum requirements for admission to the M.S. program are based on an overall grade point average in undergraduate studies and scores at or above the fiftieth percentile in verbal, quantitative, and analytical aptitude on the Graduate Record Examination. Applications for fall admission must be received by May 1.

Applicants for financial aid are due by March 1.

A baccalaureate degree in communications or a related field is recommended. Admission is possible with other baccalaureate degrees. However, all applicants without the appropriate background are required to take up to 18 semester hours of prerequisite and corequisite courses as determined by the department in which the student is enrolled. Students may take a proficiency test on any prerequisite course, subject to review by the master's or doctoral committee of the College of Communications.

Students who have had courses in their major area of concentration may expect to spend four or more full-time semesters in the program, including a media internship.

THE MASTER'S PROGRAM

The Master of Science with a major in Communications is intended for students who desire a career in the mass media and communications industry. The program offers an emphasis on communications management and a deeper understanding of the communication processes and social role of media. The program follows a broad-based multi-media approach while allowing the student to specialize in one of five fields: advertising, broadcasting, journalism, public relations, or speech communication. Both thesis and non-thesis options are available.

The prospective student who is interested only in acquiring basic skills in one of the areas listed above is advised to enroll for a second baccalaureate rather than an advanced degree.

Students planning to pursue a doctoral degree with a major in Communications may be accommodated for the M.S. program through special academic advising.

Degree Requirements

The M.S. program emphasizes communications management and industry in the areas of advertising, broadcasting, journalism (publications), public relations, and speech communication. For the thesis option, a minimum of 30 hours of approved graduate work is required. The non-thesis option requires 33 hours. Orientation attendance is required.

1. Nine hours of core courses—Communications 512, 540, and 560, or 560, the first three of which must be taken during the first two semesters of the student's program, except with written approval of the Associate Dean for Graduate Studies for the College.

2. Twelve hours within one department of the college, at least 6 hours at the 500 level or above. An internship, if needed, is included.

3. Three hours for the thesis option and 9 hours for the non-thesis option of electives from a list provided by the department in area of concentration.

4. Six hours of thesis work (Communications 500) or a 3-hour project (Communications 590).

Additional hours may be required for those who do not have academic prerequisites, and an internship may be required for those who do not have professional experience in the field they wish to study. A course in communications law is a prerequisite.

A student's internship experience requires approval by his/her advisor. Credit will be given through Advertising 598, Broadcasting 596, Journalism 598, or Public Relations 598 on the basis of 3 hours of credit for the equivalent of 15 weeks of full-time professional experience. This credit is to be included in the hour requirements for the M.S. program. Previous professional experience will be evaluated by the student's committee.

Students interested in subsequent entry into a doctoral program are advised to pursue the thesis option and to take additional courses in communications theory and research, subject to advisor's approval.

After completion of the formal program of coursework and research for the thesis option, the student must pass an oral examination conducted by his/her graduate committee. The non-thesis option requires a written comprehensive examination and oral defense of the project.

THE DOCTORAL PROGRAM

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

The program is interdisciplinary, consisting of a required core curriculum and recommended courses outside the College in the related social and behavioral sciences. The program is flexible and will accommodate a wide variety of career goals in communications. The program requires 33 hours of course work at the 500 level, or 60 credits, and 9 credits of dissertation work. Students may be admitted to the program at any time; however, core courses begin only in the fall semester. Orientation attendance is required.

The master's degree is required for entry into the doctoral program. Students lacking academic or professional experience in
communications will be required to take prerequisite courses. In general, however, the program may be completed within three academic years of full-time study beyond the master's degree.

The following are normally minimal requirements for admission to full potential candidate status:
1. A 3.0 (4.0 system) grade-point average in undergraduate studies, and 3.5 for graduate work in a master's degree;
2. at or above the fifth percentile in verbal, quantitative and analytical aptitude on the Graduate Record Examination;
3. endorsement by at least three former teachers or professional colleagues; and
4. a statement of the applicant's goals and reasons for pursuing the doctorate. Personal interviews with members of the Ph.D. Admissions Committee are recommended and may be required. Professional experience in some field of communications is a highly desirable criterion for admission.

A minimum of 87 hours of approved graduate work is required for the Ph.D.
1. Twenty-seven hours of core courses--Communications 612, 620, 640, 641; 6 hours of statistics; and three of the following courses: Communications 622, 632, 642, and 652.
2. Fifteen hours in a primary concentration (advertising, broadcasting, information sciences, journalism, public relations, or speech communication) supplementing the core. Courses may be taken in one or more of the Departments of Advertising, Broadcasting, Speech Communication, and/or the Schools of Information Sciences and Journalism.
3. Twelve hours in a secondary concentration (outside the College of Communications).
5. Twenty-four hours of dissertation.

All courses require the approval of the student's advising committee. Admission to candidacy must be attained at least two semesters prior to graduation and requires successful completion of a written comprehensive examination. Each doctoral student's progress will be reviewed annually by the Doctoral Committee of the College of Communications. Results will be reported to the student by his/her program advisor, who will convey the committee's recommendation concerning the student's remaining in the program (non-binding) and suggestions for improvement in performance.

Candidates without prior teaching experience must register for Communications 521, Tutorial in Communications Teaching. Planned course offerings in the College of Communications for a full calendar year are available the preceding November. This information is available from the Graduate Studies Office, 420 Communications Building, 974-6651. See also courses listed under Advertising, Broadcasting, Information Sciences, Journalism, and Speech Communication.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis.

The M.S. program in Communications is available to residents of Arkansas or Kentucky. The Ph.D. program is available to residents of the states of Alabama, Arkansas, Louisiana, Virginia, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

ACADEMIC STANDARDS

A student in the College of Communications whose graduate grade-point average, not including incomplete grades, is below 3.0 at any time after the end of 12 hours of graduate credit will be placed on probation. A student on probation will be dropped from the program unless his or her cumulative grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 semester hours of graduate coursework attempted that is specified in the student's degree program. Exceptions to this policy may be made only with the approval of the Associate Dean for Graduate Studies of the College of Communications on the recommendation of the student's faculty committee.

GRADUATE COURSES

400 Mass Communications Law and Ethics (3) Legal issues directly affecting the mass media: libel, privacy, free press-fair trial, judicial controls, governmental regulations. Ethical standards and practices of mass media in America. Prereq: News Writing or Advertising Creative Strategy or Radio-TV News. Advertising and Promotion or History of Rhetorical Theory or consent of instructor.

500 Thesis (1-18) P/NP only. E


521 Tutorial in Communications Teaching (1) Experience as teacher under guidance of faculty member. Prereq: Consent of instructor. S/NC only.

540 Communications Theory (3) Selected research hypotheses in literature of mass communications. Prereq: Consent of instructor or admission to program. Sp

550 Seminar in Media Economics and New Technology (3) Economic and technical aspects of mass communication, their impact on society. Prereq: Consent of instructor or admission to program.

551 Seminar in Science, Society, and the Mass Media (3) Communication of scientific information to the public. Social and political implications of mass media. Prereq: Consent of instructor or admission to program.

552 Seminar in Health Communication (3) Methodology of research and evaluation. Prereq: Consent of instructor.

553 Seminar in Risk Communications (3) Theories of scientific, technical, and medical issues. Prereq: Consent of instructor.

560 Seminar in Communications Management (3) Organizational structure and functions of communications corporations: development of objectives, strategies, and tactics. Analysis of major principles and case studies. Prereq: Consent of instructor.

565 Project (3-15) Research project on special topics in communications. Prereq: Consent of instructor or admission to program. S/NC only.

612 Fundamentals of Communications Research (3) Universal research process from defining ideas and problems to reporting results. Causal inference and relative strength of various research designs. Prereq: Consent of instructor or admission to program. S/NC only.

620 Seminar in Mass Communications Education (3) Role and scope of mass communications teaching roles and the nature of curriculum, teaching methods and instructional objectives, classroom testing and measurement, design of educational materials. Prereq: Consent of instructor or admission to program. S/NC only.

622 Quantitative Research (3) Techniques for evaluation of research design and measurement. Survey, content analysis, and experimental techniques. Assessment of reliability and validity. Data analysis, hypotheses testing, and inference strategies. Prereq: 612. F

632 Mass Communications History and Historiography (3) Origins and development of mass media in America, Europe, and Asia, and their verifications and interpretations of data. Prereq: Consent of instructor or admission to program. S

640 Mass Communications Theory I (3) Selected research hypotheses and theories in literature of mass communications. Prereq: Consent of instructor or admission to program. F

641 Mass Communications Theory II (3) Selected topics in theory. Prereq: Consent of instructor or admission to program. F

642 Qualitative Research (3) Theories and applications of qualitative research methods to social science and communications research. Prereq: Consent of instructor or admission to program. S

652 Mass Communications Law and Legal Research (3) Legal aspects of communication organizations. Prereq: Consent of instructor or admission to program. S

692 Advanced Topics in Communications Theory and Methodology (3) Advanced study of communication issues, theories and methods. May be repeated. Prereq: 652 or 653. F

693 Seminar in Mass Communications Issues (3) Contemporary topics in communications. Prereq: Consent of instructor. S/NC only.

597 Independent Study (1-3) Research or projects on special topics in communication. Prereq: Consent of instructor or admission to program. S/NC only.

600 Doctoral Research and Dissertation (3-15) Prereq: Consent of instructor or admission to program. S/NC only.

590 Project (3) Capstone project under guidance of faculty. Prereq: Consent of instructor or admission to program. S/NC only.

598 Seminar in Mass Communications Issues (3) Contemporary topics in communications. Prereq: Consent of instructor. S/NC only.
Comparative and Experimental Medicine

(Office of the Provost)

MAJOR DEGREES

Comparative and Experimental Medicine .............. M.S., Ph.D.

L. N. D. Potgieter, Director
Joint Graduate Coordinating Committee:

Karstad, M.D., Ph.D., Anesthesiology
Lawler, J. E., Ph.D., Psychology
Lozzo, C. M.D., Medical Biology
Potgieter, L. N. D. (Liaison), B.V.Sc., Ph.D., Veterinary Teaching Hospital
Slauson, D. O., D.V.M., Ph.D., Veterinary Teaching Hospital

The Comparative and Experimental Medicine degree program (M.S. and Ph.D.) is a jointly-administered graduate program intended to prepare students for teaching and/or research careers in the health sciences. This program emphasizes the comparative approach to the study of experimental pathobiology, infectious diseases, pharmacokinetics, epidemiology, clinical medicine, immunopathology, hematology, aberrant metabolism, oncology, and genetic disorders. The Ph.D. program is open to approved graduate students seeking training in this area and is especially useful for individuals with professional degrees. For the student with undergraduate biological science background, the Comparative and Experimental Medicine program provides an unusual opportunity to study disease processes common in humans and animals from a multidisciplinary perspective. The scope of this intercollegiate program, which pools faculty resources from both veterinary and human medicine, is broadened by faculty members representing animal science and numerous areas of the life sciences. The interdisciplinary training environment includes such diverse support as facilities and personnel at the Veterinary Teaching Hospital, UT Medical Center at Knoxville, the Oak Ridge National Laboratory, Knoxville Zoological Park, Hemophilia Clinic, Developmental and Genetic Center, Hematology and Oncology services, and departments of life sciences.

For additional information, write to the Office of Research and Graduate Programs, c/o Graduate Admissions and Records.

ADMISSION REQUIREMENTS

Admission requirements of The Graduate School of UT apply. In addition, all applicants must furnish three letters of recommendation from individuals who are familiar with their scholastic or professional records.

Master of Science Degree Program

Applicants must have a baccalaureate degree with coursework in chemistry through organic, mathematics through calculus, physics, and basic biology. More advanced study in biology such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants for admission to the Master of Science degree program whose background include no formal training in the biomedical field beyond the baccalaureate degree will be required to score at least 1,000 on the quantitative and verbal portions of the Graduate Record Examination.

Doctor of Philosophy Degree Program

Applicants generally will be expected to have a master's degree in one of the biological sciences and a Graduate Record Examination score of at least 1,000 for the quantitative and verbal sections, or a professional degree in one of the medical sciences, (e.g., M.D., D.D.S., D.V.M.).

An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted upon presenting evidence of exemplary performance on the Graduate Record Examination.

Exceptional veterinary students at UT may be admitted to the Comparative and Experimental Medicine program but will be enrolled officially as veterinary students. During summers such students may take advantage of registering for graduate courses to be counted as elective courses in the veterinary program.

THE MASTER'S PROGRAM

All students must take at least 4 credit hours in 500- or 600-level courses in basic mechanisms of disease and at least 7 credit hours of 500-level biochemistry or cell biology. See listings under Biochemistry and Cellular and Molecular Biology program for information on these courses. In addition, students must complete a minimum of 6 hours of coursework in a specified discipline, 5 or more hours of electives, and 6 hours of Thesis 500. Exceptions to accommodate students with specific interests must be approved by the joint Graduate Coordinating Committee after application, in writing, to the director.

The graduate committee (at least 3 members) is chosen after the first term and must include at least one member from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine. If a minor is declared, one member must be from the minor discipline.

A final oral examination is given at the end of the program.

THE DOCTORAL PROGRAM

All students must take at least 4 credit hours in 500- or 600-level courses in basic mechanisms of disease and at least 7 credit hours of 500-level biochemistry or cell biology. See listings under Biochemistry and Cellular and Molecular Biology program for information on these courses. In addition, students must complete a minimum of 8 hours of coursework in a specified discipline. Exceptions to accommodate students with specific interests must be approved by the joint Graduate Coordinating Committee after application, in writing, to the director. Areas of emphasis may include hematology, oncology, comparative pathology, comparative pharmacology, toxicology, immunology, genetics, infectious diseases, or biochemistry of disease. At least 24 hours of coursework, including a minimum of 6 hours at the 600 level, and 24 hours of Dissertation 600 are required for a total of 48 hours. For students with professional degrees, a minimum of 18 hours of coursework beyond the professional degree is required for a total of 42 hours.

The doctoral committee (at least 4 members) is chosen during the first year. Three of the four members, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from the College of Veterinary Medicine and at least one member from the Graduate School of Medicine.

A comprehensive examination is given at the completion of coursework. A seminar and final oral defense of the dissertation culminate the program.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs up to the doctoral level residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S. program is available to residents of Georgia. The Ph.D. program is available to residents of the state of Florida. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

Comparative and Experimental Medicine--Graduate School of Medicine

GRADUATE COURSES

Participating departments include: Anesthesiology, Medicine, Medical Biology, Obstetrics and Gynecology, Pathology, Pediatrics, Radiology, and Surgery.

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
508 Graduate Research Participation (3) Advanced research techniques while completing individual biomedical research projects under the supervision of faculty. Open to all graduate students. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs. S/NC only. E
521 Principles of Oncology (3) Lectures, classroom discussion, and case reports surveying major topics of oncology. Prereq: Biology 220-30 or consent of instructor. E
541 Molecular Basis for Human Diseases (4) Disease at molecular level. Changes in molecular events in cells that lead to disease and occur as result of disease. Correlation with clinical and pathological states. Prereq: Biochemistry and Cellular and Molecular Biology 410-419 or equivalent. F.A.
545 Clinical Genetics (3) Human genetic disorders: new developments in cytogenetics, molecular gene-
Comparative and Experimental Medicine—Veterinary Medicine

GRADUATE COURSES

Participating departments include: Animal Science, Comparative Medicine, Microbiology, Pathology, Large Animal Clinical Sciences and Small Animal Clinical Sciences. Several faculty in the Department of Microbiology hold joint appointments in the College of Veterinary Medicine. See Microbiology under Fields of Instruction for additional courses.

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

501 Special Topics in Comparative and Experimental Medicine (1-6) Specialized experience in comparative and experimental medicine. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F, Sp

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

503 Predictive Toxicology (3) Principles and techniques of predictive toxicology: structure-activity relationships, expert systems, neural nets and molecular similarity. Sp, A

505 Laboratory Animal Care and Use (2) Review of basic laboratory animal care and use as prerequisite to conducting research using animal subjects. Compliance issues and techniques. F

506 Experimental Animal Surgery (3) Competence in performing surgical modifications of experimental animals. Techniques of anesthesia. Drug administration and postoperative care. Prereq: Embryology, parasitology, physiology and/or consent of instructor. 1 hr and 2 labs. F

530 Wildlife Diseases (2) (Same as Wildlife and Fisheries Science 530.) F, A

551 Mammalian Organology (3) (Same as Animal Science 551.) F

552 Anatomy of Domestic Carnivores (4) (Same as Animal Science 552.) F

561 Pharmacology (4) Principles of pharmacokinetics and pharmacodynamics properties of drugs: mode of action, pharmacologic effects, chemical and physiological properties, metabolism, toxicology, important idiosyncrasies and clinical applications. Prereq: Consent of instructor. F

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

610 Surgical Pathology (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 Clinical Epidemiology (3) Theory and principles of design and analysis of clinical research. Lab: appraisal of biomedical literature and design of proposals for clinical research project. Prereq: Consent of instructor. Sp

607 Diagnosis and Pathogenesis of Virus Diseases of Domestic Animals (3) Advanced study of virus diseases important to domestic animals: virus biology, pathogenesis, pathology and diagnostic techniques. Prereq: Consent of Instructor. 2 hrs and 1 lab. Sp

608 Descriptive and Applied Epidemiology (2) Principles of epidemiologic and historical modern application to diseases of animals. Host-agent relationships, measurement of disease frequency, animal production and disease monitoring and control, field investigations, animal health economics. Prereq: Consent of instructor. Sp

609 Mechanisms of Disease (4) Advanced study in pathobiology and mechanisms of disease: pathophysiology, cellular degeneration, inflammation, immunopathology, hemostasis. Principal biochemical, immunologic responses of various cells, tissues, and organs to injury and other metabolic derangements. Selected contemporary topics from current literature and textbooks. Prereq: Consent of instructor. Sp, A

610 Advanced Topics in Comparative and Experimental Medicine (1-3) Specialized in-depth experience in various disciplines. Current and future research methodology, advance in instrumentation and analytical techniques for comparative medicine. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. E

611 Advanced Topics in Animal Anatomy (1-4) (Same as Animal Science 611.) E

612 Disorders of the Endocrine System (2) (Same as Animal Science 612.) Sp, A

Computer Science

See College of Veterinary Medicine and Comparative and Experimental Medicine

Comparative Medicine

THE MASTER'S PROGRAM

Two semesters of calculus plus two additional semesters of college mathematics (e.g., linear algebra, differential equations, probability) and a course in discrete structures and in systems programming are required for admission. For the master's degree, 30 semester hours of graduate credit are required, 24 of which must be 500 level or above. Computer Science 530, 550 and 580 are required for the degree.

Graduate courses taken outside the department are sometimes allowed but must be approved by the Graduate Committee before enrollment.

Thesis Option

The student must present a thesis topic with a faculty advisor and must pass an oral exam on the problems before enrollment. The student's advisor must verify that an acceptable set of courses has been taken before the student may schedule the examination. Information concerning the examination is available in the departmental office.

Problems in Lieu of Thesis Option

The student must present a thesis topic with a faculty advisor and pass an oral exam on the problems before a committee of three or more faculty members, at least two of whom must be Computer Science faculty.

Master's Minor in Computer Science

The graduate minor consists of any two of the three core courses (530, 550, 580) plus an additional 3 hours of graded computer science graduate-level courses at or above the 400 level.

THE DOCTORAL PROGRAM

A student seeking admission to the Ph.D. program is expected to meet the following requirements:

1. The student should have three letters of recommendation sent directly to the department head from individuals capable of...
assessing the student's potential for advanced work in computer science (for example, college teachers or employers for whom the student has worked after earning a Bachelor's degree). The department reserves the right to contact these individuals or other knowledgeable people if additional information is deemed necessary or desirable.

The student is expected to have taken the GRE verbal and quantitative general test within the past three years and to have these scores sent to The Graduate School.

The student should satisfy the same background requirements as for the master's program. See the departmental brochure for details.

Original research reported in a dissertation of high quality is emphasized. The minimum hour requirements are 24 hours of course 600 Doctoral Research and Dissertation and 24 hours of graduate courses beyond the equivalent of a master's degree (i.e., beyond 30 graduate credit hours) graded A-F. Computer Science 530, 560 and 580 are required for the degree. At least six hours of 600-level graded courses must be taken in computer science at UT. The student's advisor and committee will establish the specific course requirements. The comprehensive examination consists of a departmental written examination and a subsequent oral examination conducted by the student's committee.

GRADUATE COURSES

420 Advanced Topics in Machine Intelligence (3) Search, learning, expert systems, neural networks, pattern recognition and natural language processing. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

430 Advanced Topics in Hardware Systems (3) Architecture, parallel processors, microprogramming, networks and communications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

490 Advanced Topics in Computer Architecture (3) Operating systems, compilers, parallel computation, software engineering, database systems and programming languages. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

471 Numerical Analysis (3) Same as Mathematics 471.

472 Numerical Algebra (3) Same as Mathematics 472.

490 Advanced Topics in Theoretical Computer Science (3) Theory of computation, complexity theory, formal languages and graph theory and its applications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

494 Special Topics in Computer Science (1-3) May be repeated. Maximum 9 hrs.

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

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

522 Cybernetics (3) Various functions in living systems and their actual or potential realization in computers. Prereq: Discrete Structures.

525 Software Engineering (3) Survey of key ideas in software engineering, formal methods, tools, testing, reliability, structured design and development, metrics, management and history of the field.

530 Computer Systems Organization (3) Architecture and systems organization for serial and parallel machines. Required background: Architecture or machine organization.


540 Computer Networks (3) Design of efficient computer communication networks. Hardware and software systems; communications subsystems. Prereq: System Programming and 532.

541 Database Management Systems (3) Data model, theory, optimization, and normalization; intelligent database systems; comparison of implementations; analysis of distributed and networked databases. Prereq: Discrete structures and analysis of algorithms. Prereq: Discrete structures and probability or statistics.


571-72 Numerical Mathematics (3) Same as Mathematics 571-72.

573 Finite Difference Methods for Partial Differential Equations (3) Same as Mathematics 573.

574 Finite Element Methods (3) Same as Mathematics 574.

575 Matrix Theory and Techniques in Numerical Analysis (3) Same as Mathematics 575.

576 Sparse Matrix Computations (3) Solution of large sparse linear systems: graph models, reordering techniques, symbolic factorizations, data structures, numerical algorithms, complexity issues, parallel algorithms. Prereq: Numerical linear algebra.

580 Foundations (3) Fundamental algorithms and algorithm analysis. Required background: Automata theory.

581 Advanced Design and Analysis of Algorithms (3) Analysis of algorithms and relevance of theory to design of efficient computer algorithms. Sorting, searching, graph algorithms, pattern matching, dynamic programming, efficient approximation algorithms. Prereq: 580.

590 Independent Study (1-15) May be repeated.

594 Special Topics in Computer Science (1-3) May be repeated.

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

620 Advanced Topics in Intelligent Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

650 Advanced Topics in Pattern/Image Analysis (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

Consumer and Industry Services Management

(College of Human Ecology)

MAJORS

DEGREES

Human Ecology ........................................ Ph.D.
Recreation, Tourism and Hospitality Management ...................... M.S.
Textiles, Retailing and Consumer Sciences ........................ M.S.

Nancy B. Fair, Head

Professors:

Brsee, Randall R. (Liaison), Ph.D............................. Florida State
Collier, Billie J., Ph.D............................. Tennessee
Duckett, Kermit E., Ph.D............................. Tennessee
Fair, Nancy B., Ph.D............................. NC State
Hayes, Gene A. (Liaison), Ph.D............................. North Texas State
Wadsworth, Larry C., Ph.D............................. NC State

Associate Professors:

Bhat, Gajanan, Ph.D............................. Georgia Tech
Blanton, Mary Dale, Re.D............................ Indiana
Costello, Carol, Ph.D............................. Tennessee
Fairhurst, Ann E. (Liaison), Ph.D............................. Oklahoma State
Krick, Ken L., Re.D............................. Indiana
Lee, Jinkook, Ph.D............................. Ohio State

Assistant Professors:

Lin, Li-Chun, Ph.D............................. Kansas State
Paige, Rosalind, Ph.D............................. Iowa State
Pflaum, Carl, Ph.D............................. Tennessee
Young, Allison, Ph.D............................. Minnesota

The Department of Consumer and Industry Services Management offers the master's degree with majors in Textiles, Retailing and Consumer Sciences, concentrations in textile science and in retail and consumer sciences; and in Recreation, Tourism and Hospitality Management, concentrations in therapeutic recreation, recreation administration, tourism, and hospitality management. An interdepartmental/interdisciplinary minor in gerontology gives the graduate student an opportunity for combining the knowledge and experience about aging in American society with his/her own major concentration.

The programs in Consumer and Industry Services Management prepare students for
careers in industry, business, public and private agencies, and educational institutions. Master's level work enables students to conduct research in retail management and merchandising and in the consumer areas related to retail decision making. Students in textile science are expected to have a solid foundation in mathematics, as well as a formal background in a physical science or engineering. Interested students should contact the department head for more information.

ADMISSION REQUIREMENTS

A complete file for review includes the Graduate School application file, Department of Consumer and Industry Services Management application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology.

In addition to specified entrance requirements stipulated by The Graduate School, admission to the master's degree program with a major in Textiles, Retailing and Consumer Sciences is dependent upon completion of undergraduate courses that give the necessary background for success in the graduate program. For the concentration in retail and consumer science, students should have an adequate background in retailing and/or consumer science supported by coursework in economics, marketing, mathematics, and statistics. For the concentration in textile science, students should have a basic technical background in textile science or materials science supported by mathematics through differential equations, organic chemistry, and general physics.

Students deficient in one or more of the above requirements, may be admitted at the discretion of the department's graduate faculty.

THE MASTER'S PROGRAM

The requirements for the major in Textiles, Retailing and Consumer Sciences are listed below.

Retail and Consumer Sciences (Thesis) Major (Required RCS courses): 510, 511, 541, 550, 562, 590 16
Cognate Area 6
Statistics 6
Thesis 6
Total 34

Retail and Consumer Sciences (Non-Thesis) Major (Required RCS courses): 510, 511, 541, 550, 562 15
Cognate Area 6
Statistics 6
501 (Professional Paper/Project) 6
Electives 9
Total 36

Textile Science (Thesis Option) RCS 552 3
Research Methods* 3
TS 590 1
Textile Science courses 12
Cognate Area 6
Statistics 6
Thesis 6
TOTAL 34

*Must include RCS 562 or equivalent; or 3 hours of laboratory techniques in materials analysis and characterization.

Textile Science (Non-Thesis Option)
Nonwovens Core (Required TS courses: 510, 521, 526, 528, 565) 15
Related Courses 9
Statistics 3
Professional Project, TS 501 3-6
Total 30-33

The major in Recreation, Tourism and Hospitality Management requires 33-36 hours for the thesis option and 30-39 hours for the non-thesis option depending upon the specific concentration. For all thesis concentrations, individuals not possessing an undergraduate degree in the discipline or having appropriate full-time work experience will be required to take 590 (graduate internship).

Requirements for each concentration are:

Hospitality Management
All students (28 hours): Hotel and Restaurant Administration 532, 537, 542; Nutrition 541; Hotel and Restaurant Administration/Nutrition electives (12 hours); related area (6 hours); statistics (3 hours);
Thesis Option (6 hours): 500;
Non-Thesis Option (6 hours): 535; Hotel and Restaurant Administration/Nutrition elective (3 hours); elective (3 hours).

For a description of courses in the hospitality management concentration, see Nutrition.

Recreation Administration
All students (27 hours): 415 or 440, 510, 515, 540, 541; Sport Management 512; statistics (3 hours); research methods (3 hours);
Thesis Option (6 hours): 500;
Non-Thesis Option (9 hours): 590 (6 hours); elective (3 hours).

Therapeutic Recreation
All students (24 hours): 420 or 425, 510, 515, 520, 522; statistics (3 hours); research methods (3 hours);
Thesis Option (9 hours): 500; elective (3 hours);
Non-Thesis Option (12 hours): elective (6 hours); 590 (3-6 hours).

Tourism
All students (30 hours): 470, 510, 515; Hotel and Restaurant Administration 532, 542; Marketing 510; Hotel and Restaurant Administration 555 or Planning 540; Planning 548 or 560; statistics (3 hours); research methods (3 hours);
Thesis Option (6 hours): RTM or HRA 500;
Non-Thesis Option (9 hours): 590 (3-6 hours); elective (3-6 hours).

THE PH.D. CONCENTRATIONS

Retail and Consumer Sciences
Students enrolled in the Ph.D. program with a concentration in retail and consumer sciences are provided with a foundation in management and retail and consumer sciences to further theory and application in advanced study and research. Requirements are either 81 or 90 hours, depending upon whether students select a minor in statistics. Requirements include:

RCS Required Courses: 614, 615, 625, 641, 651 15
Research Methods: 590, 616 5
Statistics 12-15
Cognate Area 9
Human Ecology 630 3
Electives 21
Dissertation 24
Total 83-99

Textile Science
Students enrolled in the Ph.D. program in Textile Science take one common course which provides a foundation for the integration of textiles and apparel in the context of the near environment. A required departmental research seminar exposes students to research being conducted in all areas of study in the department. Requirements include:

Textile Science Courses 18
TS 552 3
TS 590 2
Cognate Area 9
Statistics (500-600 level) 6
Research Methods* 6
Electives 14
Dissertation 24
Total 82

*Must include 6 hours of laboratory techniques in materials analysis and characterization.

Note: Students must take a minimum of 9 hours at the 600-level in the College of Human Ecology, exclusive of dissertation. Transfer students with a master's degree from another institution are required to complete at least 42 hours (including dissertation hours) from UT.

ACADEMIC STANDARDS

1. Evaluation of student progress will normally occur prior to enrollment for thesis hours (or the non-thesis option) and during the second semester of full time enrollment in the program. The review of the student will be undertaken by the faculty with consideration given to factors such as: GPA (minimum 3.0), portfolio evaluation, and demonstrated research capability.

2. If progress or performance is deemed insufficient, the faculty may recommend probation with specific goals set for a specified time or termination.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S. program in Recreation, Tourism, and Hospitality Management is available to residents of the state of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.
Hotel and Restaurant Administration

GRADUATE COURSES

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

502 Registration for Use of Facilities (3-15) Required for the student or otherwhised 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

530 Computer-Assisted Foodservice and Lodging Management (3) Application of computer technology to foodservice and lodging industry; inventory, cost accounting, production, nutrition, management, and sales planning and analysis. Prereq: Quantity Food Procurement, Production and Service, Microcomputer Applications or consent of instructor. F, A

531 Advanced Financial Management (3) Financial planning, operations and evaluation techniques used in foodservice and lodging management; developing budgets, accounting systems and financial reports. Prereq: Food and Lodging Cost Control or consent of instructor. F, A

532 Advanced Human Resource Management (3) Identifying labor needs; development and maintenance of work force; management of complex human resources. Prereq: Food and Lodging Personnel Development or consent of instructor. F, A

533 Advanced Food Production and Delivery System Management (3) Analysis of food production and delivery systems; application of quantitative methods and models to optimize decisions. Prereq: Quantity Food Procurement, Production and Service or consent of instructor. F

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

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

537 Seminar in Foodservice and Lodging Administration (1) May be repeated. S/NC only. F

542 Advanced Hotel Administration (3) Strategic management of hotel organizations. Theoretical and applied literature on formation and implementation of strategy; external and internal factors relevant for business and corporate level decisions. Consideration of role of marketing in hotel firms. Analysis of industry and case studies. Prereq: 501, 502, 532. S, A, P

544 Experimental Study of Quantity Food Production (3) Design and preparation of food products applicable to foodservice industry. Market research, sensory evaluation, production techniques, and microbiological evaluation of food. Prereq: Quantity Food Procurement, Production and Service with lab, or Observation, Hospitality Sales and Marketing, 542 and Nutrition 413, or equivalents. F, A

547 Field Experience (3-9) Experience in food- and lodging-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. S/NC only. E

555 Foodservice and Lodging Law (3) Management organization and policy as imposed or granted by law. Legal research to determine legal principles at state and federal levels which impact industry. Prereq: Hospitality Law or equivalent, or consent of instructor. S, A, P

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

Retail and Consumer Sciences

GRADUATE COURSES

411 Entrepreneurship and Small Business Management (3) Concepts of entrepreneurship within single ownership and other business organizations; risk taking and risk management; management of small business; current issues and problems. Prereq: Marketing 301 Principles of Marketing. Accounting 202 Principles of Managerial Accounting. E

412 Direct Retail Methods (3) Use of direct selling methods to sell goods and services. Analysis of consumer and product/service types for integrated direct retail methods. Direct mail, catalogs, telemarketing, infomercials, and electronic commerce (internet). Prereq: 301. S, A, P

415 Retail Promotion (3) In-store promotional activities; development of retail promotion strategies; evaluation of retail promotions; supplementary focus on advertising and other methods to communicate in-store promotions. Prereq: 376 Strategies for Growth. E

450 Economics of Consumer Choice (3) Micro and macro economic approaches to consumer choice across life span; demographics; economic status of consumers; demand analysis; market structures and its impact on consumers; economic analysis of information, implications on private and public sectors. Required background: Introductory economics. E


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

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Enrollment limited to retail and consumer sciences students in non-thesis program. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. E

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

510 Retail Strategy and Decision Making (3) Strategy, strategic management and strategic process in retail sector. Analytical decision-making skills in retailing. Retail industry structure, international differences in retail systems. Prereq: Retail Management or equivalent. S


512 Distribution Systems (3) Analysis of food distribution systems; inventory control, commercial/public cooperative ventures and microcomputer applications. Prereq: 430 or consent of instructor. S

541 Management and Operation of Recreation and Sport Related Facilities (3) Research for making program and management decision, process of cost analysis, and basic design and maintenance of recreation and sport related facilities. Prereq: Consent of instructor. S

590 Graduate Internship (3-6) Required of all graduate students. Minimum 50 clock hrs for each credit. Work experience, evaluation by agency and university and written paper required. E

591 Directed Study in Leisure & Recreation (1-6) Detailed study of theme, issue, or concern. Designed to meet needs of individual students. May be repeated. Maximum 6 hrs. E

592 Special Topics in Recreation & Leisure Studies (1-6) May be repeated. Maximum 6 hrs. E
Textile Science

GRADUATE COURSES

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

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Enrollment limited to textile science students in non-thesis program. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/N only.

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

510 Fiber Science (3) Physical properties, mechanical properties and microstructure of polymeric fibers; relation to end-use properties. Prereq: Organic Chemistry and Thermal Physics or equivalent.


521 Nonwovens Science and Technology I (3) Nonwoven fabric technology: different web forming processes; and relationships among the chemical, morphological and mechanical properties of fibers and orientation in webs to final performance properties of bonded structures. Prereq: Organic chemistry or consent of instructor.

526 Nonwovens Science and Technology II (3) Interrelations between mechanics of production and mechanical properties of nonwoven fabrics; characterization of fiber morphology and web structure; chemistry of nonwoven binders and finishes, and engineering of specific fabric properties. Prereq: 521 or equivalent.

528 Laboratory Methods in Nonwovens Processing and Characterization (3) Laboratory experience in nonwovens fabrication processes and characterization techniques. Effect of processing conditions on structure development and properties of different types of webs. Prereq: 510 and 521.

552 Economics of Textile Complex (3) Economics consideration of U.S. textile complex. Quantitative approaches to industry structure, production marketing, distribution and institutions within both global and domestic settings. Current and future international issues and implications. Prereq: Calculus III or equivalent; micro economics. F,A


590 Research Seminar (1) Research topics in textile science. May be repeated. S/N only. F,Sp

593 Directed Study (1-3) Individual problems in retailing and consumer sciences. Prereq: 9 hrs retailing and consumer sciences graduate coursework. May be repeated. Maximum 9 hrs.

595 Special Topics in Retail and Consumer Sciences (1-3) Lecture, group discussion on specialized topics: retail industry structure, international trade, international retailing, consumer affairs, entrepreneurship, small business management, issues in retail management, issues in retail strategy, quality perception by consumers, product and service value, retailing to children, retailing and special populations in current significance: to retail and consumer sciences. Prereq: 9 hrs retailing and consumer sciences graduate coursework or consent of instructor. May be repeated. Maximum 9 hrs.

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


616 Research Methods, Models and Measurement in Retail and Consumer Sciences (3) Quantitative methods and analytical concepts in research process. Mathematical and statistical formulation of retail and consumer sciences phenomena, utilizing models, model building and measurement constructs. Prereq: 562, 566, 568, 569, F,Sp.

625 Strategic Managerial Retailing (3) Decision-making orientation that integrates strategic framework components with preparation and analysis of specific retail case situations. Prereq: 510.

641 Retail Consumer Behavior (3) Theories and concepts from social science in relation to ultimate consumer's behavior. Prereq: 6 hrs of sociology and/or psychology or consent of instructor.

651 The Consumer and Public Policy (3) Public policy issues within consumer environments. Analysis of past and present policies within economic, social, legal and business frameworks. Implications of consumer issues and policy alternatives. Literature and research focus. Prereq: 550 or consent of instructor.

695 Advanced Topics in Retail and Consumer Sciences (3) Lecture, group discussion, individual research on advanced topics and research areas of current significance to retail and consumer sciences. Prereq: 9 hrs graduate hours in retailing and consumer sciences. May be repeated. Maximum 9 hrs.

Counseling, Deafness and Human Services

(Office of Education)

MAJORS

DEGREES

Counseling .................... M.S., Ed.D., Ph.D.

Counseling psychology .......... Ph.D.

Counselor education .............. Ed.D.

Counselor education ......... Ph.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.

Counselor education .......... Ed.D.
The M.S. in Counseling and Ed.S. degree program with their respective concentrations are accredited by the Council for Accreditation of Counseling and Related Educational Programs. In addition, the counseling psychology concentration under the college-wide Ph.D. program is accredited by the American Psychological Association. Finally, the concentration in counselor education is accredited by the Council for Accreditation of Counseling and Related Educational Programs.

The department includes several educational programs sponsored by the U.S. Department of Education, Office of Special Education and Rehabilitation Services, Rehabilitation Services Administration, including: Regional Rehabilitation Continuing Education Program, Orientation to Deafness, Southeastern Regional Interpreters Training Consortium, National Interpreter Training Center, and the Educational Interpreting program.

The department emphasizes research-based practices that address the growth and development of the whole person throughout the lifespan. In its counseling programs, it concentrates on maximizing development and adjustment of individuals through prevention and treatment models in schools, colleges, community agencies, businesses, and private-practice settings. In its rehabilitation programs, it pursues improvement in the quality of life for persons with disabilities and focuses research interests on the development of new knowledge and technology to meet the unique educational, social, and employment needs of this population. A major goal of the department is the preparation of graduates for future leadership and professional roles in business and industry, education, and community and government service.

The application deadline for admission to the doctoral and Ed.S. programs is February 1; and November 1 and February 1 for the master's program.

ADMISSION REQUIREMENTS

Admission requirements include up-to-date scores from the GRE for the major in Counseling, a departmental admissions application form and letters of recommendation. For the doctoral program, a writing sample is also required.

Counselor Education and Counseling Psychology

GRADUATE COURSES

410 Gender Role Development: Implications for Education and Counseling (3) Theories and research: development of gender roles and their relevance to identity and behavior in socio-psychological, educational, and counseling settings. (Same as Women's Studies 410) F, Su

431 Personality and Mental Health (3) Various perspectives of mental health with application to education and other social institutions. E

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

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


504 Special Topics (1-3) Instructor-initiated course offered at convenience of academic unit on topics of current interest. May be repeated. Maximum 16 hrs. S/NC or letter grade. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Statistics and Research Design: Conceptual (3) Consumer-oriented, conceptual treatment of statistics, research design, and quantitative basis of testing. E

525 Formal Measurement in Education and Counseling (3) Principles of test construction and item analysis. Survey of standardized tests of intelligence, achievement, aptitude, vocational interest, attitudes and personality. Prereq: 520 or equivalent. F, Su

535 Ethical, Legal, and Professional Issues in Counseling (3) Professional practices in school and community counseling and related fields: education, research, standards of practice, credentialing, and policy. Prereq: Admission to counseling program or consent of instructor. Su, A

550 Introduction to Pupil Personnel Programs (3) History, philosophy, professional standards, counselor role in relation to personnel staff and mental health professionals, and ethics of profession. F

551 Theory and Practice of Counseling (3) Philosophical bases of helping relationships; development of counselor and client self awareness; counseling theory/techniques. F, Su

552 Career Development: Vocational Theory, Research and Practice (3) Relationship of vocational theory, career development research and societal factors to life career roles. E

553 Career and Educational Information Systems and Resources (3) Use of print and non-print materials: computer-based systems, for career and educational placement. Prereq: 552 or consent of instructor and Internet access account. Sp

554 Group Dynamics and Methods (3) Theory and types of groups, descriptions of group practices, methods, dynamics, and facilitative skills, supervision of leadership skills. E

555 Practicum in Counseling (3) Supervised practicum and application of counseling skills with individual clients. Prereq: Admission to counselor education program; 556 and 551 and consent of instructor. May be repeated. Maximum 9 hrs. E

556 Orientation to Mental Health Counseling (3) Mental health counseling as profession: professional organizations, work settings, code of ethics, certification requirements, and role identity. F, Sp

558 Internship in School Counseling (1-6) Supervised postpracticum employment at academic unit approved site. Prereq: 550 and consent of instructor. May be repeated. Maximum 15 hrs. S/N only. E

559 Internship in Community Counseling (1-6) Supervised postpracticum employment at academic unit approved site. Prereq: Admission to counselor education program; 556 and 551 and consent of instructor. May be repeated. Maximum 12 hrs. S/N only. E

561 Development and Operation of School Counseling Programs (3) Management of comprehensive school counseling programs to include needs assessment, program goals, resource identification, evaluation, and use of computer-based program management software. Prereq: 550. Sp, Su

565 Facilitation of Technical Task Groups (3) Technical and social aspects of group dynamics in context of technical task groups. Application of counseling techniques to facilitation of workplace teams. Prereq: 551, 554, or consent of instructor.

566 Approaches to Family Intervention and Counseling (3) (Same as Child and Family Studies 566)

655 Practicum in Counselor Education (3) Supervised practicum and application of counseling skills with individual clients. Prereq: Admission to counselor education program and consent of instructor. May be repeated. Maximum 12 hrs. S/N only. E

661 Education Implications of Neuropsychology (3) Theories of assessment, Common syndromes and their behavioral and cognitive manifestations. Prereq: 516; and 541 or equivalent individual assessment course; or consent of instructor. Sp, A

662 Applied Research Design (3) Planning of empirical investigations; collection of data; and drawing of inferences from evidence gathered. Prereq: Two-course sequence in statistics. F


671 Personvity and Vocational Assessment (3) Use and interpretation of personality and vocational measures of assessment of clients. Prereq: 555, 551 or consent of instructor. A

672 Psychological Dysfunction (3) Classification methods, dynamics and treatment of dysfunctional individuals in counseling. Prereq: 625 and 680 in abnormal psychology, or consent of instructor. A

673 Advanced Theory and Practice in Group Counseling (3) Theories and supervised practice. Prereq: 554, 555, and consent of instructor. F

674 Practicum in Counseling Psychology (3) Supervised practicum of individual counseling. Minimum 135 clock hours required each semester. Prereq: Admission to counseling psychology doctoral program, 555, and consent of instructor. May be repeated. Maximum 6 hrs. E

570 Cross-Cultural Counseling: Theory and Research (3) Theory and research on issues and problems in counseling of clients from different cultural backgrounds in U.S. and abroad. Sp

571 Individual Cognitive Assessment in Counseling (3) Basic concepts and applications in individual assessment of intelligence; proficiency in administrative interpretation for clients and children. Stanford-Binet. Prereq: 525 and 520 and admission to counseling program or consent of instructor. S, N only, Sp, A

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Educational Psychology 585, Exercise Science 585, Nursing 585, Public Health 585, Social Work 585, and Sociology 585.)

593 Independent Study (1-3) May be repeated. S/N only or letter grade. E

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

602 Directed Research (1-3) Instructor-initiated group investigation of empirical and theoretical problems in educational and counseling psychology. May be repeated. Maximum 12 hrs. S/N only. E

604 Special Topics (1-3) Instructor-initiated courses offered at convenience of academic unit on topics of interest. May be repeated. Maximum 15 hrs. S/N or letter grade. E

625 Advanced Study in Personality (3) Theory, research and conceptual analysis of studies with application to education and counseling. Prereq: 431 or equivalent. F

635 Ethical, Legal, and Professional Issues in Psychology (3) (Same as Psychology 635 and Educational Psychology 635.) Sp

650 Seminar in Counselor Education (1) Professional issues related to role and function of counselor-educator. Prereq: Admission to doctoral program in counselor education. May be repeated. Maximum 2 hrs. S/N only. F

655 Practicum in Counselor Education (3) Supervised practice and application of counseling skills with clients. Prereq: Admission to counselor education program and consent of instructor. May be repeated. Maximum 6 hrs. Sp

659 Internship in Counselor Education (1-6) Supervised employment in academic unit approved internship sites in counselor education. May be repeated. Maximum 12 hrs. S/N only. E

661 Education Implications of Neuropsychology (3) Theories of assessment. Common syndromes and their behavioral and cognitive manifestations. Prereq: 516; and 541 or equivalent individual assessment course; or consent of instructor. Sp, A

662 Applied Research Design (3) Planning of empirical investigations; collection of data; and drawing of inferences from evidence gathered. Prereq: Two-course sequence in statistics. F


671 Personality and Vocational Assessment (3) Use and interpretation of personality and vocational measures of assessment of clients. Prereq: 555, 551 or consent of instructor. A

672 Psychological Dysfunction (3) Classification methods, dynamics and treatment of dysfunctional individuals in counseling. Prereq: 625 and 680 in abnormal psychology, or consent of instructor. A

673 Advanced Theory and Practice in Group Counseling (3) Theories and supervised practice. Prereq: 554, 555, and consent of instructor. F

674 Practicum in Counseling Psychology (3) Supervised practicum of individual counseling. Minimum 135 clock hours required each semester. Prereq: Admission to counseling psychology doctoral program, 555, and consent of instructor. May be repeated. Maximum 6 hrs. E
Rehabilitation and Deafness

GRADUATE COURSES

415 Language Development of Deaf/Hard of Hearing I (3) Language problems of hearing impaired contrasted with scope and sequence of normal language development. Formal linguistic systems used to describe language development problems.


419 Speech Development of Deaf/Hard of Hearing (4) Theories of speech development, approaches in training perception and production of speech, and aural rehabilitation. Practicum experiences.

424 Nature of Hearing Impairments (3) Basic principles of audiology: anatomy and physiology of hearing; nature and causes of hearing loss; methods and instrumentation for assessment of hearing level; interpretation of audiologic services to medical and other rehabilitative disciplines.

425 Introduction to the Psychology and Education of the Deaf/Hard of Hearing (3) Primarily for those planning to teach hearing impaired. Overview of research related to psychology, social adjustment, communication methodology, language development and education of hearing impaired. Survey of literature. Visits to programs.

431-32 American Sign Language III, IV (3,3) Fluency of expressive and receptive sign communication skills. Use of language in context. Grammatical structures of ASL and cultural implications of deaf community. Must be taken in sequential order. Prereq: 426; 431 for 432 or consent of instructor.

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

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


504 Clinical Experience in Teaching an Supervision of Exceptional Children (3-9) Same as Special Education 504.

509 Vocational Guidance and Career Planning With Hearing Impaired (3) Utilization of psychological, educational, social and vocational, diagnostic materials and resources appropriate for hearing impaired persons to provide guidance in career decisions and individualized rehabilitation plan.

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only.

523 Practicum with Deaf/Hard of Hearing (3) Receptive and expressive language capabilities of hearing impaired student. Designing teaching, and post-testing unit of instruction for remediation of specific language errors.


529 Teaching Reading to Deaf/Hard of Hearing (3) Specific methods necessary to teach the profoundly hearing impaired student. Practice in preparation of developmentally appropriate reading programs. Prereq: Admission to professional education. May be repeated. Maximum 12 hrs. S/NC only. E

530 Orientation to Rehabilitation (3) History, philosophy, legal and economic bases, current issues, and practices in public and private rehabilitation programs. Qualifications of service providers. Assessment, planning development, and provision of services for people who have disabilities and vocational handicaps. Identification, mobilization, and utilization of rehabilitation resources.

532 Case Management in Rehabilitation (3) Techniques and procedures involved in management of caseloads in Federal-State vocational rehabilitation agencies; private rehabilitation companies, and public and private rehabilitation programs. Principles of administrative management, and provision of services to people who have disabilities and vocational handicaps. Identification, mobilization, and utilization of rehabilitation resources.

533 Job Analysis, Development, and Placement (3) Determining employment-readiness of people with disabilities. Identifying appropriate jobs for selected clients, and assisting clients in seeking, obtaining, and retaining employment. Job analysis, job modification and re-engineering techniques, and employer-service- ing techniques; legislation and interpretation of job placement; methods supported work; and use of occupational information.

535 Vocational Evaluation: Statistical Methods (3) Process principles and techniques used to determine vocational assets and liabilities of people with disabilities. Functional analysis of biographical and interview data; selection and application of relevant psychometric instruments; integration of statistical data into diagnostic reports; application of computer-generated reporting systems.

537 Vocational Evaluation: Clinical Methods (3) Process, principles, and techniques used to assist individuals in determining and understanding their own work behavior and vocational potential. Selection and use of occupational exploration programs and work samples; application of situational tasks, job tryouts, and simulated work experiences in vocational evaluation. Clinical interpretation of data through formal staff conference, vocational counseling, and report writing.

539 Disability Management (3) Return-to-work issues in disability management programs: early intervention, quality services, and cost containment standards. Procedures for rehabilitation counseling/case managers in private sector rehabilitation.

541 Psychosocial Aspects of Disability (3) Psycho-social impact of disability on person and family. Reaction to loss, coping with disability, and societal rehabilitation.

543 Medical Aspects of Disability (3) Pathology and clinical symptoms related to disabling conditions served by special education and rehabilitation personnel. Restrictive measures to eliminate or minimize resulting handicaps. Skills necessary to communicate with lay and professional persons.

545 The Rehabilitation Interview (3) Interview as used in assessment and planning with people who have disabilities and vocational handicaps.

547 Practicum in Rehabilitation (3) Supervised experience in area of rehabilitation; application of concepts, principles, and skills. Prereq: Consent of instructor.

549 Internship in Rehabilitation Counseling (12) Supervised practice in rehabilitation counseling. Full time clinical experience for second-year students (600 clock hrs required).

579 Special Topics (1-3) Prereq: Admission to graduate program. May be repeated. Maximum 9 hrs. S/NC or letter grade.

693 Independent Study (1-3) May be repeated. S/NC or letter grade.

699 Independent Study (1-3) May be repeated. S/NC or letter grade.

Ecology and Evolutionary Biology

MAJOR

DEGREES

Ecology and Evolutionary Biology (College of Arts and Sciences)

T. G. Hallam, Head
C. R. Boake, Associate Head

Professors:
Boake, C. R. B., Ph.D. .................. Cornell
Bunting, D. L., Ph.D. ..................... Oklahoma State
Burghardt, G. M., Ph.D. ................. Chicago
Delcourt, H., Ph.D. ...................... Minnesota
Delcourt, P. A., Ph.D. ................... Minnesota
Echternacht, A. C., Ph.D. ............... Kansas
Ettrier, D. A., Ph.D. ..................... Minnesota
Greenberg, N. B., Ph.D. ............... Rutgers
Gross, L. J., Ph.D. ....................... Cornell
Hallam, T. G., Ph.D. .................... Missouri
Harris, W. F., Ph.D. ..................... Tennessee
McCormick, J. F. (Emeritus), Ph.D. ... Emory

592 Assistive Technology in Special Education and Vocational Rehabilitation (3) Technology as applied to needs of children and youth with disabilities. Delivery of assistive technology services; software programs and assistive devices; delivery systems, interdisciplinary evaluation/planning, and funding issues.

593 Independent Study (1-3) May be repeated. S/NC or letter grade.

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

601 Seminar in Educational Theories in Special Education and Rehabilitation (3) Education theories: education and rehabilitation of exceptional persons. Theory applications in educational settings. Prereq: Admission to doctoral program or consent of instructor.

602 Seminar in Social Processes in Special Education and Rehabilitation (3) Social phenomena which influence impact of disability on person and on significant others. Implications for habilitation. Prereq: Admission to doctoral program or consent of instructor.

603 Seminar in Research in Special Education and Rehabilitation (3) Development and implementation of research. Independent research studies. Research proposals. Prereq: 9 hrs of research core and consent of instructor.

610 Internship in College Teaching and Supervision (3-9) Prereq: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

620 Internship in Research in Special Education and Rehabilitation (3-9) Prereq: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Advanced level field experiences under supervision of practitioners. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

679 Special Topics (1-3) Prereq: Admission to doctoral program. May be repeated. Maximum 9 hrs. S/NC or letter grade.

693 Independent Study (1-3) May be repeated. S/NC or letter grade.

Ecology and Evolutionary Biology
McCrank, G. F., Ph.D. ............... Cornell
Pan, M. L., Ph.D. ....................... Pennsylvania
Pimn, S. L., Ph.D. ....................... New Mexico State
Riehert, S. E., Ph.D. ....................... Wisconsin
Sayler, G. S., Ph.D. ....................... Idaho
Schultz, T. W., Ph.D. ....................... Tennessee
Simberloff, D. (Gore Hunger Chair of Excellence), Ph.D. ............... Harvard
Stacey, G., Ph.D. ....................... Texas
Vaughan, G. L. (Emeritus), Ph.D. ............... Duke

Associate Professors:
Amundsen, C. C., Ph.D. ............... Colorado
Drake, J. A., Ph.D. ....................... Purdue
Fox, D. J., Ph.D. ....................... Johns Hopkins
Gavrilits, S., Ph.D. ....................... Moscow State
Pigliucci, M., Ph.D. ....................... Connecticut

Assistant Professors:
Cruzan, M. B. C., Ph.D. ... SUNY (Stony Brook)
Weltzin, J., Ph.D. ....................... Arizona

Research Associate Professor:
Grebmeier, J. M., Ph.D. ............... Alaska

Shared faculty are drawn from other University departments, the Oak Ridge National Laboratory, the National Biological Service, and the Tennessee Valley Authority.

The Department of Ecology and Evolutionary Biology administers an interdisciplinary graduate program which offers the Master of Science and Doctor of Philosophy degrees with a major in Ecology and Evolutionary Biology and concentrations in behavior, ecology (including mathematical ecology) and evolutionary biology.

**Requirements for Admission**

Applications are accepted once a year. The deadline for receipt of all application materials is June 1 for those applicants wishing to enroll in the following Fall or Spring semesters. Applications incomplete as of that date, or received after that date, will not be considered. Applicants are expected to have an academic background consistent with a Bachelor's degree in one of the life sciences. They are expected to have completed a minimum of one year of general biology, two years of chemistry including one year of general chemistry, one year of physics, and one year of college-level calculus. Occasionally, applicants who are highly qualified otherwise but lack one of these courses or course sequences will be admitted with the understanding that the deficiency will be made up within the first year of graduate study. Applicants are required to submit scores from the general Graduate Record Examination (GRE) and successful applicants will usually have a composite score on the verbal, mathematical and analytical sections of the GRE of at least 1650. Submission of scores on appropriate (e.g., biology, mathematics) advanced GRE examinations is recommended but not required. Applicants are also expected to have an overall grade-point average of at least 3.0, and 2.7 or above for all science and mathematics courses, on a 4.0 scale (successful applicants will usually have grade-point averages well above these minima).

Application must be made to both the Graduate School and the department. The departmental application requires 3 letters of reference from persons capable of assessing the applicant's suitability for graduate work in ecology. It is a prerequisite to state 1) one's educational goals and reasons for applying to this program. Applicants for the doctoral degree are expected to have made prior contact with potential advisors in the department's graduate program and this approach is recommended for applicants for the Master's degree program as well. Inquiries should be directed to the Chair, Graduate Affairs Committee, Department of Ecology and Evolutionary Biology, The University of Tennessee, Knoxville, TN 37996-1610.

**The Master's Programs**

In addition to general requirements of the Graduate School, aspirants for the Master of Science degree are expected to: (1) during the first semester in residence, take a prescriptive diagnostic examination covering major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy; (2) complete course requirements as determined by the department and the student's faculty thesis research committee; and (3) satisfactorily complete and defend a research thesis.

**The Doctoral Programs**

In addition to general requirements of the Graduate School, aspirants for the Doctor of Philosophy degree are expected to: (1) during the first semester in residence, take a prescriptive diagnostic examination covering major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy; (2) complete course requirements as determined by the department and the student's faculty dissertation research committee; and (3) satisfactorily complete and defend a dissertation. The department does not require a reading knowledge of a foreign language, but this may be imposed by the student's faculty dissertation research committee. If so, the student has the option of demonstrating knowledge of the prespecified language by one of the following means: (a) passing the official reading examination given by the language department; or (b) earning a grade of at least a B in the second semester of a special language reading course for graduate students.

**Minor in Environmental Policy**

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

**Graduate Courses**

403 Plant Evolution (3) (Same as Botany 403.)
411-12 Minicourse in Ecology and Evolutionary Biology (2) Selected advanced topics in ecology, behavior, and evolutionary biology. Concentrated in time and subject matter. Consult department listing for topics offered. Prereq: As announced. May be repeated. Maximum 4 hrs may apply toward departmental major.

431 Plant Ecology (4) (Same as Botany 431.)
446 Introduction to Oceanography (4) Basic oceanography: physical, chemical, geological and biological processes and patterns. Oceanic systems: upwellings, polar oceans, hydrothermal vents, gyres, coral reefs, estuaries, and coastal regions. Field trip to coast required. Prereq: General Biology and General Chemistry. General Ecology recommended.

450 Comparative Animal Behavior (3) Principles and methods of ethology: ecological, developmental, physiological and evolutionary aspects. (Same as Psychology 450.)

459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. Coreq: 450. (Same as Psychology 459.)


461 Special Topics in Organismal Biology (3) Evolution, ecology, biogeography, classification, and anatomy of selected animal and plant taxa. Prereq: General Ecology or consent of instructor.

470 Aquatic Ecology (3) Introduction to the physical-chemical nature of inland waters with description of biotic communities and their interrelationships. Prereq: General Chemistry and General Ecology. 2 hrs and 1 lab.


484 Conservation Biology (3) Application of principles and techniques of ecological research to conservation of biological diversity at genetic, population, community, and ecosystem levels. Prereq: General Genetics and General Ecology.

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

502 Registration for Use of Facilities (3-12) Requircd of all new graduate students to current research of the student before use is permitted. Prereq: Registration for Use of Facilities. May be repeated. S/NC only. E

503 Ecology and Evolutionary Biology Seminar (1) Advanced topics in ecology, behavior, and evolutionary biology. Senior departmental majors encouraged. Required of all first- and second-year graduate students. May be repeated. Maximum 4 hrs. S/NC only.

504 Special Topics (1-3) Selected directed readings or special course topics of current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 3 hrs. S/NC only.

505 Basic Concepts in Organic Evolution (3) Processes and patterns in organic evolution. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. F

507 Basic Concepts in Ecology (3) Contemporary issues in ecology. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. Sp

508 Introduction to Faculty Research (1) Orientation of new graduate students to current research of department and to graduate faculty. Prereq: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. S/NC only.

509 Foundations: Readings in Ecology (1-2) Readings and discussion of classic papers in field.

511 Foundations: Readings in Evolution (1-2) Readings and discussion of classic papers in field.

513 Foundations: Readings in Behavior (1-2) Readings and discussion of classic papers in field.
515 Foundations: Readings in Environmental Toxicology (1-2) Readings and discussion of classic papers in field.

516 Colloquium in Ethology (1) (Same as Psychology 516.)

520 Ecology for Planners and Engineers (3) Ecological principles and the effects that human-caused changes have on living organisms. Lectures and field trips. Appropriate for students in Planning and Environmental Engineering. Not intended for graduate students in Ecology and Evolutionary Biology.

524 Physiological Ecology of Animals (3) Adaptive physiological response of animals to natural changes in the environment. Prerequisites: Undergraduate course in animal physiology or consent of instructor.

525 Ecology and Development in the Amazon (3) Study of natural history, ecosystem diversity and function, and opportunities for sustainable economic development. Prerequisites: Undergraduate course in the Amazon Basin. Includes field trip of 7-10 days to Manaus, Brazil.

540 Insect Taxonomy I: Major Orders (3) Survey of classification of major orders of insects, with practical experience in identification of insects at family level. Prerequisites: Consent of instructor. 4 hrs combined lecture and lab.

541 Insect Taxonomy II: Minor Orders (3) Survey of classification of minor orders of insects, with practical experience in identification of insects at family level. Prerequisites: Consent of instructor. 4 hrs combined lecture and lab.

542 Insect Structure and Function (3) Integrated study of morphology and physiology in insects. Prerequisites: Consent of instructor. 3 hrs lab and field study.

543 Aquatic Insects (3) Taxonomy and biology of aquatic insects; immature forms. Prerequisites: Consent of instructor. 2 hrs and 1 lab.

544 Fresh Water Invertebrate Zoology (3) Ecology and taxonomy of fresh water invertebrates exclusive of insects. Prerequisites: Comparative Invertebrate Biology or equivalent and consent of instructor. 3 hrs lab and field study.

545 Advanced Animal Behavior (3) Second-level course in ethology, stressing evolution, genetics, physiology, ecology, and human behavior. Prerequisites: Consent of instructor. 3 hrs lab and field study.

547 Conceptual Foundations of Evolution and Behavior (3) (Same as Psychology 547.)

552 Development Planning in the Third World (3) (Same as Planning 552.)

555 Environmental Planning (3) (Same as Planning 555.)

556 Ice-Age Environments and Global Climate Change (3) Glacial-interglacial climatic cycles and dynamic responses of landscapes within glacial, periglacial, and non-glacial environments across North America over past 2.5 million years. (Same as Geological Sciences 555.)

557 Quaternary Ecology (3) Perturbation, process, and pattern in Quaternary ecosystems; climatic change and vegetational response during last 2.5 million years. Prerequisites: Consent of instructor. (Same as Geological Sciences 557.)

560 Biometry (3) Statistical applications in biological research. Prerequisites: Statistics course or consent of instructor.

561 Environmental Toxicology (3) Basic concepts in toxicology: molecular toxicology and detoxification, reproductive toxicology, mutagenesis, teratogenesis, carcinogenesis, and their effects on environment. Prerequisites: Biochemistry and Cellular and Molecular Biology 410, Organic Chemistry or consent of instructor. (Same as Biochemistry and Cellular and Molecular Biology 561.)

575 Ecological Genetics (3) Genetics of natural populations, using both single-locus and quantitative genetical approaches. Prerequisites: 573 and statistics course.

577 Landscape Ecology (3) Ecological structure, function, and change through time of landscape mosaics: quantitative measures of landscape heterogeneity; response of organisms to changes in landscape heterogeneity. Prerequisites: General Ecology or equivalent or consent of instructor.

581-582 Mathematical Ecology (3,3) (Same as Mathematics 581-582.)

583 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prerequisites: Ecology course or consent of instructor.

585 Mathematical Evolutionary Theory (3) (Same as Mathematics 585.)

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

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

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

601 Advanced Topics (1-3) Readings and discussion of recent advances in the field. Prerequisites: Departmental offerings and departmental consent of instructor. Maximum 9 hrs.

604 Current Topics in Environmental Toxicology (1) Critical reviews of research problems and methods in environmental toxicology, behavioral toxicology, biochemical and ecological effects of xenobiotics and epidemiology. Presentations by students, faculty and guest lecturers from academia and industry. May be repeated with consent of department. Maximum 9 hrs.

635 Environmental Assessment and Sustainable Development in Third World Countries (3) Concepts and methods of environmental impact assessment and risk assessment. Sustainable development concepts and issues in developing countries. Prerequisites: General Ecology or equivalent. (Same as Botany 635 and Planning 635.)

681-682 Advanced Mathematical Ecology (3,3) (Same as Mathematics 681-682.)

Economics

(College of Business Administration)

MAJORS

DEGREES

Economics .................................. M.A., Ph.D.
Business Administration .................. MBA

Matthew N. Murray, Head

Professors:

Bohn, Robert A., Ph.D. .................... Washington (St. Louis)
Bowley, Roger L. (Emeritus), Ph.D. ...... Texas
Carroll, Sidney L., Ph.D. ................. Harvard
Chang, Hui S., Ph.D. ..................... Vanderbilt
Clark, Don P., Ph.D. ..................... Michigan State
Coles, William E. (Emeritus), Ph.D. .... Texas
Davidson, Paul (Fred Hollow Chair of Excellence), Ph.D. ........ Pennsylvania
Davidson, William F., Ph.D. ............. Ohio State
Garrison, Charles B., Ph.D. ............ Kentucky
Herzog, Henry W., Ph.D. .............. Maryland
Jensen, Hansen E. (Emeritus), Ph.D. .... Texas
Lee, Feng-Yao (Emeritus), Ph.D. ....... Michigan State

Moore, John R. (Distinguished Prof.) .. Cornell
Murray, M. N., Ph.D. ..................... Syracuse
Neale, Walter C. (Emeritus), Ph.D. .... London
Russell, Milton (Emeritus), Ph.D. ........ Oklahoma
Schottman, Alan M., Ph.D. .............. Washington (St. Louis)
Spive, George A. (Emeritus), Ph.D. ...... Texas

Associate Professors:

Gauger, Jean A., Ph.D. .................... Iowa State
Glustof, Errol, Ph.D. ...................... Stanford
Kahn, James R., Ph.D. ................. Maryland

Assistant Professors:

Bruce, Donald, Ph.D. ..................... Syracuse
Fallaschetti, Dino, Ph.D. ................. Washington (St. Louis)
Santore, Rudy, Ph.D. ..................... Ohio State
Stanley, Daniel L., Ph.D. ............... Wisconsin
Stewart, Steven W., Ph.D. ............. New Mexico

The Department of Economics offers graduate programs leading to the M.A. and Ph.D. The M.A. may be completed by either a thesis or non-thesis option, while the Ph.D. requires successful completion of a dissertation. Applicants to these programs should contact the Director of Graduate Studies, Department of Economics, for further information. The Department also offers a program of concentration for the MBA degree. Students interested in the MBA program should contact the Director of Graduate Business Programs, College of Business Administration.

ACADEMIC STANDARDS

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

STUDENT'S RIGHT TO PETITION

Graduate students in good academic standing have the right to petition the department for modification of departmental degree requirements and redress of grievances. Petitions must be in writing and addressed to the Director of Graduate Studies.

THE MASTER'S PROGRAM

Admission to the M.A. program is based on undergraduate academic performance and on scores from the general portion of the GRE. The student may choose either the thesis or non-thesis option. The non-thesis option requires 30 hours of coursework at the 400 level or above. Of these, at least 24 hours (at least 18 hours of which are in economics) must be at the 500 level or above. Of the minimum of 18 hours in economics at the 500 level or above, 12
hours must consist of 511, 512 and 513, 514, and the remaining 6 hours must be in one field of economics. Of the 30 hours, a maximum of 9 hours in courses approved by the department may be taken in fields other than economics. Students electing the nonthesis option are required to pass a final comprehensive examination. The thesis option requires 36 hours of coursework at the 400 level or above, including at least 24 hours at the 500 level or above, 6 hours of which may be thesis hours. Of the remaining 18 hours at the 500 level or above, at least 15 hours must be in economics and 3 must be in 511, 512, 513, and 514. A maximum of 6 hours may be in an area other than economics.

THE DOCTORAL PROGRAM

Admission to the Ph.D. program is based on promise of outstanding scholarship as demonstrated by previous academic performance, by scores achieved on the general portion of the GRE, and by recommendations. The program requires a minimum of 48 hours of coursework beyond the bachelor's degree or 24 hours beyond the master's degree, at least 24 hours of 600 Doctoral Research and Dissertation, and successful completion of the following:

1. Students are required to complete the following core requirements:
   a. Economic Theory: Microeconomic theory and macroeconomic theory by qualifying exam taken not later than the beginning of the fourth semester of study.
   b. History of Economics: Completion of 515 or 615 with a grade of B or better, or by qualifying examination.
   c. Quantitative Methods: Completion of 581, 582 and 583 with grades of B or better, or by qualifying examination.
   d. Students failing a qualifying examination must retake the examination the next time offered. A qualifying examination may be taken a third time only with approval of the department. Failing a qualifying examination for a third time will result in dismissal from the doctoral program.
   e. Students are required to demonstrate competence by a comprehensive examination in at least two fields of specialization in economics. Students failing a comprehensive examination must retake the examination the next time offered. A comprehensive examination in a specific field may be taken a third time only with approval of the department.
   f. Students are required to complete a doctoral dissertation and to defend it successfully before the faculty.

MINOR IN ENVIRONMENTAL POLICY

The program is designed to give master's and doctoral level graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. While administered through the Economics Department, the program is coordinated by a committee of representatives from the following participating departments and programs: Agricultural Economics and Rural Sociology; Botany; Civil and Environmental Engineering; Ecology and Evolutionary Biology; Economics; Forestry; Wildlife and Fisheries; Geography; Geospatial Analysis, Planning; Political Science; and Sociology. Students may request admission to the minor following admission to a graduate program in one of the participating departments. Students in good standing in one of these programs may apply for admission to the minor in environmental policy. The coordinating committee will consider the admission of interested students. Applicants should have a background in both natural and social sciences evidenced by prior coursework or experience. One course in environmental science or environmental studies in the major discipline and one course in quantitative methods are required. These requirements may be fulfilled before or after admission to the minor. All students admitted to the minor will be required to register for at least three hours of Economics 579, Environmental Policy Research Workshop, and to complete successfully the following:

1. Ecology and Evolutionary Biology 520 or Plant and Soil Sciences 414 or Geography 433 or an equivalent course approved by the coordinating committee.

2. Six hours of coursework outside the major discipline approved by the coordinating committee.

The doctoral program requires a minor in environmental policy. The minor following admission to a graduate program in one of the participating departments and programs: Agricultural Economics and Rural Sociology; Botany; Civil and Environmental Engineering; Ecology and Evolutionary Biology; Economics; Forestry; Wildlife and Fisheries; Geography; Geospatial Analysis, Planning; Political Science; and Sociology. Students may request admission to the minor following admission to a graduate program in one of the participating departments. Students in good standing in one of these programs may apply for admission to the minor in environmental policy. The coordinating committee will consider the admission of interested students. Applicants should have a background in both natural and social sciences evidenced by prior coursework or experience. One course in environmental science or environmental studies in the major discipline and one course in quantitative methods are required. These requirements may be fulfilled before or after admission to the minor. All students admitted to the minor will be required to register for at least three hours of Economics 579, Environmental Policy Research Workshop, and to complete successfully the following:

1. Ecology and Evolutionary Biology 520 or Plant and Soil Sciences 414 or Geography 433 or an equivalent course approved by the coordinating committee.

2. Six hours of coursework outside the major discipline approved by the coordinating committee.

The doctoral program requires a minor in environmental policy. The minor following admission to a graduate program in one of the participating departments and programs: Agricultural Economics and Rural Sociology; Botany; Civil and Environmental Engineering; Ecology and Evolutionary Biology; Economics; Forestry; Wildlife and Fisheries; Geography; Geospatial Analysis, Planning; Political Science; and Sociology. Students may request admission to the minor following admission to a graduate program in one of the participating departments. Students in good standing in one of these programs may apply for admission to the minor in environmental policy. The coordinating committee will consider the admission of interested students. Applicants should have a background in both natural and social sciences evidenced by prior coursework or experience. One course in environmental science or environmental studies in the major discipline and one course in quantitative methods are required. These requirements may be fulfilled before or after admission to the minor. All students admitted to the minor will be required to register for at least three hours of Economics 579, Environmental Policy Research Workshop, and to complete successfully the following:

1. Ecology and Evolutionary Biology 520 or Plant and Soil Sciences 414 or Geography 433 or an equivalent course approved by the coordinating committee.

2. Six hours of coursework outside the major discipline approved by the coordinating committee.

Students seeking a minor in environmental policy must also complete, in addition to above, a policy-relevant dissertation approved by the coordinating committee.

BUSINESS ADMINISTRATION CONCENTRATION

For complete listing of MBA program requirements, see Business Administration. MBA Concentration: Economics.

Minimum course requirements are as approved by the area MBA faculty advisor.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The Ph.D. program is available to residents of the state of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

400 Special Topics (3) Topics vary. Prereq: Determined by department. May be repeated.

413 Macroeconomic Fluctuations (3) Analysis of historical data, methods of analyzing macro-economic fluctuations, theoretical explanations of cycles, and role of monetary and fiscal policies in aggregate economy. Major writing requirement. Prereq: Intermediate Macroeconomics or consent of instructor.

415 History of Economics (3) (Same as History 415.)

424 Political Economy of World Development (3) Topics vary: Latin America, Asia, Soviet Union and Europe. Analysis of major economic strategies, policies, and problems. Prereq: 201. This course includes a major writing requirement. May be repeated when topic varies. Maximum 9 hrs.


462 Economics of Resources and Environmental Policy (3) Economic analysis of environmental policy and allocation of resources. Benefits and costs of development of natural resources; utility, intertemporal growth on environment. Major writing requirement. Prereq: 201.

471 Public Finance: Optimal Government Functions and Expenditure Analysis (3) Problems of collective consumption, external effects, public investment, social decision making. Major writing requirement. Prereq: 201.

472 Public Finance: Taxation and Intergovernmental Relations (3) Analysis of individual taxes and of tax systems, non-tax sources of revenue, fiscal federalism. Major writing requirement. Prereq: 201.

482 Introduction to Mathematical Economics (3) Application of basic mathematical tools: calculus, matrix algebra, etc. to major topics of economic theory. Prereq: Intermediate Microeconomics with B or better and Calculus.

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

502 Registration for Use of Facilities (3-15) Required for 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

511-12 Microeconomic Theory (3.3) Theory of consumer choice and demand, theory of revealed preference, attributes of goods and services. Major writing requirement. Prereq: 511 and 512.


526 Economic History of Europe (3) Nature and functioning of economic systems and policies in history of Western civilization, major issues of method and interpretation. Prereq: Graduate standing in economics or consent of instructor.

537 Managing in a Regulated Economy (3) Economic effects of antitrust and utility, international and environmental regulation on business. Development of decision-making skills in area of government-business relations.

577 Environmental Economics and Policy Management (3) Interdisciplinary perspective on goals of sustainable economic development and environmental quality. Development of decision-making tools and conflict resolution.


583 Econometric Techniques (3) Multivariate time series, seasonal data and limited dependent variable analysis applied to economic problems. Prereq: 582.

600 Doctoral Research and Dissertation (3-15) P/NP only. E
613 Advanced Macroeconomic Theory (3) Prereq: 514 or equivalent.


621 International Economics (3) Comparative advantage, trade migration, commodity composition of trade, protectionist devices, protectionist arguments, trade liberalization, U.S. trade policy, exchange rate determination, capital account flows, and multinational corporations, and international capital flows. Prereq: 512 and 514.

623 Economic Development: Theories and Policies (3) Principal theories explaining economic behavior in developing countries and policies and strategies used to promote development. Prereq: Undergraduate degree in economics or consent of instructor.

624 Economic Development: Western Impact on Asia and Africa (3) Studies of consequences of contact between developed world and developing countries of Asia and Africa. Prereq: 21 hrs of upper division undergraduate social science or consent of instructor.


642 Labor History and Legislation (3) Development of organized labor as important economic and political force in the U.S., from Colonial times to present. Evolution of legal status of labor unions and of individual workers vis-à-vis their employers.

651 Monetary Theory (3) Study of money, credit, and liquidity as related to output determination, interest rates, employment, and prices. Prereq: 515.

652 Topics in Monetary Theory (3) Advanced monetary models, issues in monetary policy, open economy monetary theory and policy. Student participation. Prereq: 651.

661 Regional and Urban Location and Development Theory (3) Theory of industrial and agricultural location and human migration. Economic basis for land-use patterns, central places, and urban form. Spatial inequalities and urban problems. National policies for regional and urban assistance.

662 Methods of Regional and Urban Analysis (3) Theory of economic, economic growth, and regional economic interactions. Regional income and product accounts, shift and share analysis, economic base studies, and regional input-output models. Theory and problem solution.


672 Public Finance: Taxation and Intergovernmental Relations (3) Theory of taxation; tax incidence and tax efficiency; policy analysis of U.S. tax structure at federal, state, and local levels. Theory of fiscal federalism and intergovernmental relations.

677 Environmental and Natural Resource Economics (3) Alternative paradigms for allocating and valuing environmental resources. Exploration of issues related to market failure and differences between renewable and nonrenewable resources.

678 Economics of Environmental Policy (3) Topics in environmental policy analysis. Consideration of alternative policy instruments, defining policy objectives and role of risk in decision-making process.


690 Workshop (3) Advanced topics in economics. Student participation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

Education

(College of Education)

MAJORS

DEGREES

College Student Personnel............. M.S.
Counseling ...................... M.S.
Education ...................... M.S., Ed.S., Ed.D., Ph.D.
Educational Administration and Policy Studies ...................... M.S.
Educational Psychology ...................... M.S.
Human Performance and Sport Studies .. M.S.

The College of Education offers the Master of Science, Educational Specialist, Doctor of Education, and Doctor of Philosophy degrees through six departments: Counseling, Deafness and Human Services, Educational Administration and Cultural Studies, Educational Psychology, Exercise Science and Sport Management, Instructional Technology, Curriculum and Evaluation.

Theory and Practice in Teacher Education The College also offers initial teacher licensure programs at the graduate level. The program features a professional year internship with accompanying coursework which may lead to a master's degree with a major in Education. See Track 2 under Master's Programs, Education, and Teacher Licensure.

For admission, most programs require current scores from the GRE general section, and all require a departmental application form and letters of recommendation as indicated on the chart of Majors and Degree Programs. For additional information about the various programs of study and admission, write to the Graduate Center in the College of Education, Knoxville, TN, 37996-3400, tel. (615) 974-0906, www.utk.edu/advising/advising.html.

THE MASTER'S PROGRAMS

College Student Personnel Students who major in College Student Personnel are prepared to enter the field of student personnel administration in colleges, universities, and community or junior colleges. The program has both a thesis and non-thesis option. A minimum of 36 hours, which includes 6 hours of practicum experience, is required in either option. Students must complete a minimum of 12 hours in Higher Education courses.

Counseling The master's degree with a major in Counseling offers concentrations in: Mental health counseling Rehabilitation counseling School counseling

The program includes thesis and non-thesis options. The concentration in mental health counseling is fully accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) and requires completion of 36 hours of coursework plus supervised practicum and internship experiences working with clients. The concentration in rehabilitation counseling is fully accredited by the Council on Rehabilitation Education, Inc. and requires 54 semester hours, including internship. A minimum of 12 hours of Rehabilitation and Deafness courses is required. The concentration in school counseling is fully accredited by the Council for Accreditation of Counseling and Related Educational Programs and requires 48 hours of coursework, including supervised practicum and internship experiences working with clients. A final examination is required of all students.

Education The master's degree with a major in Education has two tracks. Track 1 is intended for students who are licensed to teach English, elementary education, foreign language, mathematics, natural science, social science, early childhood special education, or education of the deaf and hard of hearing. (Non-licensed applicants to Track 1 will be reviewed on a case-by-case basis and must have a strong disciplinary background and professional goals which can be fostered through participation in this non-licensure program.) Track 2 is designed for students seeking initial teacher licensure in one of the above fields. Thesis and non-thesis options are available for both tracks.

Track 1 - Concentrations are available in: Art education Curriculum Education of the deaf and hard of hearing Elementary education English education Foreign language/ESL education Instructional technology Mathematics education Modified and comprehensive special education Reading education Science education Social foundations Social science education Special education: early childhood

The thesis option requires the completion of 30 hours, including 6 hours of Thesis 500. The non-thesis option requires the completion of 33 hours of coursework (36 hours for special education concentrations). Both options require a minimum of 12 hours in the major discipline (18 hours for special education concentration).

Track 2 - Concentrations are available in: Art education Education of the deaf and hard of hearing Elementary teaching Modified and comprehensive special education Secondary teaching Special education: early childhood

The thesis option requires completion of 36 hours, plus 6 hours of Thesis 500 for a total of 42 hours. The non-thesis option requires 36 hours, including 24 hours of prescribed licensure coursework and 12 hours in the academic discipline as approved by the student's committee.

For both tracks, a comprehensive written examination is required. An oral exam is given over the thesis.

Educational Administration and Policy Studies The master's degree program with a major in Educational Administration and Policy...
Studies offers a concentration in educational administration and supervision/higher education, requiring a minimum of 30 hours, including 6 hours of Thesis 500, for the thesis option, or 36 hours for the non-thesis option.

The concentration in educational administration and supervision/higher education consists of a minimum of 18 hours of coursework in Educational Administration and Supervision. A final oral examination is required for the thesis option, with a written exam at the option of the committee. A final written comprehensive examination is required for the non-thesis option, with an oral exam at the option of the committee. Students entering either of these options must complete the introductory core, consisting of Educational Administration and Supervision 513, 515, 516, and 535 or a demonstrated computer proficiency. These courses are prerequisites to other courses in the unit.

**Educational Psychology**
The master's degree with a major in Educational Psychology is offered with concentrations in:

- Adult education
- Individual & collaborative learning

Both programs include thesis and non-thesis options. The major in Educational Psychology requires 36 hours. The concentration in adult education requires a minimum of 12 hours in adult education courses. A final examination is required of all master's degree students.

**Human Performance and Sport Studies**
The master's degree with a major in Human Performance and Sport Studies offers concentrations in:

- Sport management
- Sport studies

Applicants must submit an admission application and 3 letters of recommendation. Both thesis and non-thesis options are available. The non-thesis option requires 36 hours, including 6 hours of Thesis 500. Both options require a minimum of 12 hours of sport studies, exercise science, or sport management courses.

**The Specialist in Education Program**
The Educational Specialist degree program with a major in Education encompasses concentrations in:

- Curriculum
- Educational administration & supervision
- Elementary education
- English education
- Foreign language/ESL education
- Instructional technology
- Mathematics education
- Reading education
- School counseling
- School psychology
- Science education
- Social science education

The instructional and curricular concentrations require completion of a minimum of 30 hours of coursework beyond the master's degree, including 6 hours in core courses, 18 hours in specialized courses, and 6 hours to be determined by the student's committee. The dissertation option and supervision concentration requires the completion of a minimum of 60 hours beyond the baccalaureate, including a 6-hour cognate within or external to the college, and a highly recommended internship. The thesis option requires completion of a minimum of 66 semester hours beyond the baccalaureate. Refer to Degree Requirements under The Graduate School for complete program requirements.

**The Doctor of Philosophy Program**
The Ed.D. program with a major in Education is available in the following concentrations and specializations:

- Curriculum, educational research, and evaluation (curriculum, educational research, evaluation)
- Educational administration and policy studies (educational administration and supervision, higher education)
- Educational psychology (collaborative learning)
- Instructional technology (educational applications of technology)
- Literacy, language education, and ESL education (literacy, ESL education)
- Teacher education (elementary education, social science education, mathematics education)

In addition to the requirements of The Graduate School, the hour requirements in the curricular and instructional concentration areas are determined by the student's doctoral committee. A comprehensive examination and an oral examination on the dissertation are required. The concentration in educational psychology with a specialization in collaborative learning requires the completion of a minimum of 60 hours beyond the bachelor's degree and incorporates a cohort model through which students participate in core courses as a group. This program offers an alternative residency which includes a two-year, on-campus, continuous enrollment in six to nine hours per semester including summers. During this time period, students are enrolled in a doctoral seminar (EP630) for four of the six semesters and participate with faculty on research teams for 12 of the required hours. Contact the program coordinator for additional information and program requirements. The requirements for the concentration in educational administration and policy studies are determined on an individual basis by each student's doctoral committee. Course requirements include a 6-9 hour cognate within the concentration and a 6-9 hour minor external to the college. Additional course requirements include completion of two consecutive semesters of Educational Administration and Policy Studies 604 during residence. Though an internship is highly recommended, it is not required. A foreign language requirement is at the discretion of the committee. A written comprehensive examination, as well as an oral examination on the dissertation, is required. An alternative residency, which includes a two-year, on-campus, continuous enrollment in Educational Administration and Policy Studies 606, Leadership Forum, is available for qualified students.

**Requirements**

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Minimum Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Area</td>
<td>15</td>
</tr>
<tr>
<td>General Core Requirements</td>
<td></td>
</tr>
<tr>
<td>Option A</td>
<td></td>
</tr>
<tr>
<td>- History and philosophy of education, (both areas must be represented)</td>
<td>4</td>
</tr>
<tr>
<td>- Learning theory and curriculum (both areas must be represented)</td>
<td>4</td>
</tr>
<tr>
<td>- Administrative/Leadership theory</td>
<td>2</td>
</tr>
<tr>
<td>- Trans-college seminar: two consecutive semesters</td>
<td>2</td>
</tr>
<tr>
<td>Option B</td>
<td></td>
</tr>
<tr>
<td>- Philosophy of education</td>
<td>3</td>
</tr>
<tr>
<td>- History of education</td>
<td>3</td>
</tr>
<tr>
<td>- Administrative theory</td>
<td>3</td>
</tr>
<tr>
<td>- Learning theory</td>
<td>3</td>
</tr>
<tr>
<td>- Curriculum theory</td>
<td>3</td>
</tr>
<tr>
<td>- Trans-college seminar: two consecutive semesters</td>
<td>2</td>
</tr>
<tr>
<td>Option C</td>
<td></td>
</tr>
<tr>
<td>- Philosophy of science</td>
<td>3</td>
</tr>
</tbody>
</table>
The residence requirement consists of three consecutive semesters of full-time enrollment. Additional details are available through the College's Graduate Center, CA 214, (865) 974-0907, or jmorgan@utk.edu.

TEACHER LICENSURE

In addition to the above cited degree programs, the College of Education offers graduate level teacher licensure courses. Students completing requirements for initial teacher licensure earn 24 semester hours of graduate credit which may be applied to a 36 semester hour Track 2 master's degree with a major in Education.

To earn initial teacher licensure, students must complete undergraduate prerequisite courses, gain admission to The Graduate School as a degree seeking student, and the following 24 hours of coursework:

| Fall Semester |  |  |
|---------------|  |  |
| 575 Internship| 4 hrs |  |
| Specialty Studies | 6 hrs |  |
| 574 Analysis of Teaching for Professional Development | 2 hrs |  |
| Spring Semester |  |  |
| 575 Internship | 8 hrs |  |
| 591 Clinical Studies | 4 hrs |  |
| TOTAL | 24 hrs |  |

Further details concerning the teacher licensure program and the Track 2 master's degree program are available through the College of Education Advising Center, CA 214, (865)974-8194, or jmorgan@utk.edu.

MINOR IN GERONTOLOGY

Graduate students with majors/concentrations in counseling, exercise science, or educational psychology, may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S. program in Counseling is available to residents of the states of Florida (concentration in rehabilitation counseling), or Kentucky (concentration in mental health counseling). The M.S. program in Education is available to residents of the states of Alabama, Kentucky, Maryland, South Carolina, Virginia, or West Virginia (concentration in education of the deaf and hard of hearing). The M.S. program in Human Performance and Sport Studies is available to residents of Alabama, Arkansas, Maryland, South Carolina, or Virginia. The Ed.D. program in Education (concentration in educational psychology) is available to residents of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

510 Advanced Educational and Clinical Procedures (3-6) Integration of advanced educational and clinical procedures; skills and knowledge for implementing instruction and for consulting with other professionals in treatment of exceptional individuals. May be repeated. Maximum 6 hrs.

540 Topics in Improvement of Instruction (1-3) Special conferences, workshops, and inservice programs. May be repeated. Maximum 8 hrs. S/NC only.

562 Direction and Supervision of Student Teaching (3) Roles and responsibilities of cooperating teachers and student teacher; objectives and policies of student teaching program; elements of clinical supervision; overview of research. F

563 Teacher-Parent-Community Relations (3) Techniques for effective relations between parents and teachers; examination of roles and expectations; parental involvement; volunteer programs; influence of community on educational process. Prereq: Consent of instructor. F

574 Analysis of Teaching for Professional Development (2) Strategies to document and analyze effectiveness of teaching and of professional development. Study and application of various approaches. Coreq: 575. F

575 Professional Internship in Teaching (1-8) Intensive teaching and teaching-related experiences in professional settings in public schools. Enrollment limited to postbaccalaureate students in professional year program. Prereq: Admission to Teacher Education Program. May be repeated. Maximum 12 hrs. S/NC only. F,S

576 Practicum in Classrooms Teaching (1-4) Teaching and teaching-related experiences in elementary and secondary school settings. Specific hours and school level assignment determined by licensure or certification requirements. May not be used for probationary licensure year. May not be used toward degree requirements. May be repeated. Maximum 12 hrs. S/NC only.


591 Clinical Studies (4) Group and individual seminar activities during full-time internship. Application and evaluation of professional core competencies. Completion and presentation of portfolio and analysis of teaching project. Coreq: 576.

601 Trans-College Seminar (1) Introduction to Ph.D. Program in Education: research requirements, meaning of scholarship in academia and issues/problems in education. Minimum of two consecutive semesters preceded or followed by summer term required of all Ph.D. students. Prereq: Admission to Ph.D. program or consent of Ph.D. program coordinator. May be repeated. Maximum 3 hrs. May not be used to meet 600 requirement. S/NC only.

635 Teacher Education in America (3) For students preparing to enter teacher education. Brief historical development, program analysis and evaluation, current issues, and future directions. F

---

| TEACHER LICENSURE |  |  |
|-------------------|  |  |
| 574 Analysis of Teaching for Professional Development | 2 hrs |  |
| 575 Professional Internship in Teaching (1-8) | 2 hrs |  |
| 576 Practicum in Classrooms Teaching (1-4) | 2 hrs |  |
| 577 Field Experience (1-3) | 2 hrs |  |
| 591 Clinical Studies (4) | 2 hrs |  |
| TOTAL | 24 hrs |  |

The Department of Educational Administration and Cultural Studies participates in graduate programs leading to degrees, majors, and concentrations in:

Master of Science

College Student Personnel Education
Social foundations
Educational Administration and Policy Studies
Educational administration and supervision/highest education
Human Performance and Sport Studies
Sport studies
Specialist in Recreation Education
Education
Educational administration and supervision
Doctor of Education
Education
Educational administration and policy studies
Doctor of Philosophy
Education
Cultural studies in education
Educational administration and policy studies
Socio-cultural foundations of sport and education
Cultural Studies in Education

GRADUATE COURSES

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

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication, or praxis requiring special written work. Prereq: 532.

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


505 History of Olympics: Ancient and Modern (3) Examination of various aspects of ancient and modern Games. Ancient Olympics 776 BC to 393 AD; Panhellenic Games. Modern Olympics, 1896 to date: political, social class, gender, and economic issues that influence Games. E


514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social-cultural issues. E

515 Social Theories of Sport (3) Liberal, democratic, and Marxist social theories of sport. E

526 Philosophy of Education (3) Truth, knowledge, and valuation in relation to work of schools. F, Su

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.

539 Development of Education Thought (3) Historic and philosophical approach to lives and writings of influential educators: Plato, Quintilian, Comenius, Pestalozzi, Froebel, Dewey. Gradu- ate status and consent of instructor.

540 Foundations of Educational Policy (3) Relationship between theory, policy, and practice; educational policies that arise from philosophical and practical considerations relative to human nature, to educational purpose, to content of curriculum and to methods and techniques for conducting educational enterprise. F, Su

541 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and sport. May be repeated.

542 Sociological Aspects of Sport (3) Social and cultural factors influencing sport and physical education. Pertinent issues and research applications. Prereq: Consent of instructor. (Same as Sociology 542.)

546 Educational Sociology (3) Sociological analysis of American education system. Controversial social issues that affect educational system and potential solutions offered by various programs. Open to juniors, seniors, and graduate students. F

548 Topics in History of Education (3) May be repeated. E

549 Topics in Philosophy of Education (3) May be repeated. F,Su

549 Topics in International Education (3) Historical, philosophical, and sociological foundations; selected nations and their cultures. May be repeated. E

560 Introduction to Qualitative Research in Education (3) Fundamentals of qualitative research methods and development of skills needed for qualitative research proposals. Overview of qualitative research methods: ethnography, case study, historiography, biography, oral and life history. Critical reading and evaluation of qualitative research studies. F,Su

560 Cultural Studies Seminar (1) Two semester sequence (Fall and Spring); ongoing discussion about cultural studies: presentations, videos, and readings. Prereq: Admission to doctoral program with concentration in cultural studies in education. May be repeated. Maximum 4 hrs. S/NCo ly only.

591 Issues in Cultural Studies (3) Discourse, schools, and selected principal contemporary issues in field. Prereq: Admission to doctoral program with concentration in cultural studies in education.

592 Justice, Schools, and Sports (3) Social justice issues: education and sport practices. Social justice, moral commitments to others in educational and sport settings; equality of opportunity to acquire social goods and benefits. Prereq: Admission to doctoral program with concentration in cultural studies in education.

593 Independent Study (1-3) May be repeated. S/NCo ly or letter grade.

584 Supervised Readings (1-3) May be repeated. S/NCo ly or letter grade.

595 Special Topics (1-3) Advanced study in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NCo ly or letter grade.

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

504 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/NCo ly only.

507 Advanced Seminar in the Social Foundations of Education (3) Interdisciplinary team-taught seminar. Readings selected by faculty and participants from classic studies and current periodical literature in anthropology, sociology, history, and philosophy of education. Part of general core for Ph.D. program.

508 Seminar in Philosophy of Education (3) Selected philosophical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor. E

525 Seminar in History of Education (3) Selected historical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor.

533 Advanced Motor Behavior (3) In-depth analysis, synthesis, and discussion of contemporary theory and methodology. Design, implementation and production in motor learning/controls and sport psychology. May be repeated. Maximum 9 hrs.

648 Topics in Sociology of Education (3) May be repeated. Sp

652 Advanced Studies in Educational Anthropology and/or Sociology (3) Ethnographic methods applied to formal and non-formal educational settings. Analysis of selected research in field. Prereq: 451, 2 courses in cultural anthropology, or consent of instructor. Sp


668 Practicum (1-3) Intern experience in areas of major interest. May be repeated.

693 Independent Study (1-3) May be repeated. S/NCo ly or letter grade.

694 Supervised Reading (1-3) May be repeated. S/NCo ly or letter grade.

695 Special Topics (1-3) Study for doctoral students in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NCo ly or letter grade.

Educational Administration and Policy Studies

GRADUATE COURSES

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

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


505 History of Olympics: Ancient and Modern (3) Examination of various aspects of ancient and modern Games. Ancient Olympics 776 BC to 393 AD; Panhellenic Games. Modern Olympics, 1896 to date: political, social class, gender, and economic issues that influence Games.


514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social-cultural issues.

515 Social Theories of Sport (3) Liberal, democratic, and Marxist social theories of sport.

526 Philosophy of Education (3) Truth, knowledge, and valuation in relation to work of schools.

533 Psychology of Sport (3) Social psychological factors influencing human behavior in sport context; discussion of contemporary theory, research, and methodology.

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.

539 Development of Education Thought (3) Historic and philosophical approach to lives and writings of influential educators: Plato, Quintilian, Comenius, Pestalozzi, Froebel, Dewey. Graduate status and consent of instructor.

540 Foundations of Educational Policy (3) Relationship between theory, policy, and practice; educational policies that arise from philosophical and practical considerations relative to human nature, to educational purpose, to content of curriculum and to methods and techniques for conducting educational enterprise.

541 Special Topics (1-3) Advanced study in selected disciplinary or professional areas of physical education and sport. May be repeated.

542 Sociological Aspects of Sport (3) Social and cultural factors influencing sport and physical education. Pertinent issues and research applications. Prereq: Consent of instructor. (Same as Sociology 542.)

546 Educational Sociology (3) Sociological analysis of American education system. Controversial social issues that affect educational system and potential solutions offered by various programs. Open to juniors, seniors, and graduate students.

548 Topics in History of Education (3) May be repeated. E

549 Topics in Philosophy of Education (3) May be repeated. F,Su

549 Topics in International Education (3) Historical, philosophical, and sociological foundations; selected nations and their cultures. May be repeated. E

560 Introduction to Qualitative Research in Education (3) Fundamentals of qualitative research methods and development of skills needed for qualitative research proposals. Overview of qualitative research methods: ethnography, case study, historiography, biography, oral and life history. Critical reading and evaluation of qualitative research studies.

560 Cultural Studies Seminar (1) Two semester sequence (Fall and Spring); ongoing discussion about cultural studies: presentations, videos, and readings. Prereq: Admission to doctoral program with concentration in cultural studies in education. May be repeated. Maximum 4 hrs. S/NCo ly only.

591 Issues in Cultural Studies (3) Discourse, schools, and selected principal contemporary issues in field. Prereq: Admission to doctoral program with concentration in cultural studies in education.

592 Justice, Schools, and Sports (3) Social justice issues: education and sport practices. Social justice, moral commitments to others in educational and sport settings; equality of opportunity to acquire social goods and benefits. Prereq: Admission to doctoral program with concentration in cultural studies in education.

593 Independent Study (1-3) May be repeated. S/NCo ly or letter grade.

584 Supervised Readings (1-3) May be repeated. S/NCo ly or letter grade.

595 Special Topics (1-3) Advanced study in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NCo ly or letter grade.
513 Administrative and Organizational Theory in Education (3) Introduction to theoretical administrative and organizational foundations of management and leadership of educational programs and institutions. F, Su.

515 Human Relations and Communication in Administration (3) Development and use of effective interpersonal communication skills and channels, intergroup relations, supportive work climates, personal motivation, conflict management, and role of values, attitudes, and expectations in administration. F, Su.

516 Research for Educational Administration (3) Descriptive, experimental, and quasi-experimental designs to help students without quantitative backgrounds to read and understand technical professional literature. Introduction to inferential statistics, needs assessments, and evaluation procedures. S, NC or letter grade. F, Su.

523 Administration of Special Services (3) Legal, programmatic, and ethical responsibilities of educational administrators in design and implementation of special service programs within school settings. Special learner characteristics, program categories, service delivery models, and legal/ethical frameworks. Inclusion and full service delivery. F.

529 Politics and Public Relations in Education (3) School/community relations in political context of modern, complex society. Administrator and supervisory competencies: political, social, ethical, cultural, and racial environments in which schools operate. Prereq: M.S. introductory core or consent of instructor. F, Su.

535 Administrative Applications of Micro Computers (3) DOS, word processing, data based management, spreadsheet, and voice communications. Review and development of specific administrative applications: scheduling, attendance, student record systems, and accounting. F, Su.

544 School Finance and Business Management (3) For prospective building level administrators. Financial and logical management tasks and procedures in individual school setting. Prereq: M.S. introductory core or consent of instructor. F, Su.

547 Educational Facility Planning (3) Concepts and skills for development, evaluation, construction, renovation, maintenance, and operations of quality educational environments and facilities. Prereq: M.S. introductory core or consent of instructor. F, Su.

548 Supervision and Personnel Administration (3) Basic supervisory and personnel concepts and related competencies: building (or micro-organizational) level: interviewing, personnel planning, selecting, and maintaining employee information, supervision of instructional and non-instructional personnel, clinical supervision, staff evaluation, and staff development. Prereq: M.S. introductory core or consent of instructor. F, Su.

553 Strategies of Educational Planning (3) Processes for improving decision-making function through use of both qualitative and quantitative planning techniques. Policy analysis, CPM,PERT, Delphi. Prereq: M.S. introductory core or consent of instructor. F, Su.

554 Policy Issues in Educational Law, K-12 (3) Legal organization of case and statutory materials for public school administrators and teachers; problems concerning law and public education. Prereq: M.S. introductory core or consent of instructor. F, Su.

560 School/community relations in political context of modern, complex society. Administrator and supervisory competencies: political, social, ethical, cultural, and racial environments in which schools operate. Prereq: Consent of instructor. May be repeated. S, NC or letter grade. F, Su.

570 Values and Ethics in Educational Leadership (3) Examination of core values and ethical dimensions of work of educational administrators; assistance to current and prospective administrators to deal with ethical dilemmas associated with diverse sectors of human activity. Prereq: Consent of instructor. F, Su.

580 Values and Ethics in Educational Leadership (3) Development and use of effective interpersonal communication skills and channels, intergroup relations, supportive work climates, personal motivation, conflict management, and role of values, attitudes, and expectations in administration. F, Su.

583 Educational Leadership—Principalship (3) Knowledge, skills and relationships for principal to be effective professional leader. Simulation materials and field-based activities. Culminating courses with internships at end of planned course of study. Placement by department assignment. Some on-campus during fall semester with 583 or 582. Prereq: 21 hrs in educational administration and supervision or consent of instructor. E.

590 Special Topics (1-3) May be repeated. E.

592 Field Problems in Educational Administration and Supervision (3) Topic to be assigned. May be repeated. S, NC or letter grade. F.


605 Advanced Seminar in Administrative Theory (3) Interdisciplinary seminar. Readings selected by faculty for research and scholarly value from early to contemporary literature in administrative and organizational theory. Required of Ph.D. students in education. Prereq: Doctoral standing in the student's field. F, Sp.

610 Internship in Educational Administration (3) Opportunity for doctoral and advanced graduate students to gain experience in performance of critical tasks of educational administration under supervision of practitioner and University representative. May be repeated at discretion of student's committee. Minimum 12 hrs. S, NC only. E.

614 Statistics for Educational Administrators (3) Descriptive and inferential statistical techniques used in research in educational settings. F.

615 Research Designs (3) Statistical methods through multi-variate techniques and applications to various research designs. Prereq: 614 or consent of instructor. Sp.

616 Research Methods (3) Overview of descriptive and experimental research designs: data collection, analysis, and interpretation for survey studies and school surveys. Prereq: Basic statistics and computer skills consent of instructor. E.

620 Seminar in Policy Issues in Education (3) Local, state, and federal education policy: theory analysis, development, and implementation. Why education policy is changing rapidly, ways to follow and influence education policy, and conceptual frameworks to use for future understanding. Prereq: 529, 516 or equivalent or consent of instructor. F.

646 School Personnel Administration (3) Personnel administration functions for professional and supporting staff in educational organizations. Recruitment, selection, placement, personnel policies, employee wage and salary administration, fringe benefits, collective negotiations, human relations, staff development, and staff evaluation. Prereq: 548 or consent of instructor. F, Su.


656 Legal Issues in Education (3) School law; constitutional foundations as they relate to public education at state and local levels. F, Su.

658 Conflict Management (3) Social conflict and its management. Causes of interpersonal, intergroup, and organizational conflict, skills and strategies used to manage conflict, conflict management models associated with different sectors of human activity, and current organizational practices for managing destructive conflict. F.

660 Administration of Complex Organizations (3) Concepts and theoretical formulations to understand, analyze, evaluate, and change complex educational program organizations. Prereq: 513 or consent of instructor. Sp, Su.

690 Special Topics (1-3) May be repeated. E.

Higher Education

GRADUATE COURSES

530 Special Topics (1-3) May be repeated. E.

534 Program Evaluation in Education (3) (Same as Instructional Technology. Curriculum and Evaluation 534.)

536 Policy Issues in Higher Education Quality Assurance (3) Exploration of historic and contemporary approaches to definition and demonstration of quality in higher education and examination of contemporary policy and practice issues related to quality assurance in colleges and universities. F.

537 Student Assessment in Higher Education (3) Outcome assessment in American higher education: origins of assessment policies, rationales for assessment policy and practice, constructs and outcomes typically assessed, methods for conducting assessment and use of assessment data. Philosophies, priorities, and values, recent assessment efforts in higher education. F.

542 The College Student and the Court (3) Legal precedent affecting student personnel services in public higher education. Student discipline, housing, dress, organizations, activities fees, tuition and related federal regulations. F.

543 American Higher Education in Transition (3) History, philosophy, purposes, functions, organizations, and programs in American higher education. F, Su.

570 Student Affairs Administration in Higher Education (3) Theory and Practice (3) Historical, philosophical and organizational perspective. Functional areas comprising field and major issues. F.

Educational Psychology

(College of Education)

MAJORS

DEGREES

Education .................. Ed.S., Ed.D., Ph.D.
Educational Psychology .................. M.S.

R. S. McCallum, Head


Associate Professor: kindall, luther m., ed.d., tennessee

The Department of Educational Psychology offers graduate programs leading to degrees, majors, and concentrations in:

Master of Science

Educational Psychology

Adult education Individual and collaborative learning

Educational Specialist

Education School psychology

Doctor of Education

Educational psychology

Doctor of Philosophy

Educational psychology

School psychology

See Education under Fields of Instruction for full description of all degree requirements. The mission of the department is to provide national leadership in creating learning environments that foster psychological, health, address authentic educational needs, and promote life-long learning. The department will seek opportunities in a diversity of contexts to engage in data-based problem solving, in reflective and evaluative thinking, and implement the structures and processes necessary for effective collaboration.

The school psychology concentration under the college's Ph.D. program is accredited by the American Psychological Association. The school psychology concentration under the Ph.D. and Ed.S. programs are accredited by the National Association of School Psychologists and both have the approval of the National Council for Accreditation of Teacher Education.

Three programs have an application deadline of 15 January: (1) Ph.D. with a minor in Education, concentration in school psychology, (2) Ed.S. with a major in Education, concentration in school psychology, and (3) Ed.S. with a major in Education, concentration in educational psychology, specialization in collaborative learning. One program has application deadlines of 15 January and 15 October: Ph.D. in Education, concentration in educational psychology, specialization in adult education and applied educational psychology. Application reviews are completed throughout the year for both concentrations under the M.S. degree program with a major in Educational Psychology.

Admission Requirements

Admission requirements include completion of all items in the department's admission packet and three letters of recommendation. Up-to-date GRE scores are required for admission to all degree programs except the master's program. For all doctoral programs, a writing sample is also required.

GRADUATE COURSES

432 The Disadvantaged Student: Psychosocial Perspectives (3) Theory and research regarding theology, psychosocial behavior and appropriate interventions. sp

460 Self-Management in the Helping Professions (3) Applications of self-management strategies to career, social, emotional, and health domains for both helping professionals and their clients. Prereq: Introduc
tory course in psychology or consent of instructor. S/N/C or letter grade. F/Su

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 needs University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/C only. E

503 Problems in Lieu of Thesis (3-3) May be repeated. Maximum 6 hrs. S/N/C only. E

504 Special Topics (1-3) Instructor-initiated course offered only at discretion of current interest. May be repeated. Maximum 15 hrs. S/N/C or letter grade. E

509 Internship in Adult Education (3) Practical field experiences in selected settings under supervision of practitioner and departmental representative. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

510 Psychological Theories of Human Development (3) Theories of human development, philosophical and humanistic theories of current interest. May be repeated. Maximum 21 hrs. S/N/C or letter grade. E

513 Reflective Practice in Education and Psychology (3) Concepts, theories and processes of reflective practice applied to educational settings. E

514 Individual Study in Adult Education (3) Prereq: Consent of supervising instructor. Approval form to be completed in office of unit head. May be repeated. Maximum 6 hrs. E

515 Educational Applications of Behavioral Theories of Learning (3) Behavioral theories and research, conditioning, observational learning, and ethical learning as systems apply to student motivation, discipline and learning. E

516 Educational Applications of Cognitive Learning Theories (3) Cognitive theory and research and social learning, attribution and information processing as applied to education. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Survey of Adult Education (3) Historical development of adult education programs, adult education, associations, programs, issues, and literature illustrating process of adult education and diversity of continuing education. Prereq: Consent of instructor. F/Su

521 Program Development and Operation in Adult Education (3) Theories and methods of research to practice in planning and operating adult education programs. Prereq: Consent of instructor. F/Su

522 Adult Development (3) Theory and research in adult development and change over lifespan and its implications for adult learning in formal and informal contexts. F. Su

523 Post-Secondary Education for Adults (3) History, evolution, philosophy, structure and functions of post-secondary, sub-university institutions, their programs and clientele. Prereq: Consent of instructor.

524 Continuing Professional Education (3) Theories and concepts supporting design and management of educational programs for adults in professions. Prereq: 520 or equivalent.

525 Characteristics of Adult Learners (3) Key characteristics of adult learners, current theory and research on adult learning, and implications for teaching and learning concepts. S. Su

526 Informal Methods of Assessment (3) Development and use of rating scales, check-lists, observation, tests and case reports in assessment and counseling of children and adults. Prereq: Counselor Education and Counseling Psychology 525. Su

527 Controversies in Adult Education (3) Controversies confronting field of adult education: development of critical analysis skills by looking at controversies from different perspectives.

528 Psychology of Aging (3) Theory and research of aging and gerontology related issues: psychological and sociocultural developmental changes that occur in later life stages of human development. Implications for treatment programs and policy. Sp
612 Modes of Inquiry (3) (Same as Educational Administration and Policy Studies 612).

620 Seminar in Adult Education (3) Issues in adult education, theories and concepts, and related problems of instruction. PreReq: 520 or equivalent. F

621 Advanced Seminar in Program Planning (3) Concepts, principles, and theories related to program planning in adult education. PreReq: 521 or equivalent. Sp

622 Advanced Seminar in Adult Development and Learning (3) Adult development and adult learning theory and research. Prereq: 525 or equivalent. F, Sp


655 Research in Psychoeducational Studies (1) Data analyses, collection, and interpretation. May be repeated. Maximum 9 hrs. S/NC only. F, Sp

663 Scale Construction (3) Development, pilot testing, and revision of attitude inventories, rating scales, and other paper-and-pencil techniques for assessing beliefs, personality characteristics, and opinion. Prereq: Counselor Education and Counseling Psychology 525, and two-course sequence in statistical analysis. F

668 Practicum in Instructional Planning (3) Development and management of courses or program of instruction in educational psychology. Prereq: 665, or consent of instructor. F, Sp

669 Internship in Educational Psychology (1-6) Supervised employment in unit-approved educational psychology internship sites. May be repeated. Maximum 12 hrs. S/NC only. E

671 Mediated Learning Theory (3) Feuerstein's theory of mediated learning experience and its connections to work of Piaget, Vygotsky, and others. Implications for transformational learning and building of learning communities for learners of all ages. Prereq: Admission to doctoral program or consent of instructor. F

673 Collaborative Learning (3) Team taught, interactive course on collaborative learning theory related to practical applications. Integration of mediated learning practice with reflective practice theory related to collaborative teaching in professional settings. Enrollments of class members in collaborative teaching. Prereq: 513 and 571 or consent of instructor. Sp

690 Psychopathology of Childhood (3) Descriptive and critical study of psychopathology of childhood and of system of nomenclature related to individuals with mental disorders: nomenclature provided in State Department of Education's Student Evaluation Manual and Diagnostic and Statistical Manual of Mental Disorders of American Psychiatric Association.

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

and discussions based on significant research and scholarly publications. Sp

Electrical and Computer Engineering

(Office of Engineering)

MAJOR

DEGREES

Electrical Engineering.................................................. M.S., Ph.D.

Mohammad A. Kamir, Head

Professors:

Abidi, Mongi A., Ph.D. .................................................... Tennessee

Alexeff, Igor (Emeritus), PE, Ph.D. ........................................ Wisconsin

Bailey, J. Milton (Emeritus), Ph.D. ........................................ Georgia Tech

Birdwell, D. Douglas, Ph.D. ................................................... MIT

Bishop, Asa O., Jr. (Emeritus), Ph.D. ....................................... Clemson

Blalock, T. Vaughan (Emeritus), Ph.D. ...................................... Louisiana State University

Bodenheimer, Robert E. (Emeritus), Ph.D. ..................... Northwestern

Boe, Bimal K. (Conrad Chair of Excellence), Ph.D. ............. Calcutta

Boulton, Donald W., PE, Ph.D. ........................................... Vanderbilt

Gonzalez, R. C. (Emeritus), Ph.D. ........................................... Florida

Goode, Joseph M. (Emeritus), PE, Ph.D. ............................. Georgia Tech

Green, Walter L. (Emeritus), PE, Ph.D. ............................... Texas A&M

Hung, James C. (Emeritus), PE, Ph.D. ................................. New York

Karim, Mohammad A. (Liaison), Ph.D. ................................. Alabama

Kennedy, Eldridge J. (Emeritus), PE, Ph.D. ....................... Pennsylvania State University

Lawler, J. S., Ph.D. .......................................................... Michigan State

Neff, Herbert P. (Emeritus), PE, Ph.D. ................................. Auburn

Pace, Marshall O., PE, Ph.D. ............................................... Georgia Tech

Pierce, J. Frank (Emeritus), PE, Ph.D. ................................. Pennsylvania State University

Rochelle, Robert W. (Emeritus), Ph.D. ............................. Maryland

Roth, J. Reece, Ph.D. ..................................................... Cornell

Symonds, Frederick W. (Emeritus), Ph.D. ............................ Liverpool University

Walker, Alverno, Ph.D. .................................................... NC State

Associate Professors:

Bomer, Bruce W. (UTSI), Ph.D. .............................. Tennessee

Crilly, Paul B., Ph.D. .................................................... New Mexico State

Islam, Syed, Ph.D. ........................................................ Connecticut

Joseph, Roy D. (UTSI), Ph.D. ............................................ Missouri (Rolla)

Newport, Danny, PE, Ph.D. .............................................. Tennessee

Rochelle, James M., Ph.D. ............................................... Tennessee

Walker, Alverno, Ph.D. .................................................... NC State

Assistant Professors:

Bradley, Arthur, PE, Ph.D. .............................. Auburn

Chaisson, John, Ph.D. .................................................... Minnesota

Montoya, Tom P., Ph.D. .................................................... Georgia Tech

Qi, Haorong, Ph.D. ......................................................... NC State

Smith, L. Montgomery (UTSI), Ph.D. ............................. Tennessee

Smith, Philip W. ........................................................ Virginia

Tolbert, Leon, Ph.D. ...................................................... Georgia Tech

Whitaker, Ross T., Ph.D. .................................................. North Carolina
The Department of Electrical and Computer Engineering offers graduate degrees leading to the Master of Science and a Doctor of Philosophy. Applicants for admission to the M.S. program are expected to have completed a bachelor's degree in Electrical Engineering with an average of at least 3.0 out of 4.0 both overall and in the senior year. All applicants whose native language is not English, including those who have earned degrees at U.S. institutions, must score at least 550 on the TOEFL exam. The TOEFL score of 550 is required for non-native speakers of English, including those who have earned degrees at U.S. institutions. Specific departmental requirements for the Ph.D. include the following:

1. A Master of Science or Master of Engineering degree.
2. A minimum of 24 semester hours of coursework beyond the Master's, excluding research and dissertation credit. These hours must include:
   - a minimum of 12 semester hours in electrical engineering at the 500 and 600 levels.
   - a minimum of 9 semester hours of 600-level coursework. At least 3 hours of this work must be in an area other than the student's major area.
   - a minimum of 6 hours of mathematics courses at the 500 level or above and approved by the electrical engineering graduate committee.
3. One foreign language if the student's faculty committee feels that a reading knowledge of a foreign language is crucial to the student's research efforts.
4. Satisfactory performance on a qualifying examination and on a comprehensive examination. The qualifying examination is prepared by the Electrical Engineering faculty and consists of two 4-hour written examinations covering courses required in the undergraduate electrical engineering curriculum through the junior level. The qualifying examination is offered twice each year (January and August) and is to be taken the first time it is offered after the student enrolls in the program. A student who fails the qualifying examination must take and pass the examination the next time it is offered to remain in the program. A minimum of 18 hours of coursework must be completed after the student has taken the qualifying examination the first time.

A comprehensive examination is required by the Graduate School. In this department the comprehensive exam is administered by the student's committee; the exam results are reported to the graduate committee for approval; and the exam is filed in the department. The comprehensive exam is given when the student is ready to apply for admission to candidacy. The comprehensive exam consists of both written and oral parts. The written part consists of at least two sections: a complete review of the literature in the student's dissertation topic, and a review of the major tools to be used in the dissertation work. The student's committee may require additional sections. The students must demonstrate a mastery of the dissertation area, ability to think analytically and creatively, skill in using academic resources, and ability to complete the dissertation satisfactorily. The oral part consists primarily of a professional presenta-
THE MASTER'S PROGRAM

Requirements

Coursework: A minimum of 24 semester hours in English beyond the B.A., to include 6 hours at the 600 level; 12 additional hours at the 500-600 level (Only 3 hours of 593 hours at the 600 level; 12 additional hours at the 500-600 level, making a total of 30 hours of required coursework.

Language Requirement: Evidence of proficiency in one foreign language, to be fulfilled in one of the following ways:
1. Completion of the second year of a language at college level with a grade of C or better.
2. Completion of French 302 or German 332 at UT with a grade of B or better.
3. Passing of the regular Ph.D. foreign language examination as currently administered at UT.

Capstone Experience Requirement: An integral part of all options in the master's degree program in English is a capstone experience which allows the student to synthesize and apply the knowledge and skills gained through the completion of the program in a substantive way. Examples of capstone experiences include, but are not limited to, the completion of a thesis or the formal public presentation of a paper at a professional meeting or departmental colloquium. All capstone experiences normally occur after the completion of 24 hours of coursework and must be approved by the Director of Graduate Studies.

Final Examination: A candidate presenting a thesis must pass a one-hour oral examination; a candidate presenting a creative project must pass a ninety-minute oral examination. The examination consists of a short thesis defense, but chiefly of questions covering the general history of English and American literature, not merely the original reading list.

Residence Requirement: There is no residence requirement for the M.A., but students should attempt to pursue a full-time program whenever possible.

WRITING CONCENTRATION

The master's program with writing concentration is intended for those students who plan to do the following: writing specialization in teaching writing courses at the college level, or work as professional writers in business or industry.

Requirements

The requirements for the writing concentration are the same as those for the thesis option above with the following exceptions:

Coursework: Writing students may substitute two 400-level writing courses for two 500-level courses. Students must take at least 9 hours in writing and in literature, the remaining 6 to be selected from any English courses at the proper level. Of the courses in writing, at least 3 hours must be taken at the 500 level; additional 500-level courses are strongly recommended.

Writing Projects: One of the following writing projects for six hours of credit:
1. A thesis, using research to analyze some aspect of writing or rhetorical theory.
2. A creative project, such as a collection of poems or short stories, a short novel, a play, or a creative work of non-fiction prose.

The nature and length of each project will be determined by the Director of Graduate Studies after consulting with the student and the project director. In addition to the director, two other English Department faculty members will supervise and approve the project; at least one should be from the literature faculty.

Final Examination: The reading list may be modified by the M.A. examining committee, meeting as a body with the student, to reflect the candidate's particular writing emphasis. However, most of the oral examination should focus upon the literature outlined in the original reading list.

THE DOCTORAL PROGRAM

Requirements

A student must successfully complete a program of study, normally 8 full semesters as outlined below, approved by the candidate's committee or the Director of Graduate Studies in English.

Coursework: At least 54 semester hours beyond the B.A. (of which at least 24 semester hours must be beyond the M.A.) to include at least 21 semester hours at the 600 level, at least 15 semester hours at the 500 level, or above (only 3 hours of 590 Independent Study may be applied toward the M.A. and 3 at the M.A.); a 3-hour course in teaching composition; and 15 additional hours at any level approved for graduate credit (including a maximum of 12 hours at the 400 level if approved by the Director of Graduate Studies).

Up to 6 of these additional hours may be taken in some cognate field or fields such as history, philosophy, French. These courses must be drawn from those approved for graduate credit. All other coursework must be in the English department. In this coursework, students must normally maintain a 3.5 GPA.

Dissertation: Twenty-four semester hours of dissertation. These represent the research for and writing of the dissertation. The research and dissertation will be directed by a faculty member of the department and approved by a doctoral committee of three or four other faculty members.

Language Requirement: A language requirement met in one of the following ways:
1. Two languages approved by the Director of Graduate Studies in English. The requirement for each language may be fulfilled by (a) completion of French 302 or German 332 with a grade of B or better; (b) completion at UT of any two courses on the 300 level or above in the foreign language or literature with at least a grade of B in each course; (c) passing of the regular Ph.D.
foreign language examination as currently administered at UT.

2. One modern language approved by the Director of Graduate Studies in English. This requirement must be fulfilled by passing a grade of B or better in a modern language course at the 400 or 600 level. A minimum grade of B must be received in each course.

3. One modern language approved by the Director of Graduate Studies in English and intensive study of the English language. This requirement must be fulfilled by completion of (a), (b), or (c) in option 1. for one foreign language; and completion of 6 semester hours in English language courses with grades of B or better, at least three of which must be from English 508 or 509 History of the English Language (offered in alternate years only). For the other 3 hours, the student may either complete the history of the language sequence or choose one other course in language taught in the Department of English at the 500 or 600 level and approved by the Director of Graduate Studies in English. These courses will not count toward the minimum number of courses for the Ph.D., and anyone electing this language option may not take the comprehensive examination in linguistics.

Examinations: (1) A 4-hour qualifying examination taken before the end of the first year of Ph.D. coursework; this examination is given three times a year, with the M.A. written examination. (2) A 4-hour comprehensive written examination which may be divided as the department directs; see the English Department graduate brochure. The comprehensive examination is given twice a year, normally in March and September. Before a student may take it, he/she must have completed all coursework required. A student must also have met all requirements for a foreign language before beginning the first part of the examination.

Dissertation Defense: A one-hour examination on the dissertation and other related areas.

Residency Requirement: Two consecutive semesters as a full-time student. For students not on teaching assistanceships, full-time consists of 9 or more hours of coursework and/or dissertation hours each semester. For students on assistanceships, full-time consists of at least 6 hours of courses and/or dissertation hours and 3 hours of teaching each semester.

GRADUATE COURSES

Note: Students enrolling in English graduate courses must first register in the office of the Director of Graduate Studies in 306 McClung Tower.

401 Medieval Literature (3) Reading and analysis of selected medieval literary masterpieces in modern English.

402 Chaucer (3) Reading and analysis of Canterbury Tales and Troilus and Criseyde in Middle English.

404 Shakespeare I: Early Plays (3) Shakespeare's dramatic achievement before 1601. Reading and discussion of selected plays, including Twelfth Night, English histories, including Henry IV; and early tragedy, including Hamlet.

405 Shakespeare II: Later Plays (3) Shakespeare's dramatic achievement between 1601 and 1612. Reading and discussion of selected plays from great tragedies, including Othello; problem plays, including Measure for Measure; and dramatic romances, including The Tempest.

406 Renaissance Drama (3) English theatre between 1550 and 1640 through reading of representational plays by Shakespeare's contemporaries: Marlowe, Webster, Jonson.

407 Spenser and his Contemporaries (3) Principal achievements in prose and poetry of sixteenth century authors; Spenser, Wyatt, Marlowe, More, Sidney, and Bacon.

410 Milton, Donne and their Contemporaries (3) Principal achievements in prose and poetry of first two-thirds of seventeenth century: poetry of Milton, Donne, Marvell, and prose of Browne, Bacon, Walton.

411 Literature of Restoration and Early Eighteenth Century: Dryden to Pope (3) Survey of English literature and culture from 1660 to 1745.

412 Literature of Later Eighteenth Century: Johnson to Burns (3) Survey of English literature and culture from 1745 to 1800.

413 Restoration and Eighteenth-Century Genres and Modes (3) Major genres and literary modes: romance, novel, poetry, non-fiction prose, satire, romance, or epic, written between 1650 and 1800. May be repeated.

414 Romantic Poetry and Prose I (3) Wordsworth, Coleridge, Blake; readings from Lamb, De Quincey, and other prose writers.

415 Romantic Poetry and Prose II (3) Keats, Shelley and Byron; readings from Hazlitt, Peacock, and other prose writers.

416 Early Victorian Literature (3) May include poetry by Tennyson and the Browns; prose by Carlyle, Newman, and Mill.

419 Later Victorian Literature (3) May include poetry by the Pre-Raphaelites, Arnold, Hopkins, and Hardy; prose by Arnold, Ruskin, and Carroll; plays by Gilbert and Wilde.

420 The Nineteenth-Century British Novel (3) Scott to Hardy.

421 Modern British Novel (3) Works from authors such as Joyce and Woolf through contemporary British fiction writers.

422 Women Writers in Britain (3) Literary consciousness and works of women writers in Britain. Topics vary: Marie de France, Margery Kempe, Aemilia Lanyer, Elizabeth Cary, Aphra Behn, Frances Burney, Mary Wollstonecraft, Mary Shelley, George Eliot, Virginia Woolf, and Doris Lessing. May be repeated. Maximum 6 hrs. (Same as Women's Studies 422.)

431 Colonial, Federal, and Early National American Literature (3) From Columbus to Washington Irving.

432 American Romanticism and Transcendentalism (3) Prose and poetry of American Romanticism, from c. 1830 to end of the Civil War: Cooper, Poe, Hawthorne, Melville, Emerson, Thoreau, Douglass, Whitman, and Dickinson. May be repeated.

433 American Realism and Naturalism (3) Literature from the turn of the Civil War to World War I: Twain, Howells, James, Jewett, Freeman, Crane, and Norris.

434 Modern American Literature (3) World War I to present.

435 American Novel before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900: Hawthorne, Melville, Stowe, Clemens, and James.


441 Southern Literature (3) Southern writing from colonial period into twentieth century: frontier humorists, local color writers, and Southern literary Renaissance.

442 American Humor (3) Early nineteenth century into twentieth century: Mark Twain.

443 Topics in Black Literature (3) Contents vary: particular genres, authors, or theories from 1845 to present: Langston Hughes and Harlem Renaissance, Richard Wright and Gwendolyn Brooks, writing by Black women, international Black literature in English, and Black American autobiography.

451 Modern British and American Poetry (3) From Yeats and Frost to Auden, Stevens, and more recent poets.

452 Modern Drama, 1860-1945 (3) Survey of British, American, and international drama from the advent of modern drama to the end of World War II.

453 Contemporary Drama (3) Survey of British, American, and international drama since World War II.

454 Twentieth-Century International Novel (3) Fiction written in translation by authors such as Kafka and Camus through contemporary authors.

455 Persuasive Writing (3) Writing and analyzing persuasive texts in public, private, and academic contexts. Prereq: Advanced Expository Writing or consent of instructor.

456 Contemporary/Postmodern Literature (3) Studies in literature written after World War II. Content will vary. May be repeated with consent of instructor. Maximum 6 hrs.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, graphics, layout, introduction management. Prereq: Technical and Professional Writing or consent of instructor.


463 Advanced Poetry Writing (3) Further development of skills acquired in basic writing poetry course. Prereq: 363 or consent of instructor.

464 Advanced Fiction Writing (3) Further development of skills acquired in basic fiction course. Prereq: 363 or consent of instructor.

466 Writing, Layout, and Production of Technical Documents (3) Principles of design for desktop publishing. Production of various documents to be incorporated into professional portfolio. Prereq: Technical and Professional Writing or consent of instructor.

470 Special Topics in Rhetoric (3) Topics vary. Prereq: Advanced Expository Writing or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

471 Sociolinguistics (3) Study of language in relation to society. Empirical and theoretical focus. Large-scale units: tribes, nations, social groups, Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 471.)

472 American English (3) Phonological, morphological, and syntactic characteristics of major social and regional varieties of American English: origins, functions, and implications for cultural pluralism. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 472.)

474 Teaching English as a Second or Foreign Language I (3) Major issues surrounding teaching ESL / EFL, including cultural, linguistic, and pedagogical issues in language teaching; classroom management; the teaching-learning process; and strategies and techniques for teaching ESL / EFL. Prereq: Second year of foreign language or consent of instructor. (Same as Linguistics 474.)

475 Teaching English as a Second or Foreign Language II (3) Issues, principles, and techniques in teaching ESL / EFL, including teaching strategies, classroom management, pronunciation, reading, and writing in ESL / EFL. Prereq: Teaching English as a Second or Foreign Language I.

476 Second Language Acquisition (3) How humans learn second languages. Theoretical models and research. Differences between first and second language acquisition. Prereq: Long before contact with the learner variables; socio-cultural factors; and implications for second language instruction. (Same as Linguistics 476.)
513-14 Readings in Medieval Literature (3, 3) Reading and analysis of medieval literature; study of Continental sources in Modern English. May be repeated. Maximum 9 hrs. each.

520-21 Readings in Analysis in Selected Areas of Sixteenth- and Seventeenth-Century Prose, Poetry, and Drama (3, 3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

530-31 Readings in English Literature of the Restoration and Eighteenth Century (3, 3) Topics vary: genre, poetry, prose, fiction, drama, or period; Restoration, eighteenth century, eighteenth century. May be repeated. Maximum 9 hrs. each.

540-41 Readings in English Literature of the Nineteenth Century (3, 3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

550-51 Readings in American Literature (3, 3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

552 Readings in Black American Literature (3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs.

560-61 Readings in Twentieth-Century Literature (3, 3, 3) Content varies: genre, theme, literary movement, or other coherent emphasis. May be repeated. Maximum 9 hrs. each.

576 Introduction to Contemporary Criticism (3) An introductory survey of twentieth-century literary criticism. Prereq: English 463 or consent of instructor. May be repeated. Maximum 9 hrs.

580 Fiction Writing (3) Advanced fiction projects; under supervision of instructor and time for independent study. Prereq: Extensive background in reading and writing fiction. May be repeated. Maximum 6 hrs.

581 Colloquium in Poetry Writing (3) Major poetic person project. Prereq: 463 or consent of instructor. May be repeated. Maximum 6 hrs.

582 Special Topics in Writing (1-5) Topics vary. May be repeated. Maximum 6 hrs. Enrollment by consent of director of graduate studies only.

583 Special Topics in Literature (3) Topics vary: genres, modes, and other literary subjects not in standard period divisions. May be repeated. Maximum 6 hrs.

584 Topics in Feminist Studies (3) Topics vary. May be repeated. Maximum 9 hrs.

585 Issues in Invention, Style, and Audience (3) Theoretical perspectives on contemporary research in rhetoric and composition.

586 History of Rhetoric I (3) Survey of rhetorical forms from Sophocles to Romanesque.

587 History of Rhetoric II (3) Survey of rhetoric from Bacon to present.

588 Readings in Applied Rhetoric (3) Content varies: Writing across curriculums, writing centers, computer communications, text linguistics. May be repeated. Maximum 6 hrs.

590 Topics in Critical Theory (3) Topics vary. May be repeated. Maximum 9 hrs.

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

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

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

594 Film History, Form, and Analysis (3) Issues in film studies: history of narrative film; concept of film form; critical approaches to film study (genre, auteur, formalism, and others); and critical analysis of individual films.

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

611 Studies in Beowulf (3) Translation and critical study of Beowulf. Prereq: English 610 or consent of instructor. Sp/A

620 Studies in Medieval English Literature (3) Seminar in literature and literary genres of Medieval English literature. Read in Old and Middle English. Subject matter varies from year to year. May be repeated. Maximum 9 hrs.


630-31 Studies in Renaissance Literature (3, 3) Seminars: Spenser, Milton, sixteenth and seventeenth-century prose and poetry, Shakespeare, sixteenth and seventeenth-century prose and poetry, non-Shakespearian drama, or similar. May be repeated. Maximum 9 hrs. each.

641-42 Studies in Restoration and Eighteenth-Century Literature (3, 3) Topics vary: Swift, satire, Restoration literature, Johnson and Boswell, Addison and Steele, Restoration drama, Dryden. May be repeated. Maximum 9 hrs. each.

650 Studies in English Romanticism (3) Content varies: particular literary figure or figures, or other coherent focus. May be repeated. Maximum 9 hrs.

651-52 Studies in Victorian Literature (3, 3) Seminar content varies: particular literary figure or figures, or other coherent focus. May be repeated. Maximum 9 hrs. each.

660-62 Studies in American Literature (3, 3, 3) Southern literature before 1830, frontier realism, women's literature, Irving, Cooper, Poe, Emerson, Thoreau, Hawthorne, Melville, Whitman, Dickinson, James, and Twain. May be repeated. Maximum 9 hrs. each.

670-71-72 Studies in Twentieth-Century Literature (3, 3, 3) Seminar content varies: particular literary figure or figures, genre, or other coherent focus. May be repeated. Maximum 9 hrs. each.

680 Topics in English Language (3) May be repeated with consent of instructor. Maximum 9 hrs.

682 Studies in Rhetoric and Composition (3) Content varies: Advanced work in theory and or history of rhetoric and composition. Issues in invention, textuality, literacy, historiography, style and ethics. May be repeated. Maximum 9 hrs.

686 Studies in Creative Writing (3) Content varies: Connection between theory and practice in writing. May be repeated. Maximum 9 hrs.


690 Special Topics (3) Content varies. History of ideas, humor, biography, autobiography, extra-literary disciplines. May be repeated. Maximum 9 hrs.

694 Studies in Film (3) Content varies. Advanced work in history and analyses. May be repeated. Maximum 6 hrs.
THE MASTER'S PROGRAM

Admission Requirements

For admission to the M.S. degree program, a student must meet all requirements of The University of Tennessee Graduate School and have completed (1) general botany or biology, 8 hours; (2) advanced biological sciences, 8 hours; (3) general inorganic chemistry, 6-8 hours; (4) organic chemistry, 3 hours. In addition, three completed rating forms and a written statement of career goals and interest in entomology or plant pathology are required.

Degree Requirements

The program requires a written thesis based on original research and the completion of a minimum of 24 hours of coursework for graduate credit approved by the student's advisory committee. Included in the course requirements are two acceptable seminar presentations for 1 hour each. An oral examination must be passed for the satisfactory completion of the thesis. A minor is not required but may be selected at the option of the student. The minor will include at least 6 hours and not more than 10 hours of graduate-level credit in the minor department. The student's committee shall include a member of the faculty from the minor department to assist in designating courses required for the minor.

GRADUATE COURSES

410 Diseases and Insects of Ornamental Plants (3) Symptoms, identification and management of diseases and insect pests that affect plants in greenhouses, nurseries, and landscape environments. Prerequisites: Plant Pathology or Economic Entomology or consent of instructor. Sp, A

500 Thesis (1-15) PNP only. E

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

510 Plant Disease Fungi (4) Morphology, taxonomy, biology, and genetics of plant pathogenic fungi. Isolation and identification of plant pathogenic fungi. Prerequisites: 313 or consent of instructor. 2 hrs and 2 labs. Same as Plant Pathology 511. F, A

514 Bacterial Plant Diseases (4) Morphology, taxonomy, and genetics of bacterial plant pathogens, and of plant-parasitic nematodes and other agents; host-parasite-soil-environment interactions; epidemiology, and biological, cultural, and chemical control. Prerequisites: Plant Pathology or consent of instructor. F, A

515 Physiology of Plant Disease (3) Biochemical and physiological events involved in host-pathogen interactions. Mechanisms of disease resistance. Prerequisite: Introductory plant physiology and pathology, or consent of instructor. F, A

520 Plant Parasitic Nematodes (4) Morphology, physiology, taxonomy, and control of plant-parasitic nematodes, host-parasite relationships. Prerequisites: 6 hrs biological science or consent of instructor. 2 hrs and 2 labs. Sp, A

521 Plant Virology (3) Symptomatology, epidemiology, and management of virus infection, structure, morphology, replication, transmission, purification, characterization, and classification of plant viruses; serology; plant pathogenic viruses, mycoplasmas, and viroids. Prerequisites: 313 or consent of instructor, 2 hrs and 1 lab. Sp, A

522 Field Crop and Vegetable Insects (2) Identification, biology, and management of insects affecting commercial vegetable and ornamental crops. Prerequisites: 321 or basic entomology course. 1 hr and 1 lab. F, A

525 Medical and Veterinary Entomology (3) Morphology, taxonomy, and control of arthropod pests and vectors of pathogens of animals and humans. Ecology and behavior of vectors in relation to host-pathogen transmission and control. Prerequisites: 321 or 325, or consent of instructor, 2 hrs and 1 lab. Sp, A

530 Integrated Pest Management (3) Principles and application of biological, cultural, genetic, behavioral, and chemical methods of control to maintain pest populations below economic threshold levels. Prerequisites: 321, or consent of instructor. Same as Plant Pathology 530. F, A

531 Special Problems in Entomology (1-3) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. E

532 Special Problems in Plant Pathology (1-4) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. E

533 Concentrated Study in Entomology (1-3) Comprehensive individual study of current problems. May be repeated. Maximum 6 hrs. F, Sp

541 Seminar (1) Review of literature and current research in entomology and plant pathology. May be repeated. Maximum 2 hrs. E

Environmental Engineering

See Civil Engineering

Exercise Science and Sport Management

(Majors of Education)

MAJORS

Education .................................................. Ph.D.

Human Performance and Sport Studies .... M.S.

Edward T. Howley, Head

Professors:

Beitel, Patricia A. (Emeritus), Ed.D. North Carolina (Greensboro)

Capek, Edward K. (Emeritus), Ph.D. ....... Iowa

Howard, Edward T., Ph.D. ................. Wisconsin

Kozar, Andrew J. (University Prof.), Ph.D. Michigan

Lay, Nancy E. (Emeritus), Ph.D. ......... Florida State

Lippman, W. P., Ph.D. ..................... Iowa

Naimy, T. C., M.D. ......... Washington (St. Louis)

Rockets, Ian R. H., Ph.D. ............... Brown

Watson, Helen W., Ph.D. ............... Michigan

Welch, Hugh (Emeritus), Ph.D. ......... Florida

Associate Professors:

Bassett, David R., Jr., Ph.D. ......... Wisconsin

Jones, Ralph E., Ph.D. ................. Toledo

Kelley, Dennie R., Ph.D. ............... Georgia State

Thompson, Dixie L., Ph.D. .......... Virginia

Assistant Professor:

Borovik, Patricia C., M.S. ......... Tennessee

Patrick, Charles R., Ph.D. .......... Georgia

Zhang, Songning, Ph.D. ............ Oregon

The Department of Exercise Science and Sport Management offers graduate programs leading to degrees, majors, and concentrations in:

- Master of Science
- Human Performance and Sport Studies

Exercise science (exercise physiology, biomechanics, sport medicine)

Sport management

Doctor of Philosophy

Education

Exercise science

See Education under Fields of Instruction for full description of all degree requirements. The exercise science concentration promotes and integrates scientific research, education, and practical applications of
exercise science to maintain and enhance health, fitness, performance, and quality of life. The department offers an undergraduate major in Exercise Science that will prepare students for careers in fitness and provide the science-based background needed for application to graduate programs in biomechanics, physical therapy, cardiac rehabilitation, public health, exercise physiology, athletic training, or public school teaching. Graduate students and faculty focus on research dealing with theoretical and applied aspects of exercise and sport.

The sport management concentration provides the opportunity for students to attain knowledge and to develop the essential skills to be successful sport managers. In addition, the department coordinates and provides instruction in many physical activities designed to improve physical fitness and encourage future participation in lifetime sports.

E elective courses are offered in dance. These courses are appropriate for students interested in management of dance studios, teaching dance, or dance performance.

ADMISSION REQUIREMENTS

Applicants are required to complete the departmental application which will be sent to all persons upon their initial inquiry about the program. This is in addition to The Graduate School application. Applications from persons who have less than a 3.0 GPA will not be considered.

The following retention policy applies to all graduate students seeking a degree in the department:
1. Graduate students are required to maintain an overall 3.0 GPA.
2. Any student who falls below this standard will be advised in writing by the department head of the need to discuss the matter with his/her advisor.
3. If a student's overall GPA remains below 3.0 for a second semester, the student will have his/her degree status revoked.

GRADUATE ASSISTANSHIPS

A limited number of graduate assistantships are available for qualified women and men who are graduates of accredited colleges or universities. These assistantships are open to students in the master's and doctoral programs. Students interested in these opportunities should file their applications before February. Letters should be addressed to Graduate Assistantships Coordinator, Exercise Science and Sport Management Department, The University of Tennessee, Knoxville, TN 37996-2700.

Exercise Science

GRADUATE COURSES

480 Physiology of Exercise (3) Functions of body in muscular work; physiological aspects of fatigue. Training and adaptation to environment. Prereq: 486 or 533. (Same as Exercise Physiology). (441 or 445 Composition II or consent of instructor)

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

501 Special Project (3) Culminating experience for non-thesis major. Research study suitable for publication or practicum requiring special written work. S/NC only.

502 Registration for Use of Facilities (3-15) Repeatable. S/NC only.


508 Research in Exercise Science (3) Research for writing of thesis and institutional review board proposals: presentation of research through free communications and poster presentations; calculation and interpretation of statistical results related to common research designs used in research; and use of computer software.

509 Graduate Seminar in Public Health (1) (Same as Public Health 509. Nutrition 509, Nursing 509 and Social Work 509.)


513 Biomechanics of Orthopedic Rehabilitation (3) Effect of physical activity on musculoskeletal tissue flexibility development and measurement, surgical implications, and rehabilitation related research.

516 Therapeutic Exercise (3) Current research in therapeutic exercise: role of nervous system, soft tissue healing, proprioception, muscle activation patterns, and strength.

521 Analytic Epidemiology (3) Epidemiologic strategies for evaluating research questions concerning causes, prevention and treatment of morbidity and mortality. Presentation by experts working with large population-based datasets. Research process: grant writing and protocol preparation. Prereq: Course in statistics or consent of instructor.

525 Epidemiology of Injury and Violence (3) Epide- miologic methods to describe magnitude and examine etiology of unintentional and intentional injury. Alternative approaches for preventing or controlling occurrence of injury and violence in both general population and high risk sub-populations.

533 Exercise Physiology (3) Physiology of human performance: acute and chronic effects of exercise on metabolism, cardiovascular, pulmonary, and skeletal systems. Prereq: Human physiology or general physiology, general chemistry, 2 hrs and 1 lab.

541 Special Topics (1-3) Advanced study in selected areas of exercise science. May be repeated.

563 Laboratory Techniques in Exercise Physiology (3) Laboratory course in methods, methodology and instrumentation: respiratory and metabolic measurements, blood chemistry, and gas analysis. Prereq: 460 or 533.

565 Advanced Physiology of Exercise (3) Systematic study of skeletal muscle and metabolism related to acute exercise and physical training; lectures, discussions of major scientific reviews, and appropriate laboratory experiments. Prereq: 480 or 533.


569 Clinical Exercise Physiology (3) Cardiac structure and function, interpretation of 12-lead electrocardiograms, exercise considerations for cardiac and pulmonary patients; Prereq: 480 or 533 and 567. (Same as Public Health 569.)

570 Cardiovascular Rehabilitation Practicum (1-3) Supervised experience in hospital-based exercise programs for participants with cardiac and/or pulmonary disorders. Use of telemetry monitoring, leading safe exercise regimens counseling participants on safe exercise guidelines, Presenting educational class on topic applicable to patients. Prereq: 533 and 567, or consent of instructor. Coreq 509. May be repeated. Maximum 6 hrs.

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counseling Education and Counseling Psychology 585, Nursing 585, Public Health 585, Educational Psychology 585, Social Work 585, and Sociology 585.)

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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

601 Research Seminar in Exercise Science (1) Research topics in different aspects of exercise science. May be repeated. S/NC only.

622 Directed Independent Research (1-6) Prereq: Doctoral student or consent of instructor. May be repeated. S/NC or letter grade.

625 Mortality and Survival (3) Life table and other population-based approaches to studying international and sociodemographic patterns and differentials in mortality, morbidity, and disability, Prereq: 2 graduate statistics courses or consent of instructor.

635 Physical Activity and Positive Health (3) Review of scientific, epidemiological, and experimental evidence concerning relationship and effects of exercise on health-related components of fitness. Prereq: Elementary statistics, 460 or 533 and 567, or consent of instructor. (Same as Public Health 635.)

661 Seminar in Exercise and Applied Physiology (1-3) Selected topics in exercise and environmental physiology. Prereq: 460 or 533. May be repeated with consent of instructor.

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.

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E
## Finance

### Courses

#### Business Administration

**MAJOR**

- **DEGREES**
  - MBA, Ph.D.

**Professors:**
- James W. Wansley, Head

**Associate Professors:**
- Auxier, A. L., Ph.D.
- Collins, M. Cary, Ph.D.
- Davis, Phillip R., Ph.D.
- Gunthorpe, Deborah L., Ph.D.
- Philippatos, G. C., Ph.D.
- Shreve, Ronald E., Ph.D.
- Wachowiak, J. M., Jr., CPA, Ph.D.
- Wansley, James, W. (Olayton Chair of Excellence) (Liaison), CFA

**CONCENTRATIONS**

- MBA Concentration: Finance
  - The curriculum offers courses for those interested in finance. Required: Business Administration 504 and 505 or consent of instructor.

**GRADUATE COURSES**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>532</td>
<td>Problems in Financial Management (3)</td>
<td>Topics vary. Prereq: Business Administration 504 and 505 or consent of instructor.</td>
</tr>
<tr>
<td>501</td>
<td>Financial Management of a New Enterprise (3)</td>
<td>Course associated with formation, control, and long-term planning of new enterprise.</td>
</tr>
<tr>
<td>641</td>
<td>Seminar in Finance (1-3)</td>
<td>Topics vary. Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs. S/NC or letter grade.</td>
</tr>
<tr>
<td>507</td>
<td>Event Management (1-3)</td>
<td>Topics vary. Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs. S/NC or letter grade.</td>
</tr>
<tr>
<td>508</td>
<td>Special Topics (1-3)</td>
<td>Topics vary. Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs. S/NC or letter grade.</td>
</tr>
</tbody>
</table>
Food Science and Technology
(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREES
Food Science and Technology .... M.S., Ph.D.

Clark J. Brekke, Head

Professors:
Brekke, C. J., Ph.D. ....................... Wiscon.
Collins, J. L., (Emeritus), Ph.D. .......... Maryland
Davidson, P. M., Ph.D. .................. Washington State
Draughon, F. A., Ph.D. .................. Georgia
Jaynes, H. O. (Emeritus), Ph.D. .......... Illinois
Melton, C. C., Ph.D. ................... Kansas State
Melton, S. L., Ph.D. ..................... Tennessee
Miles, J. T. (Emeritus), Ph.D. .......... Wisconsin
Morris, W. C., Ph.D. ................... Iowa State
Overcast, W. W. (Emeritus), Ph.D. ...... Iowa State
Penfield, M. P., Ph.D. ................... Tennessee

Associate Professors:
Golden, D. A. (Liaison), Ph.D. .......... Georgia
Loveday, H. D., Ph.D. .................. Kansas State
Mount, J. A., Ph.D. ...................... Ohio State

Assistant Professors:
Hulbert, G., Ph.D. ....................... Illinois
Kelly-Wintenberg, Kimberly (Adjunct), Ph.D. .......... Utrecht
van Laack, R. L., Ph.D. ................. Tennessee
Weiss, J., Ph.D. ......................... Massachusetts

The Department of Food Science and Technology offers the Master of Science and Doctor of Philosophy degrees. Students in the doctoral program may choose research in the concentration areas of food processing, food chemistry, food microbiology or sensory evaluation of foods. Commodity interests (meats, dairy, fruits, vegetables, bakery products) can be emphasized in any of the areas by careful selection of courses and the research topic. Minors are available in cognate fields. For detailed information, contact the department head.

Admission requirements of The Graduate School of UT apply. In addition, applicants must submit scores from the general section of the Graduate Record Exam (GRE), a written statement of educational and career goals, and Graduate School rating forms or letters of recommendation, from at least three people familiar with the applicant's scholarly ability and professional potential. Admission to the program is contingent upon faculty evaluation of the applicant's undergraduate/graduate GPA, GRE scores, rating forms, relevant work experience, and scores from the Test of English as a Foreign Language (TOEFL), if applicable.

THE MASTER'S PROGRAM
Applicants must have a B.S. in food technology, food science or a related scientific field.

1. Prior to research for the thesis, the student must develop a detailed written research plan. Registration for 6 hours of 500 Thesis is required.

2. In addition to the thesis requirement, a minimum of 36 semester hours of graduate coursework is required. This work must be approved by the student's committee and a maximum of 9 hours must be courses numbered above 500. The committee may require additional coursework if the student's progress or background indicates such need.

3. All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their master's program. Completion of 510 or equivalent is also required.

4. An oral, final examination covering the thesis and coursework is required.

Non-Thesis Option
1. In lieu of a thesis, students are required to complete a problem in cooperation with their employer (company or governmental agency) and their faculty committee. Students working on a problem must register for 6 hours of 503.

2. In addition to the requirement for 6 hours of 503, a minimum of 24 semester hours of graduate coursework is required. This work must be approved by the student's committee and a minimum of 12 hours must be courses numbered above 500. The committee may require additional coursework if the student's progress or background indicates such need.

3. All students are required to take 2 hours of 501 Seminar in their program and are expected to attend this course and participate in discussions during their master's program. Completion of 510 or equivalent is also required.

4. Students will be required to take a written comprehensive examination covering their coursework. In addition, an oral, final examination covering the problem and coursework is required. The oral examination will be held on the Knoxville campus.

THE DOCTORAL PROGRAM
1. Completion of a master's degree in the field, or a closely related field, or passing a special qualifying examination is required for admission.

2. A dissertation is required for the Ph.D. degree. Each student must develop a detailed written plan for the dissertation research. A minimum of 72 hours beyond the Bachelor's degree is required. The dissertation is required. Of this, 24 semester hours must be 600 Doctoral Research and Dissertation.

3. At least 24 hours of coursework numbered above 500 are required exclusive of doctoral research and dissertation. At least 6 of the 24 hours must be courses numbered above 600.

4. A minimum of 6 hours of graduate credit must be taken outside the Department of Food Science and Technology.

5. All candidates must complete 601 (2 hrs.) and are expected to attend 601 during their Ph.D. program.

Each candidate must pass both written and oral comprehensive examinations prior to admission to candidacy. Major professors will advise candidates on competencies expected. A final oral examination is required that includes a defense of the dissertation and subject matter that the student's committee considers appropriate.

GRADUATE COURSES
430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Prereq: Basic statistics. 2 hrs and 1 lab. F


460 Meat Science (3) Characteristics of meat animals, muscle structure and composition, cut identification, curing, freezing and cooking. Prereq: Food Industry or consent of instructor. Sp.

469 Meat Science Lab (1) Slaughter and processing methods for beef, pork, lamb and poultry. Coreq. 460. Sp

470 Food Crop Products (3) Food products from plants: types, manufacturing systems, quality attributes and utility. Prereq: Food Preservation and 3 hrs. biological science or consent of instructor. Sp.

480 Cereal Science and Bakery Products (3) Chemistry and technology of processing cereal grains, interactions of ingredients during production and storage of baked products. Prereq: Food Laws and Regulations, Food Chemistry, Food Preservation or consent of instructor. 2 hrs and 1 lab. Sp.

490 Food Laws and Regulations (3) Laws and regulations designed to preserve safety, wholesomeness, and nutritional quality of United States food supply: precedent case studies and their impacts on laws and regulations. Prereq: The Food Industry; consent of instructor for non-majors. Recommended prereq: Core courses in Food Science and Technology. F

495 Food Processing System Analysis and Evaluation (3) Design and evaluation of food processing operation to produce a safe and acceptable quality food product. Prereq: Food Chemistry, Food Microbiology, Food Preservation or consent of instructor. Sp.

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

501 Seminar (1) Individual reports and discussion on topics from current literature. May be repeated. Maximum 3 hrs. F,Sp

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

503 Problems in lieu of Thesis (2-3) May be repeated. S/NC only. E

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

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

510 Instrumental Analysis of Food (3) Modern instrumental methods for control of food manufacturing processes. Prereq: Food Chemistry; 2 hrs and 1 lab. F

511 Color of Foods (2) Chemical basis, measurements, and reactions involved in color changes in foods. Manufacture and application of materials used to modify color of foods. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. F,A
Forestry, Wildlife and Fisheries

(College of Agricultural Sciences and Natural Resources)

MAJORS

Forestry ............................................. M.S.
Wildlife and Fisheries Science ............... M.S.

George M. Hopper, Head

Professors:

Associate Professors:

Graduate study leading to the Master of Science with majors in Forestry and in Wildlife and Fisheries Science is offered by the Department of Forestry, Wildlife and Fisheries. The Master of Business Administration, with a concentration in forest industries management, is available for qualified students. This degree program is offered by the College of Business Administration with participation by the Department of Forestry, Wildlife and Fisheries. The Doctor of Philosophy can be achieved through the University’s Department of Ecology and Evolutionary Biology.

The mission of the Department of Forestry, Wildlife and Fisheries is to advance the management, utilization, and appreciation of natural resources in Tennessee, the region and beyond through programs in teaching, research and extension.

THE MASTER'S PROGRAMS

Both thesis and non-thesis options are available for the major in Forestry; a thesis is required in Wildlife and Fisheries Science. For admission, the student must have a Bachelor's degree from an accredited institution in forestry, wildlife, fisheries, or other natural resource area. Applicants must take the general Graduate Record Examination (GRE) with minimum scores required. Graduate School rating forms or letters of recommendation from three individuals familiar with the applicant’s academic ability are required. The department also has an application that must be submitted at the time of application to the Graduate School.

Thesis Option

1. Prior to research for the thesis, the student is required to develop a detailed written research proposal. Registration for 6 hours of Thesis (Forestry 500 or Wildlife and Fisheries Science 500) is required.

2. A graduate committee of no fewer than 3 faculty members must be selected by the second semester of residence. At least one member shall be from outside the department. In addition to the thesis requirement, a minimum of 24 hours of graduate coursework is required. This work must be approved by the student’s committee and no more than 10 hours of the minimum 30 can be below the 500 level. The committee may require additional coursework if the student’s progress or background indicates such need.

3. All students are required to include Forestry 512 or Wildlife and Fisheries Science 512, Seminar, in their programs. This is required of each graduate student in residence fall semester.

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

Non-Thesis Option (Forestry only)

1. Thirty-five hours of graduate coursework of which 23 must be at the 500 level or above is required.

2. A graduate committee of no fewer than 3 faculty members will be selected. At least one member shall be from outside the department. The committee will meet and schedule the student’s program during the first semester in residence.

3. Three hours of Forestry 511 are required.

4. Nine hours of coursework in the department must be at the 500 level or above, exclusive of Forestry 511.

5. Final comprehensive written and oral examinations shall be taken at completion of no fewer than 28 hours of approved study.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

Forestry

GRADUATE COURSES

421 Forest and Wildland Resource Economics (3) Production functions, supply-demand and market analysis; non-market programs and projects; economic analysis and decision models; investment and financial analysis; managerial economics, taxes; forest products marketing. Prereq: Forest Resource Analysis or consent of instructor. F

422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for policy determination; forest and wildland law and regulation; theory of conflict resolution; formal and informal resolution. Prereq: Senior standing or consent of instructor. F

423 Wildland Recreation Planning and Management (3) Planning processes, master and site planning, site design projects; management strategies, methods of visitor and recreation site management; case

512 Flavor of Foods (2) Chemical basis, measurement, and reactions involved in flavor changes in foods. Manufacture and application of flavorings in foods. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. F, A

515 Food Carbohydrates, Proteins and Lipids (4) Advanced study of chemical and physical attributes of carbohydrate, protein, and lipid components of foods; effects of components on production of safe and consistent quality food products; and changes during processing and distribution of food products. Prereq: Food Chemistry or equivalent. 3 hrs and 1 lab. Sp, A

520 Food and Industrial Fermentations (3) Microbiology, biochemistry and technology of food-related fermentations involving dairy products, meat, cereals, fruit and vegetables. Production of food ingredients and by-product utilization. Prereq: Food Microbiology and Lab, Food Preservation, Biochemistry and Molecular Biology 410 or equivalent. 2 hrs and 1 lab. Sp, A

521 Advanced Food Microbiology (3) Extrinsic and intrinsic factors associated with foods and food processing that relate to growth, survival, inhibition, detection, and recovery of foodborne pathogens and spoilage organisms; traditional and current approaches to microbiological food safety and quality. Prereq: Food Microbiology and Lab or current. 2 hrs and 1 lab. Sp, A

540 Food Product Development (3) Art, science and technology of developing and marketing new food products. Prereq: Food Preservation. 2 hrs and 1 lab. Sp, A

560 Advanced Meat Science (3) Physical and chemical changes that occur in conversion of muscle to meat; effect of postmortem treatments on meat quality, composition and palatability; packaging, preservation and quality control. Prereq: 465. 2 hrs and 1 lab. Sp, A

580 Food Oils and Fats (2) Chemistry and technology of food oils/fats processing and use: oils from oilseeds. Prereq: Food Chemistry or equivalent. 1 hr and 1 lab. Sp, A

590 Special Topics in Food Technology and Science (1-3) Critical reviews of current research and production concerns of food industry. May be repeated. Maximum 9 hrs. F, Sp

593 Directed Studies (1-3) Research on non-thesis topics chosen by student and major professor. Supervised experience in food industry or governmental laboratories. May be repeated. Maximum 9 hrs. F, Sp

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

601 Seminar (1) Reports and directed discussion on research topics from current literature. May be repeated. Maximum 3 hrs. F, Sp

620 Food Toxicology (2) Basic and applied concepts in food toxicology, toxicological aspects of processed foods. Mode of action, prevention and control of food toxicants in food supply. Prereq: Food Chemistry, 521, or consent of instructor. Sp, A

640 Advanced Food Processing (3) Role of processing treatments in modification of food properties; texture, flavor and color characteristics. Prereq: Food Preservation, 510, 511, 512 or consent of instructor. Sp, A
studies. Weekend field trips. Prereq: Wildland Recreation or consent of instructor. 2 hrs and 1 lab. Sp.

433 Wood Adhesives and Glued Wood Products (2) Theory and practice of adhesive bonding of wood, wood substrate-adhesive interface for bonding, principles of adhesion; wood adhesives; gluing of solid wood and composite wood products; adhesive testing practices; laboratory manufacture and/or testing of adhesives; adhesive bond strength and glued-wood product performance; day field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F.

434 Wood Processing and Machining (2) Primary log breakdown and secondary processing into major products. Fundamentals of machining technology for major types of machining operations: basic planning, veneer cutting, and laser machining; day field trip. Prereq. Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. Sp.

435 Wood Drying and Preserving (2) Discussion of wood-moisture relationships. Introduction to commercial wood drying equipment and practices. Proper use, specification, and disposal of preserved treated wood. Day field trips. Prereq. Wood Properties and Uses and Wood Identification, or consent of instructor. F.

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/NC only. E.

511 Problem Analysis in Forest Resources (3) Problem identification and solution in forest resources management; Identify, analyze and prepare written report. Topic and report must have approval of graduate committee. Available only to students in nonthesis option for M.S. in Forestry. E.

512 Seminar (1) Current developments in forestry. Required of all graduate students in residence in fall. May be repeated. Maximum 2 hrs. S/N/C only. F.

520 Advanced Forest Ecology (3) Physiological ecology and adaptations of trees; relationships between overstory structure, microclimate, and understory response; regeneration ecology; competition and effects of natural and human disturbance regimes at multiple scales; forest succession and stand dynamics. Prereq: Graduate standing in forestry or biological sciences, or consent of instructor. Sp, A.

530 Advanced Forest Resource Management (3) Analysis of forest management problems in public and private organizations. Forest resource management, forest resource conservation, and goal programming, as applied to resource management problems; advanced forest investment analysis; decision making for primary forest resource management; and methodologies for incorporating non-timber values in forest management operations. Prereq: Senior-level forest management or consent of instructor. Sp, A.

540 Genetics in Forestry (3) Genetic improvement of forest trees, selection of superior phenotypes; field testing for genetic variability; tree breeding; development of seed orchards, hybridization; tree cytology and tissue culture; use of biochemical variation; testing for genetic variability; tree breeding; development of seed orchards; hybridization; tree cytology and tissue culture; use of biochemical variation; testing for genetic variability; tree breeding. Prereq: Silvicultural methods and Biology 220 or consent of instructor. Sp.

550 Recreation Planning for Forests and Associated Lands (3) Planning process for recreation development on forests and associated lands; analysis and critique of specific contemporary alternatives. Overnight field trips. Prereq: Senior level in forest recreation or consent of instructor. F, A.

570 Management & Policy of Forest Resource Organization (3) Theory and application of management as applied to natural resource organizations: institutional direction and culture, strategic planning, development of policy as planning tool and as results from conflict resolution. Linkage between policy development and structured management of organizations. Prereq: Forest Management and Policy or consent of instructor. F, A.

580 Advanced Silviculture (3) Silvicultural characteristics, silvicultural practices and systems applied to commercially important hardwoods and softwoods. In-depth analysis of silvicultural principles involved and tools used, prescribed fire, pesticides, in regeneration and management; computer modeling of stand dynamics, structure-adhesive interface for bonding, principles of adhesion; wood adhesives; gluing of solid wood and composite wood products; adhesive testing practices; laboratory manufacture and/or testing of adhesives; adhesive bond strength and glued-wood product performance; day field trips. Prereq: Wood Properties and Uses and Wood Identification, or consent of instructor. 1 hr and 2 labs. F.

585 Advanced Forest Biometry (3) Application of sampling techniques to forest inventory; fixed and variable plot sampling; list sampling; regression sam-pling; regression estimators; multistage and multiple phase sampling. Growth and yield predictors for even-aged and uneven-aged forests. Prereq: Land Measurement Techniques and Forest Resource Inventory or consent of instructor. F, A.

590 Advanced Topics in Forestry (1-3) Recent advances and concepts; research techniques and analysis of current problems. Consent of instructor. May be repeated. Maximum 6 hrs.

593 Independent Study in Forestry (1-4) May be repeated. Maximum 6 hrs. E.

Wildlife, Wildlife & Fisheries

GRADUATE COURSES

410 Wildlife Habitat Evaluation and Management (3) Ecological relationships between wildlife and habitat. Evaluation, modification, and management of wildlife habitat. Effects of land-use practices on wildlife habitat. Weekend field trips. Prereq: Principles of Wildlife, Fisheries, and Natural Resource Management or consent of instructor. Available to majors in Forestry and in Wildlife and Fisheries Science. 2 hrs and 1 lab. F.

416 Planning and Management of Forest, Wildlife and Fisheries Resources (3) Integrated forest and wildlife resource management and planning through developing land management plans and analyzing case studies including conflict resolution. Applicable to majors in Forestry and in Wildlife and Fisheries Science. Prereq: Senior standing 1 hr and 2 labs. Sp.

520 Natural Resource Issues at International Level (2) Identification and analyses of issues regarding forestry, wildlife, fisheries and wildland park resources beyond U.S. borders. Political, economic, social, and biophysical elements impacting natural resources in different parts of the world: Northern Europe, Latin America, Asia, Africa, and South America. In-depth case study and class presentation required by student teams. Not available for students who have taken 420. F, A.

525 Management of Forestry, Wildlife and Fisheries Resources (2) Current technologies and management strategies concerning wise use of forestry, wildlife, and fisheries resources necessary for decision making and implementation. Prereq: 6 hrs of biological sciences or consent of instructor. Not available to students in forestry or wildlife and fisheries science. 4 hrs and 1 lab for six weeks. Sp.

535 Environmental Impacts to Natural Ecosystems (3) Current environmental problems impacting natural ecosystems: climatic change, acid deposition, air pollution, species declines due to exotic species. Management methodologies to mitigate environmental problems. Weekend field trips. Prereq: 410 or equivalent or consent of instructor. Applicable to majors in Forestry and in Wildlife and Fisheries Science. Sp, A.

540 Seminar on Integrated Resources Management in Biosphere Reserves (2) MAB program, UNESCO-sanctioned global conservation initiative. Analysis of integrated resources management practices that demonstrate concept of sustainable development. Environmental policy and application of science to management practice. Applicable to majors in Forestry and in Wildlife and Fisheries Science. Sp, A.

590 Advanced Topics in Forestry, Wildlife and Fisheries (1-3) Recent advances and concepts, research techniques, and analysis of current problems. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

Forestry, Wildlife & Fisheries Science

GRADUATE COURSES

440 Wildlife Techniques (2) Methods of wildlife capture, control, and mark; wildlife habitat management; management of endangered species; wildlife techniques and management of wetland species. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 1 hr and 1 lab or field. F.

442 Fisheries Techniques (2) Active and passive sampling methods for fish and aquatic organisms; population estimation methods; fish handling and transport; food habits analysis; marking and tagging techniques; age determination and incremental growth analysis; equipment and instrumentation usage and maintenance; safety in sampling methods. Weekend field trip. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 1 hr and 1 lab or field. F.

443 Fisheries Science (3) Quantification and management of freshwater fisheries: population estimation, age and growth, biological assessment, and stocking. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. F, A.

444 Ecology and Management of Wild Mammals (3) Biological and ecological characteristics of game mammals and endangered mammals. Current principles and practices of wild mammal management. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 2 hrs and 1 lab. One weekend field trip required. Sp.

445 Ecology and Management of Wild Birds (3) Biological and ecological characteristics of game birds, upland game birds, and endangered birds, and bird pests. Current principles and practices of wild bird management. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. 2 hrs and 1 lab. Sp.

490 Ethics in Wildlife and Fisheries Management (1) Ethical bases for decision-making and application of methodologies in practice of wildlife and fisheries management. Seminars by ethicists, wildlife and fisheries scientists and managers, and foresters to acquaint students with diverse perspective of ethical behavior in practices of wildlife and fisheries management. Lectures, panel discussions, and case studies. Team taught. Prereq: Senior standing. Sp.

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

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

512 Seminar in Wildlife and Fisheries Science (1) Current developments in wildlife and fisheries science. Required of all graduate students in residence in fall. May be repeated. Maximum 2 hrs. S/N/C only. F.

520 Planning and Administration of Fisheries and Wildlife Programs (2) Factors influencing policy and program planning activities of fisheries and wildlife agencies. Decision-making policies, case histories. Sp, A.

525 Endangered Species Management and Conservation of Biodiversity (2) Status, ecology, and management of endangered wildlife and plant species. Historic aspects, policy implications and philosophical issues surrounding recovery efforts. Approaches to monitor and manage for biodiversity. Prereq: Graduate standing or consent of instructor. (Same as Comparative and Experimental Biology 550). F, A.

530 Wildlife Diseases (3) Necropsy of birds and mammals. Recognition of various diseases and methods of preparing pathological materials in field and lab. Investigative procedures concerning wildlife disease. Prereq: Principles of Wildlife and Fisheries Management or consent of instructor. (Same as Comparative and Experimental Medicine - Veterinary Medicine 530). F, A.

540 Predator Ecology (2) Dynamics of terrestrial vertebrate predator populations in human-altered and relatively unaltered environments. Prereq: 444 or 445 or consent of instructor. Sp, A.
The doctoral program is for those who have demonstrated proficiency in conducting independent research. The department is particularly well-qualified to direct graduate work in location analysis, transportation geography, urban and rural geography, cultural ecology, and the geography of the natural environment (especially biogeography and geomorphology). The faculty is qualified to direct students from a variety of approaches ranging from historical and humanistic to rigorously analytic and GIS-based.

THE MASTER'S PROGRAM

The department offers the thesis and nonthesis options for the Master of Science. Both options require a minimum of 30 semester hours beyond the completion of a sound undergraduate major program. At least two-thirds of the total hours in the degree program must be at or above the 500 level and must include 501 (at each offering during residency), 504 and 3 semester hours at the 600 level. In the thesis option, 6 hours must be Thesis 501. A final examination is required in both programs.

THE DOCTORAL PROGRAM

The doctorate is a research degree and is granted only to those who demonstrate proficiency in conducting independent research. Students must have a broad foundation and understanding of the discipline; these should have been achieved in a comprehensive master's program.

Course requirements for the degree shall be determined by the student's faculty committee in accordance with specific interests and needs. The program must include 504, 515, 550, 599, 9 hours of 600-level seminars, and at each offering during residency. 501. A minimum of 9 hours must be earned in related fields outside the department. Competence in cartography and quantitative techniques is required. Additional tools, including languages, will be required as appropriate to the student's area of specialization.

Examinations required for admission to candidacy include a written comprehensive examination, comprised of written examinations in a subset of special fields. The student will be tested on his/her knowledge of two special fields and areas of research, an oral examination on the student's program, the special fields and related areas, and the dissertation proposal. All parts of the written comprehensive examination should be taken within the same semester.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

410 Global Positioning Systems and Geographic Data (3) Theory, field, and laboratory use of Global Positioning Systems for capturing digital geographic data; measurement of geographic data; coordinate systems; datum issues, scanning and digitizing, map standards, and uncertainty in Geographic Information Systems. 2 hrs and 12-hr lab.

412 Advanced Cartography Techniques (3) Cartographic design and display techniques for reference and thematic maps. Basic principles and methods of map reproduction. Prereq: Introduction to Cartography or consent of instructor: 2 hrs and 12-hr lab.

413 Remote Sensing: Types and Applications (3) Principles and uses of remote sensing imagery, digital data, and spectral data: geographic interpretation and mapping techniques. Prereq: Introduction to Cartography or consent of instructor.

415 Quantitative Methods in Geography (3) Geographic application of statistical techniques, point pattern analysis, and analysis of areal units. Prereq: Statistical Reasoning or two semesters of calculus or consent of instructor.

421 Geography of Folk Societies (3) Geographical study of folk culture, traditional material culture and rural settlement, examples from eastern North America and selected foreign areas. Prereq: World Geography or Cultural Geography: Core Concepts or consent of instructor.

423 Geography of American Popular Culture (3) Geographical study of popular cultures, youth cultures in United States. Prereq: Cultural Geography: Core Concepts or consent of instructor. (Same as American Studies 423.)

425 Historical Geography of the United States (3) Survey of changing human geography of United States during four centuries of settlement and development. Changing population patterns, development of agricultural regions, and patterns of urban-industrial development. Prereq: Regional or Cultural Geography of the United States and Canada or consent of instructor.

433 The Land-Surface System (3) Characteristics of surface form, water, vegetation, and surface materials, and their regional interrelationships. People as evaluators and agents of change. Prereq: Geography of the Natural Environment or consent of instructor.

434 Climatology (3) General circulation system leading to world pattern of climates. Climatic change and modification, and interrelationships of climate and human activity. Prereq: Geography of the Natural Environment or Meteorology or consent of instructor.

435 Biogeography (3) Changing distribution patterns of plants and animals on global scale. Effects of continental drift, Pleistocene climatic change, and human activity on world biota. Prereq: Geography of the Natural Environment or consent of instructor.

436 Water Resources (3) Global water resources and hydrologic processes: water availability, flooding, and water quality issues from physical and economic environmental perspectives. Prereq: Geography of the Natural Environment or consent of instructor.

439 Plant Geography of North America (3) Characteristics and distribution of major plant communities of Canada, the U.S., Mexico, and Central America; relationships to climate, soil, fire, and human disturbance. Prereq: Coursework in geography or botany or consent of instructor.

441 Urban Geography of the United States (3) Concepts and theories concerning development and significance of systems of cities and internal morphologies of cities in United States. Prereq: World Geogra-
443 Rural Geography of the United States (3)
Geographical appraisal of rural areas of United States: small towns and urban fringes. Problems and potentials of rural America. Prereq: Geographic or Economic Geography: Core Concepts or consent of instructor. Writing intensive. (Same as Urban Studies 441.)

445 Geography of Resources (3) Study of factors related to variations in resource availability from time to time and place to place, energy and metallic resources. Prereq: World Geography or Economic Geography: Core Concepts or consent of instructor.

449 Geography of Transportation (3) Examination of transportation systems, their effects on trade patterns, land use, location problems, and development. Prereq: Economic Geography: Core Concepts or consent of instructor.

450 Process Geomorphology (3) (Same as Geology 450.)

468 Teaching and Learning Geography (3) Preparation of prospective teachers in content, skills, strategies, and toward research needed for effective teaching and assessment of geography in K-12 schools. Course organization and content based largely on that of National Geography Standards.

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

501 Colloquium in Geography (1) Discussion of departmental research, current research literature, and general topics. Registration required of resident graduate students whenever offered. May be repeated. Maximum 4 hrs. May be applied toward graduate degree. 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

504 Introduction to Geographical Research (1) Research interests and methods of departmental faculty. Research frontiers in geography. Required of new graduate students.

505 Directed Research (2-6) Research on problems as defined by individual students. Prereq: Written consent of instructor and department prior to registration. May be repeated with consent of instructor. Maximum 9 hrs. S/NC or letter grade.

506 Directed Readings (2-6) Readings on topics of interest as defined by individual students. Prereq: Written consent of instructor and department prior to registration. May be repeated with consent of instructor. Maximum 9 hrs. S/NC or letter grade.

508 Topics in Geography (2-3) Topics vary. Prereq: Consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs. S/NC or letter grade.

510 Geographic Software Design (3) Algorithms for spatial analysis, software design, and program implementation in stand alone and distributed computing environments. Prereq: Consent of instructor.

513 Topics in Remote Sensing (3) Applied research using imagery for interpretation and mapping of geographic data. Prereq: 415 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

515 Topics in Quantitative Geography (3) Multivariate analysis applied to problems in geography; research problems utilizing appropriate computer programs; usefulness to geographic research of techniques developed by other disciplines. Prereq: 415 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

517 Geographic Information Management and Processing (3) Concepts and methods in management of geographic information. Database design, manipulation, sampling and analysis. Prereq: Consent of instructor.

518 Graduate Practicum in Cartography/Remote Sensing/GIS (2-6) Prereq: Written consent of department before registration. May be repeated with consent of instructor. Maximum 6 hrs.

521 Topics in Cultural Geography (3) Examination of trends, problems, and methods in cultural geography. Prereq: 421 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

532 Topics in Global Change (3) Emerging trends, anticipated problems and methods in global change research and response. Prereq: 434 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

533 Topics in Physical Geography (3) Examination of trends, problems, and methods in geography of land surface systems or in modern climatology. Prereq: 433 or 454 and consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

534 Topics in Climatology (3) Trends, problems and methods in area of climatology. Prereq: 434 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

535 Topics in Biogeography (3) Examination of trends, problems, and methods in biogeography. Prereq: 435 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

541 Topics in Urban Geography (3) Examination of trends, problems, and methods in urban geography. Prereq: 441 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

549 Topics in the Geography of Transportation (3) Examination of trends, problems, and methods in transportation geography and transportation networks. Prereq: 449 or consent of instructor. May be repeated with consent of instructor. Maximum 6 hrs.

577 Biological Conservation (3) Analytical treatment of politics, policies, and forms of biological conservation as practiced in U.S. and abroad. Prereq: Consent of instructor.

591 Foreign Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. S/NC or letter grade.

592 Off-Campus Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. S/NC or letter grade.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Written consent of department prior to registration. S/NC or letter grade.

599 Geographic Concept and Method (3) Traditional and modern geographic thought; readings on nature, scope, problems, and methods of geography. Prereq: Consent of instructor.

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

609 Seminar in Geography (2-3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

631 Seminar in Natural Hazards (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

633 Seminar in Physical Geography (3) Prereq: 533 or consent of instructor. May be repeated. Maximum 6 hrs.

634 Seminar in Climatology (3) Prereq: 534, 532 or consent of instructor. May be repeated. Maximum 6 hrs.

635 Seminar in Biogeography (3) Prereq: 535 or consent of instructor. May be repeated. Maximum 6 hrs.

641 Seminar in Urban Geography (3) Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hrs.

643 Seminar in Rural Geography (3) Prereq: 543 or consent of instructor. May be repeated. Maximum 6 hrs.

649 Seminar in Geography of Transportation (3) Prereq: 549 or consent of instructor. May be repeated. Maximum 6 hrs.

663 Seminar in Geography of the American South (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

673 Seminar in Geography of Latin America (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

677 Seminar in Biological Conservation (3) Conduct of original research. Prereq: 577 or consent of instructor. May be repeated. Maximum 6 hrs.

Geological Sciences

(College of Arts and Sciences)

MAJOR

DEGREES

Geology.................................. M.S., Ph.D.

William M. Dunne, Head

Professors:

Broadhead, Thomas W., Ph.D. ............... Iowa

Dnee, Steven G. (Liaison), Ph.D., Wisconsin

Dunne, William M., Ph.D. .................. Bristol

Hatcher, Robert D., Jr. (Director of

Scientist), Ph.D. ......................... Tennessee

Kopp, Otto C., Ph.D. ...................... Columbia

Labotka, Theodore C., Ph.D. ............... Calif,teh

McLaughlin, Robert E. (Emeritus),

Ph.D. ...................................................... Yale

Ph.D...................................................... Harvard

Clark, G. Michael, Ph.D. ............... Penn State

McKay, Larry D. (Jones Prof.), Ph.D., Waterloo

McKinney, Michael L., Ph.D. .............. Yale

Mora, Claudia L., Ph.D. ................. Wisconsin

Williams, Richard T. II., Ph.D. .......... VP&SU

Assistant Professor:

Kah, Linda C., Ph.D. ................. Harvard

The Department of Geological Sciences offers both the M.S. and Ph.D. degrees in Geology. Persons interested in these programs should contact the Director of Graduate Admissions in the department.

For admission, an applicant must provide transcripts of previous university work, two rating forms or letters of recommendation, and GRE scores (general). Students are not normally admitted under non-degree status. Prerequisite for both degrees is a Bachelor's degree, including coursework in mineralogy, optical mineralogy, petrology, stratigraphy, paleontology, structural geology, and field geology. One year of coursework in calculus and chemistry and one year of coursework in biology, physics, or statistics are also required. Applicants lacking any of these may be admitted, but the deficiencies must be removed within the first year without graduate credit. Substitutions may also be allowed.

THE MASTER'S PROGRAM

The department offers the thesis option in the master's program. Graduation requires successful oral defense of a written thesis.
and a minimum 3.0 GPA in all graduate coursework.

Course requirements are a minimum of 30 semester hours, including:

1. Six hours of Thesis 500.
2. Registration in 595 during the first two years in residence. Two hours may be counted toward the 30-hour minimum. This requirement may be waived in unusual circumstances.
3. Sixteen hours of geological courses, with at least 14 hours at the 500 or 600 level, including at least one course from any three of the following five groups:
   - Group 1: 410, 460, 480, 530, 563, 565.
   - Group 2: 420, 455, 456, 556.
   - Group 3: 470, 570, 571, 575, 576.
   - Group 5: Any 400- or 500-level courses with graduate credit from related departments (allied sciences, mathematics, and engineering), selected with approval of advisor.
4. Eight hours of additional graduate coursework.

THE DOCTORAL PROGRAM

The prerequisite for the Ph.D. program, in addition to that for the M.S. program, is either a master's degree in Geology, or a Bachelor's degree plus completion of 9 hours of coursework from the list in #3, above, including one course from each group. These courses may be taken while completing other course requirements.

Graduation requires passing a comprehensive examination, taken no later than the end of the second year, completion of all course requirements with a minimum 3.0 GPA, completion of the language requirement, and successful oral defense of the dissertation.

The comprehensive examination includes both oral and written parts in which the candidate will be tested on his/her knowledge of the area concerning the proposed dissertation and of related fields. The candidate is expected to be conversant in a wide field of geological sciences.

A minimum of 24 hours of graded coursework beyond the master's degree is required in addition to the 24 hours of Dissertation 600. The coursework includes the sum of 9 hours of 600-level geology courses, 9 hours of 500-level or higher geology courses, and 6 hours of additional graduate courses. Extra-departmental coursework is encouraged.

The student must demonstrate a reading knowledge of a foreign language in which there is a body of geologic literature, as approved by the student's dissertation committee. The foreign language requirement may be waived for Ph.D. students whose native language is not English and who have demonstrated mastery of the English language, as determined by the student's dissertation committee.

GRADUATE COURSES

401 Quantitative Methods in Geology (3) Applications of calculus and differential equations to problems in earth sciences. Examples of diffusion equation in hydrogeology; wave equation in geophysics; mechanical modeling and boundary conditions in structural geology and tectonics. Prereq: The Dynamic Earth or Earth, Life, and Time, 2 semesters of Calculus.


411 Optical Mineralogy (2) Laboratory course on principles of optical mineralogy. Use of petrographic microscope to identify rock-forming minerals with applications to petrology and environmental mineralogy. Prereq: Mineralogy.

412 Elements of X-ray Diffraction (2) Laboratory course on principles and applications of x-ray diffraction. Phase identification, quantitative determination of mineral abundances in mixtures, and crystal structure determination. Prereq: Mineralogy.

420 Paleocology (4) Principles of ecological analysis as applied to fossils and fossil assemblages: data collection and interpretation. Laboratory designed around preparation of scientific reports based on field and laboratory analysis. Writing emphasis course. 3 hrs and 1 lab.

421 Invertebrate Paleontology (4) Survey of invertebrate animal phyla: skeletal structure and preservation, functional morphology, ecology, and geographic distribution. Prereq: Paleobiology or consent of instructor. 2 hrs and 2 1/2 labs.

440 Field Geology (5) Summer field course for advanced undergraduate geology majors. Majors and first-year graduate students in geology. Theory and techniques demonstrated, practiced, and applied to solution of geologic problems. Prereq: Completion of major core courses and consent of instructor.

500 Process Geomorphology (3) Integrative approach to development of surface of earth based upon case histories, maps, remote sensing imagery, and computer modeling. Prereq: 310-350 or 300, Elements of Physics.

540 Seminar in Local Geology (1) Introduction of geological principles as they apply to specific local geology. A seminar designed for advanced undergraduate geology majors and first-year graduate students in geology. Taught off-campus and requires full-time of student. Synthesis of major aspects of geological sciences in societal context. Field techniques demonstrated, practiced, and applied to solution of geologic problems. Prereq: Completion of major core courses and consent of instructor.

530 Petrogenesis of Crystalline Rocks (4) Origin and processes of igneous and metamorphic rocks, magmatic and subvolcanic processes, and physical and chemical conditions. Laboratory involves petrographic study of crystalline rocks in thin section. Prereq: 310-330 or equivalent. 2 hrs and 1 lab.

550 Regional Geomorphology (3) Integrative approach to study of surface processes on continents and their interactions with the physical environment. Prereq: 310 or equivalent. 3 hrs and 1 lab.

555 Ice-Age Environments and Global Climate Change (3) (Same as Ecology and Evolutionary Biology 556.)

556 Ice-Age Environments and Global Climate Change (3) (Same as Ecology and Evolutionary Biology 556.)

565 Chemical Petrology (3) Application of thermodynamic principles to geologic materials. Thermochemistry of condensed phases, solutions, thermodynamic stability, heterogeneous multiphase equilibrium, and conduction of heat through earth. Prereq: Chemistry 120-125 or equivalent. 3 hrs and 1 lab.

566 Chemical Petrology (3) Application of thermodynamics to geologic materials. Thermochemistry of condensed phases, solutions, thermodynamic stability, heterogeneous multiphase equilibrium, and conduction of heat through earth. Prereq: Chemistry 120-125 or equivalent. 3 hrs and 1 lab.

567 Geochemical Analysis (3) Collection and treatment of geochemical data using electron microprobe, x-ray fluorescence, and atomic absorption spectrophotometry techniques. Prereq: 410 or consent of instructor. 2 hrs and 1 lab.

570 Advanced Structural Geology (4) Current topics in structural geology and tectonics of mountain belts;
Health and Safety Sciences

(College of Human Ecology)

MAJORS

Health Promotion and Health Education ... M.S. Human Ecology ........................................ Ph.D.
Public Health ........................................ M.P.H., M.S.-M.P.H.
Safety Education and Service ....................... M.S.

Charles B. Hamilton, Head

Professors:
Gorski, June, Dr.P.H............................. UCLA
Hamilton, Charles B. (Liaison),
Dr.P.H. ................................................ Oklahoma
Kirk, Robert H., H.S.D. ......................... Indiana
Wallace, Bill C. (Liaison), Ed.D. .............. Northern Colorado

Associate Professors:
Pursley, R. Jack, Ph.D. .......................... Iowa
Zemel, Paula, Ph.D. ............................. Wayne State

Assistant Professors:
Ellison, Jack S. (Liaison), Ed.D ...... Tennessee
Smith, Susan M. (Liaison), Ed.D ...... Tennessee

The Health and Safety Sciences Department offers graduate programs leading to the Master of Science with majors in Health Promotion and Health Education; and Safety Education and Service; and to the Master of Public Health degree in Public Health. The department provides doctoral preparation through a concentration in Human Ecology. Inquiries should be directed to the department head. Application packets are available by request to department. The department fosters development of pre-professional and professional competencies by those interested in the disciplines of health education/promotion, public health, and safety. The Health and Safety Sciences Department offers public health, community and public health, and safety problem. Various types of instructional/educational and intervention programs. F

400 Consumer Health (3) Survey of major consumer health care providers and health care services; selecting, purchasing, evaluating and financing medical and health care services/products. (Same as Public Health 400) Sp

405 Alcoholism and Alcohol Education (3) Problems of alcoholism. Factors which make alcoholism serious health and safety problem. Various types of instructional/educational and intervention programs. F

406 Death, Dying and Bereavement (3) Aspects of dying, death and handling trauma of loss. Medical, financial, legal and social implications of death. F, Sp

420 Sex Education As It Relates to Human Sexuality (3) Exploration of science of human sexuality. Trends, issues, and content of sex education. E

425 Women’s Health (3) Factors influencing women’s health and women consumers in nation’s health service delivery systems. Health problems/concerns of women and children and techniques for prevention, maintenance and/or correction. (Same as Women’s Studies 425) E

430 Suicide and Crisis Intervention (3) Factors which make suicide serious health problem. Assessment, intervention, and prevention techniques. Sp

435 Substance Use and Abuse (3) Drug and alcohol abuse problems and suspected causes; pharmacology of drugs and effects on society; strategies for intervention and education. Sp

465 Aging and Health (3) Aging process in health perspective as related to health promotion and wellness of aged. F, Sp

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

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

520 Sex Education and Human Sexuality (3) Advanced in-depth discussion of educational and health counseling theory, techniques, materials used in school, community, or health care facility. Sp
530 Health Promotion and Health Education Program Development (3) Theories and principles of health promotion program development; methodology, marketing, public relations. Health education as vehicle for health promotion. F

540 Evaluation in Health Promotion and Health Education (3) Evaluation principles and methodologies as related to health promotion products, processes and programs. Construction of instruments for use in assessing education outcomes. Sp

570 Special Topics (1-3) For graduate students, in-service teachers and other health professionals. Health/wellness or health promotion issues. May be repeated. Maximum 12 hrs.

590 Research Methods in Health (3) Basic research techniques in variety of health settings. Development of research skills and problem identification for research topic. (Same as Public Health 590) F

593 Directed Independent Studies (1-3) Individual identification and study of health/wellness or health promotion problem/issue. Specific proposal to instructor before registration. May be repeated. Maximum 15 hrs. E

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

601 Internship/Research in Safety and Health (3-6) (Same as Safety 601)

610 Critical Analysis of Writing and Research (3) Analysis of writing and research in health related areas. F

620 Advanced Research Techniques in Health (3) Advanced theory and techniques of research design and methodologies in health discipline. Prereq: 590, 610. Sp

650 Health Aspects of Gerontology (3) Knowledge and understanding of biological, psychological and sociological aspects of aging as related to health and wellness of individuals. (Same as Public Health 650) Su

655 Seminar in Nation's Health (3) Comprehensive study of definition, determinants, resources and health status of nation. (Same as Public Health 655) F

660 International Health (3) Study of quality of health, health promotion and health services in countries throughout world. (Same as Public Health 660) Sp


Public Health

Graduate study with a major in Public Health leads to the Master of Public Health (M.P.H.). Three professional preparation concentrations are available: community health education, gerontology, and health planning/administration. Preparation for professional practice in improving community health emphasizes a population perspective, service-learning and application opportunities through rigorous internships. The M.P.H. program is accredited by the Council on Education for Public Health. A minor in statistics is available to interested M.P.H. students due to public health affiliation with the Intercollegiate Graduate Statistics Programs.

ADMISSION REQUIREMENTS

A statement of the applicant's educational and career goals and three rating forms are required. Request application packet from the department. Preferential consideration for admission to degree status shall be given to those with a minimum undergraduate grade-point average of 2.8 and with at least one year of professional experience in a health-related occupation. As a restricted program, non-degree admission requires department recommendation. Deadlines for completed applications are 1 February for Summer term and 1 April for Fall semester.

THE MASTER'S PROGRAM

The M.P.H. is a non-thesis program requiring completion of 38 semester hours of coursework including 9 weeks of field practice. The field internship provides a full-time experience with an affiliated health agency or organization offering one or more health programs. Of importance, field practice allows the student to apply academic theories, concepts, and skills in an actual work setting. Students must complete all assigned prerequisite courses and 21 semester hours of the curriculum with a minimum overall GPA of 3.0 prior to placement in the field.

As an alternative to field practice, preparation of a master's essay may be used to fulfill the professional skills development component of the curriculum. Approval must be received from the Public Health Academic Program Committee and is contingent on consent of major advisor and formal written proposal by the student, and completion of an additional research methods course. Written guidelines stipulating expectations and eligibility criteria are available.

Requirements include:

1. Public Health Foundation courses (16 hours): 509, 510, 520, 530, 540, 555.
2. Internship (6 hours): 587, 588.
3. Concentration of Study (16 hours).

Required and recommended electives will be selected by the student in consultation with the major advisor. A list of courses is available for each concentration: community health education, gerontology, and health planning/administration. For more information, refer to the website: http://hss.he.utk.edu/pubhealth.

DUAL M.S.-M.P.H. PROGRAM

The College of Human Ecology offers a coordinated dual program leading to the conferment of both the Master of Science with a major in Nutrition (public health nutrition concentration) and the Master of Public Health. The dual program allows students to complete both degrees in less time than would be required to earn both degrees independently.

The program is designed to meet the needs of students who are interested in the benefits of majors in both nutrition and public health. Therefore, it accommodates the interests of students who: 1) plan a career in public health nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional; 2) plan a career in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional; or 3) plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission Requirements

Applicants for the M.S.-M.P.H. program must make separate application to, and be competitively and independently accepted by, the Department of Nutrition for the M.S., Department of Health and Safety Sciences for the M.P.H., and the Public Health Academic Program committee.

Students who have been accepted by both departments may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both departments. Such approval will be granted, provided that dual program studies be started prior to entry into the fourth semester of the M.S. and M.P.H. programs.

Curriculum

A dual degree candidate must satisfy the requirements for both the M.S. (public health nutrition concentration) and the M.P.H. degrees, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Health and Society (PH 550), two credits of Seminar in Public Health (PH 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of 9 semester hours of credit toward the M.S. degree for successful completion of approved graduate level courses offered in the Department of Health and Safety Sciences. The Department of Health and Safety Sciences will award a maximum of 11 semester hours of credit toward the M.P.H. degree for successful completion of approved courses offered in the Department of Nutrition. All courses for which cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student's graduate committee. A single block field experience (or public health internship) is required of all students and the analytical field paper incorporates public health nutrition and the student's public health concentration.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward the M.S. or M.P.H. degree for courses taken in the other program, except as such courses qualify for credit without regard to the dual program.

Approved Dual Credit

M.S. courses to be counted toward the M.P.H. program must include 10 semester hours of Field Study in Community Nutrition (NTR 515) and 1 semester hour of Graduate Seminar in Public Health (NTR 509). M.P.H. courses to be counted toward the M.S. include Public Health Administration (PH 520), Biostatistics (PH 530), and Epidemiology (PH 540).

MINOR IN GERONTOLOGY

Graduate students in Public Health may pursue a specialized minor in gerontology. This interunit/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis.
The M.P.H. program in Public Health is available to residents of the state of Arkansas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

**GRADUATE COURSES**

400 Consumer Health (3) (Same as Health 400.)

410 Worksite Health Promotion (3) Foundations of health promotion programs delivered in worksite that resolve around issues relative to employees and management: theory, program design, implementation, and evaluation from perspective of health promotion specialist. Prereq: Health Education, Promotion, and Behavior. Sp

493 Directed Independent Study (1-3) Individual in-depth study of selected issues. Prereq: Consent of instructor. 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

509 Graduate Seminar in Public Health (1) In-depth discussion of timely topics reflecting scope of public health as discipline and its interrelation with many other academic and professional disciplines. Students both internal and external. May be repeated. Maximum 4 hrs. (Same as Nutrition 509, Nursing 509, Exercise Science 509, and Social Work 509.) S/NC only. F, Sp


520 Public Health Policy and Administration (3) Administrative considerations of community-based health care programs and public health practice. Health policy formulation, political environment and governmental involvement in health, legal responsibilities, and managerial models/techniques/process. F, Su

521 Organization Theory and Health Care Delivery (3) Administrative and Organization theory related to health facilities; operation and management of community hospital. Case discussions and problem-solving exercises; managerial functions and skills. F

523 Management in Extended Care Settings (3) Managerial concepts and theoretical foundations essential to supervision and administration of domiciliary health services programs. Management and operation of health services programs for patients and clients in settings which provide activities of daily living and special psychosocial environmental needs. Programs for home health services, comprehensive medical rehabilitation, nursing homes, congregate living centers and similar type health programs. Prereq: 521 or consent of instructor. Sp

525 Financial Management of Health Programs (3) Financial management concepts and practices applied to health services programs. Fundamentals of budgeting, costing, financing, rate setting, financial reporting and control. Opportunities to apply techniques. Prereq: 520 or consent of instructor. Sp

530 Biostatistics (3) Application of descriptive and inferential statistical methods to health-related problems and programs. Microcomputer applications, use and interpretation of vital statistics and introductory research methodology preparatory for first course in epidemiology. Prereq: Introductory statistics or consent of instructor. F, Sp

540 Principles of Epidemiology (3) Distribution and determinants of health-related outcomes in specified populations, with application to control of health problems. Historical origins of discipline, biologic hypothesis formulation, research design, data and error sources, measurement of frequency and association, etiologic reasoning, disease screening, and injury control. Prereq. or corq: 530. F, Sp


550 Principles and Practices of Community Health Education (3) Theoretical foundation for community health education; opportunities for skill development in variety of educational processes; and introduction to community health analysis. F

552 Community Health Problem Solving (4) Dynamics of community organization, community needs assessment, educational interventions, and application of problem planning and evaluation techniques. Opportunity for practice in setting specific. Prereq: 550 or consent of instructor. Sp


560 Theories and Techniques in Health Planning (4) Overview of health planning concepts and methodologies: systems-oriented planning process. Major elements of planning: formulation and conceptualization of problem, plan design, evaluation and implementation. Health problems of institutions, communities and selected population groups, appropriate diagnoses, and programs for addressing needs. Sp

568 Physical Activity and Positive Health (3) (Same as Exercise Science 568.)

569 Clinical Exercise Physiology (3) (Same as Exercise Science 569.)

580 Special Topics (3) Prereq: Consent of instructor. May be repeated under different topic. Maximum 6 hrs.

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counseling Education and Counseling Psychology 585, Exercise Science 585, Nursing 585, Psychological Studies 585, Social Work 585, and Sociology 585.)

587-88 Internship (3,3,3) Internship (community health education, gerontology, or health planning/administration) in either approved organization or re-search setting under supervision of designated preceptor. Prereq: M.P.H. major, one semester advance notice and consent of major advisor. S/NC only available for approved extended placements. S/NC only. E

590 Research Methods in Health (3) (Same as Health 590) F, Sp

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

600 International Health (3) (Same as Health 600). Sp

660 International Health (3) (Same as Health 660.)

655 Seminar in Nation's Health (3) (Same as Health 655.)

660 International Health (3) (Same as Health 660.)

GRADUATE COURSES

443 Sports & Recreational Safety (3) Accident prevention and injury control in sports activities; philosophy of sports safety; human environmental factors and interrelationship in sports injury and control; risk-taking and protective behavior and contributions of sports medicine to safety. 3 hrs and 2 labs. Sp

452 General Safety (3) Principles, practices, and procedures in general safety. Safety problems in school, traffic, recreation, industry, home and other public areas. F, Su

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

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

532 Behavioral Problems in Safety Education & Accident Prevention (3) Problems of behavior, causes of accidents, and application of principles of psychology in development of safety behavior in all segments of environment. F

533 Problems and Research in Accident Prevention (3) Safety problems found in wide variety of accidents that occur in community: identification and research in behavioral sciences as related to variation incidence of accidents. F

534 Organization, Administration and Supervision of Safety Programs (3) National, state and local level programs; administrative, instructional, and supervisory aspects. Implementation of relevant programs. Sp

535 Emergency Management (3) Civil and defense problems: tornadoes, floods, fires, mass civil disorders, and nuclear and personnel attack by alien countries. Sp

572 Graduate Workshop in Safety (3) Special safety education programs. For advanced graduate students, teachers, supervisors, and administrators. May be repeated. Maximum 12 hrs. E

590 Special Topics (1-3) Advanced study in selected disciplinary or professional area of safety education/management. May be repeated. Maximum 12 hrs. E

593 Directed Independent Study (1-3) Individual identification and study of problem/issue in safety. Extensive reading and critical analysis of safety literature. Specific proposal to instructor before registration. May be repeated. Maximum 12 hrs. E

601 Internship/Research in Safety and Health (3-6) Field experience. Significant problem identified, researched and reported in acceptable form. May be repeated. Maximum 6 hrs. (Same as Health 601.)
History
(College of Arts and Sciences)

MAJOR DEGREES
History.............................................M.A., Ph.D.

Head

Professors:
Bergeron, Paul H., Ph.D. .......... Vanderbilt
Chmielarski, Edward V. (Emeritus),
Ph.D. ............................... Harvard
Cutler, E. Wayne, Ph.D. .......... Texas
Faris, W. Wayne, Ph.D. .......... Harvard
Finger, John R., Ph.D. .......... Washington
Haas, Arthur G., Ph.D. .......... Chicago
Hao, Yen-Ping (Lindsay Young Prof.),
Ph.D. ............................... Harvard
Piehler, G. Kurt, Ph.D.......................... Rutgers
Liulevicius, Vejas G., Ph.D........ Pennsylvania
Brosnan, Kathleen, Ph.D........ Chicago
Appier, Janis, Ph.D....... California(Riverside)
Johnson, Charles W., Ph.D. .......... Michigan
Muldowny, John, Ph.D. .......... Virginia
Higgs, Catherine A., Ph.D......... Yale
Ash, Stephen V., Ph.D. .......... Tennessee
Brat, Robert J., Ph.D. .......... Arizona
Bohstedt, John, Ph.D. .......... Harvard
Bradley, Owen P., Ph.D. .......... Cornell
Brummett, Palma R., Ph.D. .......... Chicago
Burman, Thomas E., Ph.D. .......... Toronto
Diacon, Todd A., Ph.D. .......... Wisconsin
Johnston, Charles W., Ph.D. .......... Michigan
Muldowly, John, Ph.D. .......... Yale
Pinckney, Paul J., Ph.D. .......... Vanderbilt

Associate Professors:
Appier, Janis, Ph.D. .......... California (Riverside)
Brosnan, Kathleen, Ph.D........ Chicago
Dessel, J. P., Ph.D. .......... Arizona
Glover, Lott, Ph.D. ............. Kentucky
Huitulievits, Vejas G., Ph.D. .......... Pennsylvania
Piehler, G. Kurt, Ph.D. .......... Rutgers

Assistant Professors:
Bergeron, Paul H., Ph.D. .......... Vanderbilt
Chmielarski, Edward V. (Emeritus),
Ph.D. ............................... Harvard
Cutler, E. Wayne, Ph.D. .......... Texas
Faris, W. Wayne, Ph.D. .......... Harvard
Finger, John R., Ph.D. .......... Washington
Haas, Arthur G., Ph.D. .......... Chicago
Hao, Yen-Ping (Lindsay Young Prof.),
Ph.D. ............................... Harvard
Piehler, G. Kurt, Ph.D.......................... Rutgers
Liulevicius, Vejas G., Ph.D........ Pennsylvania
Brosnan, Kathleen, Ph.D........ Chicago
Appier, Janis, Ph.D....... California(Riverside)
Johnson, Charles W., Ph.D. .......... Michigan
Muldowny, John, Ph.D. .......... Yale
Pinckney, Paul J., Ph.D. .......... Vanderbilt

The Department of History offers
graduate study leading to the Master of Arts and
Doctor of Philosophy degrees. The M.A. program includes a thesis and non-thesis
option. The doctoral program has concentrations in American and European history with
special focus on the areas identified under
group II doctoral fields and group III teaching
fields.

Detailed information may be obtained from
the Director of Graduate Studies in History
who also advises all incoming students.

THE MASTER'S PROGRAM

Admission Requirements
1. Successful completion of a baccalaureate
degree from an accredited institution,
preferably with a major in history.
2. Acceptable scores on the Graduate
Record Examination (general).

General Requirements
Complete 510 and a 500-level research
seminar normally during the fall and spring
semesters of the first year in the graduate
program. Complete 521 in preparation for the
M.A. examination. As many as 9 related
hours may be taken outside the department.
As many as 9 more credit hours may be
applied toward the M.A. degree. Except by prior approval of the
Director of Graduate Studies, a student's
coursework must be at the 500 level or above.

Thesis Option
Twenty-four hours of coursework and 6
hours of Thesis 500 for a total of 30 hours
are required. Thesis students are required to
select one M.A. field and write a thesis. At
the end of the program the thesis student will
stand on a two-hour oral examination on
both the thesis and the field.

Non-Thesis Option
A total of 30 hours of coursework is required. At least 9 hours must be completed in
each of two M.A. fields. The primary field
is examined by a two-hour written followed
within one week by a one-hour oral
examination with the single grade of pass/fail
given at the conclusion of the oral examination.
No examination is given on the secondary
field.

 retention and Termination
A 3.0 overall grade-point average is
required to remain in good standing. M.A.
students must take the M.A. examination no
later than the semester following the
completion of 30 hours. A student who fails
the M.A. examination must repeat the
examination no later than the following
semester. A student who fails the examination
a second time or does not take the
examination when required will be dropped
from the graduate program.

M.A. Fields
United States (colonial to present)
Premodern Europe
Modern Europe
Asia

Comprehensive Examination
The comprehensive examination is to be
taken no later than the semester following
the term in which the student has completed
the residence, coursework, and language
requirements. A student stands examination in
one field selected from Group I and one
field selected from Group II below. Both parts are
4-hours, written, and taken during the
same semester. A general oral exam will be
taken following the successful completion of
the two written portions. The two written
and one oral exams are separate examinations,
and Group I must be passed before
taking Group II, and the latter passed prior
to taking the oral portion. A student who fails
one of the three parts (Group I or Group
II or the Oral) which constitute the
Comprehensive Exam must repeat the failed exam
the following semester, excluding summer. A
second failure on any one of the three parts
(regardless of which one) will cause the
student to be dropped from the History
graduate program. Likewise, a student who
does not repeat a failed exam within the
allotted time (one semester) will be dropped
from the program.

Admission to Candidacy
Upon successful completion of the above
requirements, a doctoral student may be
admitted to candidacy.

Doctoral Fields
Group I:
Premodern Europe
Modern Europe
United States (colonial to present)
Graduate Study Leading to the Doctor of Philosophy Degree with a Major in Human Ecology

ADMISSION REQUIREMENTS

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

THE DOCTORAL PROGRAM

Graduate study leading to the Doctor of Philosophy degree with a major in Human Ecology is available in the Department of Child and Family Studies; Consumer and Industrial Services Management; Health and Safety Sciences; Human Resource Development; Nutrition. Concentration areas are child and family studies, community health, human resource development, nutrition science, textile science, and retail and consumer sciences. A major challenge of the doctoral program in Human Ecology is to draw upon basic research generated from the natural sciences, social sciences, humanities, and the arts, and to provide a holistic perspective that contributes to the improvement of individual and family well being. Within the College of Human Ecology, research from one discipline is enhanced by encompassing and utilizing the findings of research from other disciplines.

The Ph.D. is a research degree granted only to individuals who demonstrate proficiency in conducting original research. Course requirements for the degree are determined by the student's faculty committee, based upon college and departmental requirements and student needs and interests. The Graduate School sets minimum requirements for the doctoral degree.
Human Resource Development

(College of Human Ecology)

MAJORS

Human Ecology .............................................Ph.D.
Human Resource Development ..........................M.S.

Gregory C. Petty, Head

DEGREES

Human Resource Development

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 Ph.D. program in Human Ecology is available to residents of Alabama, Kentucky, Mississippi, or West Virginia. Additional

human resource development

information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time devoted to 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 problem and future directions in field. Examination of research, integrative framework. F,A

520 Directed Study in Human Ecology (1-3) Integrative topics. Prereq: At least 9 hrs of graduate study in college including courses from at least two departments or consent of instructor. May be repeated. Maximum 6 hrs. E

525 Practicum in Human Ecology (1-6) Field based experiences. Prereq: Consent of instructor. E


574 Analysis of Teaching for Professional Development (2) Strategies to document and analyze effectiveness of teaching and of professional development. Study and application of various approaches. Coreq: 575. F

575 Professional Internship in Teaching (1-8) Intensive teaching and related experiences in professional settings in public schools. Enrollment limited to prebaccalaureate students in professional year program. Prereq: Admission to Teacher Education program. May be repeated. Maximum 12 hrs. S/NC only. F,Sp

580 Special Topics in Home Economics Education (1-3) Current issues and trends in home economics. Prereq: Consent of instructor. May be repeated. Su,A

581 Directed Study in Home Economics Education (1-3) Prereq: Consent of instructor. May be repeated. E

585 Seminar in Gerontology (1) Scope of gerontology as discipline and as related to other academic and professional disciplines. Speakers both internal and external to UT. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. (Same as Counselor Education and Counseling Psychology 585, Exercise Science 585, Nursing 585, Public Health 585, Psychosocial Studies 585, Social Work 585, and Sociology 585.) S/NC only.

591 Clinical Studies (1-4) Group and individual seminar activities during full-time internship. Application and evaluation of professional core competencies. Completion and presentation of portfolio and analysis of teaching project. Coreq: 575.

630 College Teaching and Professional Roles in Human Ecology (3) Instructional effectiveness, techniques, organization and evaluation in college teaching. Systems and ecological framework. Professional roles and responsibilities related to higher education programs in human ecology. Sp

THE MASTERS PROGRAM

The Master of Science degree with a major in Human Resource Development provides a flexible graduate program for professionals wishing to pursue in-depth study within and across subject areas of Human Resource Development; those who work with individuals to help them enter the workforce; those who train individuals already in the workforce; and those who help individuals in the workforce advance their potential.

The M.S. degree with a major in Human Resource Development offers two concentrations, each providing opportunities for specialized interests. Both concentrations require a thesis. The training and development concentration is designed to meet the needs of professionals who work in programs encompassing all areas of human resource development. Applicants without an undergraduate degree in an area related to human resource development may be required to take 501 as a prerequisite and to complete an internship as part of their program. The teacher licensure concentration is specifically for students who seek initial teacher licensure in family and consumer sciences education, business and marketing education, and technology education. This program requires admission to Teacher Education and has specific prerequisites.

Admission Requirements

Training and Development Concentration applicants are to submit an application for admission to The Graduate School, three letters of reference from individuals...
familiar with their potential for success in academic work, and a statement describing personal career objectives directly to the Department of Human Resource Development. Applicants must hold a bachelor's degree from an accredited institution and present evidence of ability to do graduate work, including a GPA of at least 3.0 on a 4.0 scale for the last two years of undergraduate work. Any student below this level of academic quality must justify admission via other exceptional credentials. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Recent Graduate Record Examination or Miller's Analogies Test scores are required of all applicants except for those applying for the teacher licensure concentration. All applicants are required to be interviewed by the department admissions board.

**Teacher Licensure Concentration** applicants are to submit an application for admission to the Graduate School and are to be admitted to the Teacher Education Program in order to progress in the Professional Education coursework. Admission to the teacher licensure program requires a minimum 3.3 on Graduate Record Examination scores. A higher 4.0 scale or better. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Recent Graduate Record Examination scores are required of all applicants. All applicants are required to be interviewed by the department admissions board.

**Degree Requirements**

**Training and Development Concentration** is a 38-hour thesis program that includes 3 hours of research methodology and 3 hours of statistics. All students must take the departmental core of 12 hours consisting of 504, 510, 511, 512, 557 and 559. The thesis requires six hours of Thesis 500 and an oral comprehensive examination.

**Teacher Licensure Concentration** is a 36-hour thesis program that includes 3 hours of research methodology (504) and 3 hours of statistics. The core (9 hours) of the internship program is 521, 522, HE 574 and 591 (1 hour). The internship experience (575) is twelve hours of credit and is the culminating experience. Students choose another 3 hours of coursework to support the teaching field. The thesis requires six hours of Thesis 500 and an oral defense.

**THE PH.D. CONCENTRATION**

**Admission Requirements**

Applicants are to submit an application for admission to The Graduate School, five letters of reference from persons familiar with their potential for success in doctoral work, and a statement describing personal career objectives directly to the Department of Human Resource.

Applicants must hold a master's degree from an accredited institution and present evidence of ability to do Ph.D. work, including having maintained a graduate GPA of 3.3 on a 4.0 scale or better. If the applicant has prior work experience in human resource development, a reference letter should also be provided by the work supervisor. Graduate Record Examination scores are required of all applicants. All applicants are required to be interviewed by the department admissions board.

Any person whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL). A minimum score of 600 is required for admission consideration.

**Degree Requirements**

The Doctor of Philosophy degree with a major in Human Ecology and a concentration in human resource development is for graduate students who seek careers in higher education or as managers/administrators of HRD. The curriculum is designed to enable students to achieve professional objectives, develop needed competencies, and gain desirable experiences and understanding of human resource development. Students must possess a master's degree before acceptance to the program. A minimum of 96 hours beyond the baccalaureate is required.

**Concentration (12 hours):** Must include courses to support Human Resource Development and may be taken from the master's degree.

**Departmental Core (20 hours):** Must include 510, 511, 512, 557, 559 or equivalents and 12 hours of 604.

**Specialization (12 hours):** Must support a career path of university faculty member or manager of education/training.

**Cognate (6 hours):** Must be obtained from an academic unit outside the department, support specialization, and be represented by a committee member.

**Research and Statistics (15 hours):** Statistics must include advanced statistics such as multivariate analysis and computer application, 6 hours minimum; research methodology must include 504 and 610 or equivalents, 6 hours minimum.

**Internship (0-6 hours):** Required for those changing career path.

**Dissertation (24 hours):** Must be original research program. The department offers an alternative approach to residence for the Ph.D. degree. This alternative residence involves, among other requirements, a two-year, continuous enrollment in 604, Research Forum in Human Resource Development. Detailed information regarding the Ph.D. concentration program of study may be obtained from the departmental liaison for graduate studies. Note: For latest update, check the homepage of Department of Human Resource Development (http://hrd.he.utk.edu).

**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 is available to residents of the state of Kentucky. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

**GRADUATE COURSES**

415 **Coordination Techniques** (3) Necessary procedures, duties and responsibilities to implement, maintain and evaluate a successful cooperative education program. Prereq: 210 Microcomputer Applications. E

430 **Principles and Organization of Business and Marketing Education** (3) Historical background and development of the needs. Principles of vocational education in business and marketing, curriculum implications; establishing, evaluating, and improving programs.

455 **Learner and Program Evaluation** (3) Assessing effectiveness of training programs; developing performance-based measures; evaluating job performance; and measuring learner progress. Prereq: 210 Microcomputer Applications or equivalent and 320 Program Planning for Training, Development and Education.

476 **Supervised Occupational Experience** (3) Practical field experience in business/industry/community-based settings related to area of study. Prereq: Senior standing and consent of advisor. May be repeated. Maximum 9 hrs. E

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

501 **Survey of Human Resource Development** (3) Training and development programs as approaches to organizational change; management of training programs; career development in organizations. Prereq: 504 and consent of advisor. E

502 **Registration for Use of Facilities (3-15)** Required for the student not otherwise registered during any semester when student uses University facilities. E

506 **Developing Organizational Resources** (3) Strategies for developing human and organizational resources through research, partnerships, and learning. Effective utilization of human resources through active learning programs. E

509 **Internship in Human Resource Development** (3) Practical field experiences in selected settings under supervision of practitioner and departmental representative. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. E

510 **Foundations of Human Resource Development** (3) Historical, philosophical, economic, social, and psychological foundations of vocational, technical, and adult education and human resource development; fundamental principles and contemporary objectives. F,Sp

511 **Issues and Trends in Human Resource Development** (3) Analyze research-based investigations of problems and issues in human resource development. Prereq or coreq: 504. F,Sp

512 **Human Resource Management** (3) Process systems approach to human resource management: interdependent human resource activities (planning, work design, staff development, and development of HR compensations, etc.) and organizational goals. F,Sp

513 **Special Topics in Human Resource Development** (1-3) Specific training or activities, and evaluation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

514 **Individual Study in Human Resource Development** (3) Prereq: Consent of supervising instructor.
Approval form must be filed in office of department head. May be repeated. Maximum 6 hrs. E

515 Microcomputer Operations and Programming in Education (3) Operating procedures and BASIC programming for education and training applications. Hands-on experience in operating and programming microcomputers, writing, debugging, and running educational programs using sequential data files. Prereq: Teaching, administrative, or related experience in education or training, or consent of instructor.

516 Microcomputer Software Development (3) Advanced software design in BASIC: random access and binary files, search algorithms, and graphics for educational environment. Hands-on learning and program development. Prereq: 515 or consent of instructor.

521 Design and Development of Instruction (3) Curriculum development and program planning; design of instruction; development of teaching materials for classroom and educational purposes. Intended for students in family and consumer sciences, business, marketing, technology and/or industrial education, F


531 Organization and Supervision of Business and Marketing Education Programs (3) Developing business and marketing programs. Trends in business and marketing education, physical facilities, state plans, instructor qualifications, and advisory committees. Prereq: Consent of instructor. F

530 Administration of Industrial Education Programs (3) Developing, staffing, administering and evaluating trade, industrial and technical education programs in secondary and post-secondary school settings. Prereq: Consent of instructor. Sp, Su

531 Supervision of Industrial Education Programs (3) Techniques for industrial education programs. Staff development, curriculum improvement, and program updating techniques. Prereq: 455 or equivalent. F, Su

551 History and Philosophy of Industrial Education (3) Social, political, and economic events that impact development of industrial education. Philosophical problems: justification, values, principles and concepts of industrial education. Prereq: Consent of instructor. F, Su

553 Planning Technical Education Facilities (3) Preparation of educational specifications, site selection, and working relationships with other professionals involved in constructing technical education facilities. Prereq: Consent of instructor. Sp, Su

554 Program Planning (3) Instructional systems attending to analysis, design, development, implementation, and evaluation of trade, technical supervisor and related training. Prereq: Curriculum development course and consent of instructor. Sp

555 Curriculum Planning (3) Developing performance-based, criterion-referenced instructional programs. Su

556 Organizational Development (3) Strategies and interventions for organizational development: training and development of staff, models, assessment, organizational change and consultant's role. Prereq: 512 or consent of instructor. F

578 Seminar in Industrial Education (1-3) Current issues, innovations, problems associated with technical programs. Prereq: 12 hrs of graduate courses. May be repeated. Maximum 6 hrs.

599 Program Evaluation (3) Concepts, principles, practices, theories, and trends related to program evaluation. Planning, conducting, and presenting comprehensive program evaluation in various settings. Fundamentals of design, measurement, return-on-investment (ROI), and presentation and dissemination of results to stakeholders.

560 International Perspectives of Workforce Training (3) Examination and comparison of workforce systems in highly industrialized countries. In-school training programs, out-of-school training systems, upgrading of incumbent workers, retraining of displaced workers, transfer of new technologies, and role and responsibilities of businesses, private sector organizations/agencies, and state and federal government agencies.

562 Grant Writing and Project Implementation (3) Writing grant proposals, negotiating with funding sources, implementing funded programs, and closing out projects at end of funding support.

564 Self-Directed Work Teams (3) Theory and practice of implementing self-directed work teams, motivating employees, increasing employee productivity through teams and related issues.

600 Doctoral Research and Dissertation (3-15) Prereq: Consent of instructor. F

601 Curriculum Planning in Human Resource Development (3) Curriculum theory, models, content, planning evaluation and implementation of specialized program areas. Prereq: 555 or equivalent.


610 Research Development in Human Resource Development (3) Proposal development, theoretical base, research design, sampling, application of statistics, and evaluation of research in human resource development. Prereq: 6 hrs of advanced statistics courses and consent of instructor.

611 Internship in Human Resource Development (3) Field experience in relevant organizations. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

613 Special Topics in Human Resource Development (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

Industrial and Organizational Psychology

(College of Business Administration)

MAJOR

Industrial and Organizational Psychology

Robert T. Ladd (Liaison), Director

Committee:

Fowler, Oscar S., Management
James, Lawrence R., Management
Larson, John M., Jr., (Emeritus), Management
Rentsch, Joan R., Management
Rush, Michael C., Management
Schumann, David W., Marketing, Logistics & Transportation
Wohrer, David J., Management

The doctoral program is designed to prepare students for personnel, managerial, and organizational research; for university teaching; and for consulting relationships with industry. The program emphasizes a scientist/practitioner model in applying and conducting research based on accepted theory, organizational behavior, psychology, management, and statistics. The degree program is administered by a committee appointed by the Dean of The Graduate School on recommendations from the Management Department head and the program director.

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

ADMISSION REQUIREMENTS

Applicants for admission should request information and application forms from both the Office of Graduate Admissions and the Records Center, The University of Tennessee, 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 February 1.

The master's degree in Industrial and Organizational Psychology is generally not required of individuals pursuing a doctoral degree.

General Requirements

At least one year of college mathematics and one course in statistics are required. Ordinarily, an undergraduate grade-point average of 3.7 or above is required with no evidence of special weakness in mathematics and physical sciences.

Test scores on each section of the general portion (verbal and quantitative) of the Graduate Record Examination (GRE) are required. Customarily, those students admitted to the program have performed at or above the 80-90th percentile on the general test. (This corresponds to a raw score of approximately 600 on each of the tests.)

THE DOCTORAL PROGRAM

The Ph.D. degree with a major in Industrial and Organizational Psychology can be completed with a minimum of 30 semester hours in the major. Students must be in residence full time for one year; must maintain an overall 3.0 grade-point average with no more than one grade below B in the I/O Psychology, General Psychology, and Statistics core; must complete an applied research project prior to beginning dissertation work; must pass a comprehensive examination; and must pass a final oral examination on their dissertation research.
INDUSTRIAL ENGINEERING

Course Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O Psychology Core</td>
<td>9</td>
</tr>
<tr>
<td>Research Core</td>
<td>12</td>
</tr>
<tr>
<td>Statistical Principles (Statistics 537 &amp; 538 or equivalents)</td>
<td></td>
</tr>
<tr>
<td>Multivariate Statistics (Statistics 579, 679 or equivalent)</td>
<td></td>
</tr>
<tr>
<td>Advanced Research Methods (605 or equivalent)</td>
<td></td>
</tr>
<tr>
<td>General Psychology Core</td>
<td>9</td>
</tr>
<tr>
<td>One course in each of the following areas:</td>
<td></td>
</tr>
<tr>
<td>biological bases of behavior, cognitive</td>
<td></td>
</tr>
<tr>
<td>bases of behavior, history, and systems of psychology.</td>
<td></td>
</tr>
<tr>
<td>I/O Psychology Seminars</td>
<td>6</td>
</tr>
<tr>
<td>600 level IOPSY courses, from a program</td>
<td></td>
</tr>
<tr>
<td>committee approved list.</td>
<td></td>
</tr>
<tr>
<td>Approved Electives</td>
<td>9</td>
</tr>
<tr>
<td>Courses supporting the student's course of study.</td>
<td></td>
</tr>
<tr>
<td>Supervised practicum, internship, or field training (690)</td>
<td></td>
</tr>
<tr>
<td>Ethics (935 or equivalent)</td>
<td>3</td>
</tr>
<tr>
<td>Dissertation (600)</td>
<td>24</td>
</tr>
<tr>
<td>TOTAL</td>
<td>90</td>
</tr>
</tbody>
</table>

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

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

525 Research in Industrial/Organizational Psychology (1-3) Available only to students admitted to program or by prearrangement with program director. May be repeated. Maximum 12 hrs. S/NC or letter grade.

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

559 Applied Measurement for Industrial/Organizational Psychology (3) Basic techniques for collection and evaluation of individual and organizational data using both classical and modern psychometric techniques. Relevant statistical models: reliability analysis, and exploratory and confirmatory factor analyses.

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

605 Advanced Research Methods in Psychology (3) Critical analysis of new and evolving techniques for psychological research; new statistical and psychometric methods.

610 Individuals in Organizations Seminar (3) Bridging principles and processes which link individual attributes (e.g., macro organization concerns: culture, climate, and group decision-making.

611 Seminar in Organizational Leadership (3) Current theories, concepts, and issues associated with psychology of organizational leadership. Prereq: 567-68 or consent of instructor.

612 Seminar in Work Motivation (3) Current theories, concepts, and issues associated with psychology of work motivation. Prereq: 567-68 or consent of instructor.

613 Seminar in Performance Appraisal (3) Current issues, problems, and research in performance appraisal and criterion development; applications in compensation. Prereq: 567-68 or consent of instructor.

614 Seminar in Employee Selection (3) Current issues, concerns, and methods used in employee selection. Prereq: 567-68 or consent of instructor.

615 Seminar in Organizational Training and Development (3) Current issues, problems, and research in training and development. Prereq: 567-68 or consent of instructor.

625 Topics in Organizational Psychology (3) Topics vary. May be repeated. Maximum 9 hrs.

626 Topics in Industrial Psychology (3) Topics vary. May be repeated. Maximum 9 hrs.

627 Structural Equation Models in Organizational Research (3) Issues related to analysis of organizational data using structural equation and related techniques.

628 Personality Assessment (3) Review of key domains of social cognition: measurement systems which use individual differences in social-cognitive biases as basis for measuring personality.

635 Ethical and Professional Issues in Industrial/Organizational Psychology (3) Issues involved with ethical practice in research, academic, organizational, and consulting situations.

690 Supervised Practicum, Internship or Field Training in Industrial/Organizational Psychology (1-15) One credit hour per 30 hours of practice. S/NC or letter grade.

Industrial Engineering

(College of Engineering)

MAJOR

DEGREES

Industrial Engineering .......... M.S., M.S.-MBA

T. E. Shannon, Acting Head

Professors:

Bontadelli, J. A. (Emeritus), PE, Ph.D. ................................ Ohio State

Claycombe, W. W., PE, Ph.D. ................................ VPI

Devine, Michael D., Ph.D. ................................ Texas

Garrison, G. W. (UTSI), Ph.D. ...................... NC State

Loveless, Howard L. (Emeritus), PE, M.S. ................................. NC State

Shannon, T. E., PE, Ph.D. ............................ Tennessee

Associate Professors:

Aikens, C. H., PE, Ph.D. ................................ Pennsylvania

Hailey, M. L. (UTSI), PE, Ph.D. ................... Texas Tech

Hungerford, J. C., Ph.D. ................................ Ohio State

Jackson, D. F. (Liaison), PE, Ph.D. .................. Tennessee

Kirby, K. E., Ph.D. ........................................ Tennessee

Liggert, H. R., Ph.D. ...................................... NC State

Sawhney, Rupy S., Ph.D. .............................. Tennessee

Assistant Professors:

Coleman, G. D. (UTSI) PE, Ph.D. ................. VPI

Ford, R. E., Ph.D. .......................................... Tennessee

Kress, T. A., Ph.D. ........................................ Tennessee

The Department of Industrial Engineering offers a graduate program leading to the Master of Science degree with a major in Industrial Engineering, concentrations in traditional industrial engineering, engineering management, and manufacturing systems engineering. The Ph.D. with a major in Engineering Science is available through the Department of Mechanical and Aerospace Engineering and Engineering Science with a concentration in industrial engineering.

THE MASTER'S PROGRAM

Students who enroll in the Master of Science degree may select a concentration in industrial engineering, engineering management, or manufacturing systems engineering. Admission is open to graduates of ABET-accredited undergraduate curricula in engineering, or to graduates of other technical curricula who satisfy prerequisites depending on their academic backgrounds. Policies concerning prerequisite requirements will be determined by the Industrial Engineering faculty.

Industrial Engineering

Under the industrial engineering concentration, students may select either the thesis or non-thesis option. The thesis option requires 27 hours of coursework and 6 hours of thesis. The non-thesis option requires 30 hours of coursework plus a 3-hour design project.

Depending upon a student's background and career objectives, graduate work in industrial engineering enables the student to select an area of specialization from research operations, human factors, manufacturing, information systems engineering, maintenance and reliability engineering, or general industrial engineering.

Engineering Management

The engineering management concentration has an additional admission requirement of two years' U.S. industrial experience as a practicing engineer or scientist, or current full-time employment in an appropriate engineering or applied science position. The program is non-thesis and requires 33 hours of coursework plus a 3-hour capstone project. This concentration is fully supported off-campus utilizing electronic media for video taping and interactive distance teaching methods.

Manufacturing Systems Engineering

Under the manufacturing systems engineering concentration, students may select either the thesis or non-thesis option when taking the M.S. degree program, or the non-thesis option only when taking the dual M.S.-MBA program. The thesis option requires 27 hours of coursework and 6 hours of thesis. The non-thesis option requires 30 hours of coursework plus a 3-hour design or industrial problem project (36 hours in the dual M.S.-MBA program).

DUAL M.S.-MBA PROGRAM

The College of Engineering and the College of Business Administration offer a coordinated program leading to the conferral of the Master of Science degree with a major in Industrial Engineering (concentration in manufacturing systems engineering) and the Master of Business Administration degree (concentration in manufacturing management). The dual program saves the student...
one or two semesters over the time that would be required to earn both degrees independently.

The establishment of the dual program addresses the critical need for personnel trained in both engineering and management who can integrate this increasingly complex body of knowledge in achieving the efficient operation of manufacturing and production firms. The program is designed to accommodate the interests of students who desire a career leading to a leadership position in a manufacturing/production organization.

Admission Requirements

Applications are accepted for fall semester only. Applicants for the M.S.-MBA program must make separate application to, and be competitively and independently accepted by, The Graduate School for the Master of Business Administration degree program and the Master of Science degree program with a major in Industrial Engineering, and by the Dual Program Committee.

Students will initially apply for the MBA program, indicating on that application the intent to pursue the dual M.S.-MBA program in manufacturing (refer to the MBA program for separate instructions). Students accepted for both degree programs will be assigned by the Dual Program Committee advisors who will be responsible for supervision of the student's progress through the dual programs.

Applications by U.S. citizens and permanent residents received after the MBA application deadline (March 1) will be considered as space allows. Additional information is required, and different application dates are established by The Graduate School for international students.

Curriculum

The curriculum in the first academic year of the dual M.S.-MBA program is the two-semester core of the MBA program (two 15-hour courses per semester). In addition to the MBA core, three credit hours of a seminar course in manufacturing systems engineering (IE 503) will also be taken during the first year (1 hour Fall semester and 2 hours Spring semester). A summer internship in industry will be accomplished between the two academic years.

During the second year, 27 hours of coursework will be completed in the manufacturing systems engineering concentration in Industrial Engineering plus an additional core of elective courses in the College of Business Administration acceptable in meeting the requirements of the MBA program. Fifteen hours will be taken during each of the first two semesters of the second academic year. A culminating 6-hour integrated case study requiring use of most previous materials will be examined as required by the Dual Program Committee, will be taken during the first session of summer term of the second year.

The dual degree candidate must satisfy the curriculum and graduation requirements of both the Department of Industrial Engineering and the College of Business Administration. Dual degree students withdrawing from the dual program before completion of both degrees will not receive credit toward graduation in either degree program for courses in the other degree program, except as such courses qualify for credit without regard to the dual degree program. The M.S. and the M.B.A. degrees will be awarded upon successful completion of the requirements of the dual program.

Approved Dual Credit

A maximum of 6 semester hours of approved graduate-level courses completed in the College of Business Administration may be counted toward the M.S. degree program with a major in Industrial Engineering. A maximum of 15 semester hours of approved graduate-level courses completed in the Department of Industrial Engineering may be counted toward the M.S. degree program. The approval of courses is the responsibility of the Dual Program Committee and the student's assigned advisor.

Note: Any 400-level course required in the Bachelor of Science in Industrial Engineering program at UT may not be used for graduate credit in the M.S. degree program.

Industrial Engineering

GRADUATE COURSES


402 Production System Planning and Control (3) Theory and application of forecasting systems, regression and time series models. Independent demand inventory models, development of safety stock. Coverage of all modules of Manufacturing Resource Planning (MRP) systems: master production scheduling, resource requirements planning, bill of material and inventory file structures, material requirements planning, capacity planning, shop floor and purchase order control. Overlap of just-in-time inventory concepts and MRP role in manufacturing automation. Prereq: 401.

403 Production Facilities Design and Material Handling (3) Design of production facilities: plant layout, analysis and planning for overall moving, packaging and storage of materials. Office layout and service areas. Design of facilities for such diverse groups as hospitals, banking, industry. Prereq: 306 Simulation. Coreq: 401. F.


421 Information Systems Analysis and Design (3) Systems engineering approach to analysis, design, development, and implementation of systems of information. Informational requirements of industrial engineering systems. Utilization of relevant software packages. Prereq: Senior standing or consent of instructor. F.

422 Senior Industrial Engineering Problems Analysis (3) Application of industrial engineering to field assignments in local organizations, problem definitions, and solution methodologies. Prereq: Expected term of graduation or consent of instructor. F.


460 Process Improvement Through Planned Exper-imentation (3) Fundamentals of continuous improvement, advanced statistical process control techniques, and strategies for short production runs. Use of experimental design techniques to improve processes: single and multifactor designs, blocking and confounding, and fractional designs. Full factorial designs compared to fractional designs to balance experimental efficiency with loss of information. Lab component utilizes statistical and simulation software to provide on-line experiments. Prereq: 405 and 406. Coreq: 500. Sp.

484 Introduction to Maintenance Engineering (3) (Same as Nuclear Engineering 484, Materials Science and Engineering 484, and Mechanical Engineering 484.) Sp.

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. P/NP only.

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time for degree work. May be repeated. Maximum 15 hrs. P/NP only.

503 Survey of Manufacturing Systems Engineering (1-3) Current trends in manufacturing processes and systems, facilities design and materials handling, production planning and scheduling, and other related topics. Economic and other considerations related to improvements in manufacturing operations. May be repeated. Maximum 3 hrs.

513 Facilities Planning and Design (3) Modern materials handling techniques, computer-aided layout design, application of research models, and use of these to design manufacturing facilities. Prereq: 502. E

514 Advanced Information Systems Analysis and Design (3) Systems analysis and systems control concepts applied to systems of information. Role of IE in office and factory of future. Management support systems, decision support systems, and integrated support systems.

515 Advanced Production and Inventory Systems (3) Advanced topics in production planning and inventory systems. Material requirements planning, production planning and master scheduling, just-in-time concepts, total production requirements planning, and other related topics. Prereq: 421 or consent of instructor.


518 Advanced Engineering Economic Analysis (3) Application of advanced economic decision analysis to complex real-world problems. Inflation and price changes, uncertainty evaluation using nonparametric techniques, equipment and facility financing, and present worth evaluations involving equipment replacement, investor-owned utilities, and public works projects. Probabilistic risk and reliability analysis, including computer simulation and decision trees. Prereq: senior standing. Coreq: 405 and Probability and Statistics for Scientists and Engineers, or equivalent.
The mission of the school is to educate people to live, work, and flourish in an information society through excellence in teaching, research, and public service in Information Sciences. The goals and objectives of the school are:

A. To prepare students to understand the nature of information and the role of the library and other information agencies in the management of information resources, and the facilitation of information transfer.

Students will demonstrate:

1. Knowledge of the generation, production, management, dissemination, and uses of information.
2. Knowledge of the roles of various organizations/institutions in promoting the flow of information.
3. An understanding of the role of the information professional as mediator between information resources and their users.
4. An understanding of the roles of various tools and technologies in facilitating access to information.
5. An understanding of the structure and content of information resources in various formats and media.
6. Knowledge of theoretical and practical evolution of information sciences and technologies and their relationship with other disciplines.
7. Competence in creating, managing, and accessing information in a variety of formats.
8. To provide services to the state, region, and nation in association, consulting, and continuing education activities which will promote the development and improvement of information systems and services such that the school's contributions reach beyond its immediate academic programs. The school will provide:

- Continuing education for information professionals and, on a selective basis, to persons outside the information field.
- Advisory services to information organizations.
- Leadership for professional associations.
- To conduct basic and applied research which promotes the generation of new knowledge, services, and technology. The school will encourage:

1. Research which strengthens its instructional and public service programs.
2. The use of a variety of research methods.
3. Sharing the results of its research.
4. Increased research quality and productivity.

ADMISSION REQUIREMENTS

Applicants to the Information Sciences program must have a minimum undergraduate grade-point average of 3.0 or a satisfactory graduate degree grade-point average for admission as a potential candidate for the MS degree.

The verbal, quantitative, and analytical aptitude portions of the Graduate Record Examination (GRE) are required of all applicants unless a graduate degree has been completed prior to application for admission. Applicants should take the GRE at least one semester in advance of application for admission and are expected to score 1500 points or better.

A personal data sheet and three recommendations (obtained from the School of Information Sciences) should be returned to the admissions office of the school. Foreign applicants are required to take the Test of English as a Foreign Language.

THE MASTER'S DEGREE

The program leading to the Master of Science involves a total of 42 semester hours of graduate courses, 15 hours of which form a core curriculum required of all students. Either a thesis or a non-thesis option is available, with 6 hours required for thesis credit. At least 36 hours must be taken in the School of Information Sciences, allowing up to 6 hours outside the school with a maximum of 6 from outside the University.

Core Curriculum

The core curriculum is a 15 semester hour sequence of five courses required of all students: 490, 520, 530, 560, 580. These courses address the evolving information environment; foundations of information sciences and information resources, selection, acquisition, and evaluation; information content representation; information access and retrieval.

The 15-hour core is prerequisite to all elective courses for students enrolled in the MS degree program. Elective courses may begin in the final semester of core course work with permission of the advisor and the instructor of each elective course selected.

Individualized Curriculum Approach

Students, in consultation with their advisor, may wish to pursue a curricular focus to develop an individualized program of study. Graduates of the school have prepared themselves for a variety of careers, including positions as: corporate information specialist, public librarian, records manager, web designer, indexer/abstractor, online information retrieval specialist, medical or law librarian, reference librarian, youth services specialist, and many others. Once the core courses have been completed, students are encouraged to take advantage of the individualized curricular approach.

Whatever individualized curriculum is chosen, all students who complete the program receive an M.S. degree accredited by the American Library Association (ALA). For those pursuing Tennessee Department of Education licensure as a school library information specialist, stipulated requirements apply. See following section.

Tennessee State Department of Education School Library Information Specialist Requirements

The Tennessee State Department of Education requires School Library Information Specialists to hold the master's degree. The School of Information Sciences offers four tracks for School Library Information specialist endorsement.

Initial Endorsement for Non-Licensed Teachers with a Master's Degree in Library or Information Sciences: For those students who do not hold the master's degree, the requirements for initial endorsement include the 15-hour core plus 551, 567, 571, 572, 573, 585, and 595. In addition, students must complete two corequisite courses from the College of Education (5 credit hours) which do not count toward the master's degree requirements. Students pursuing the initial endorsement must follow the non-thesis option. Upon completion of the requirements, students will earn a master's degree in Information Sciences, and a Tennessee State Department of Education license as a School Library Information Specialist.

Additional Endorsement for Licensed Teachers with a Master's Degree: The requirements include the 15-hour core plus 551, 567, 571, 572, 585 and 596 (which must be taken twice). Upon completion of the requirements, students will earn a Tennessee State Department of Education additional endorsement as a School Library Information Specialist.

Additional Endorsement for Licensed Teachers without a Master's Degree: The requirements include the 15-hour core plus 551, 567, 571, 572, 573, 585, and 596 (which must be taken twice) plus 3 electives (upon approval of the faculty advisor). Upon completion of the requirements, students will earn a Tennessee State Department of Education additional endorsement as a School Library Information Specialist.

Additional Program Requirements

Thesis Option: Students electing the thesis option will write a master's thesis under close supervision of a thesis committee. Six hours of Thesis (590-599) must be taken within the 42 hours required for graduation. Students must register for more than 6 hours of 590, but only 6 hours will count toward graduation. Students must be registered for 590 in the semester they complete and defend their thesis. The oral defense of the thesis (final comprehensive examination) substitutes for the written examination that is taken by non-thesis students. The writing of the master's thesis serves as the culminating experience.

Non-Thesis Option: Upon completion of the program, all students who elect the non-thesis option must take a written comprehensive examination. A culminating experience is also required which must be completed in one of the student's last two terms with a grade of B or better (except as noted) selected from the following and approved by the student's advisor:

- 590 Problems in Information Science
- 591 Supervised Readings in Information Sciences
- 592 Seminar in Information Sciences
- 593 Independent Study
- 594 Graduate
Research Participation (S/N/C only), 595 Student Teaching in School Library Information Center (S/N/C only), 596 Student Teaching and Observation in School Library Information Center (S/N/C only), 599 Practicum (S/N/C only).

FINANCIAL ASSISTANCE OPPORTUNITIES

Employment with the University of Tennessee Libraries may provide a study work opportunity for selected students who wish to obtain experience in academic librarianship while pursuing the degree. Such students usually work at least 20 hours each week and thus may extend the period required for the degree. Similar opportunities exist with other libraries and information agencies in the Knoxville area. Work opportunities in a scientific-technical environment are available through subcontracts with Oak Ridge National Laboratory and the Department of Energy. A limited number of graduate teaching assistantships are available through the school. Assistantships of this type carry a waiver of tuition and fees as well as a stipend and require that recipients work 10 hours per week in the school.

For application forms and information about financial aid and other information about the M.S. in Information Sciences, contact the Admissions, School of Information Sciences, University of Tennessee, 804 Volunteer Blvd., Knoxville, TN 37996-4330.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

430 History of the Book (3) History of writing and various methods of bookmaking. F

450 Writing About Science, Technology and Medicine (3) Same as Journalism 450. F

465 Introduction to Electronic Communications and Information Resources on the Internet (3) Exploration of worldwide information and communication resources: email, newsgroups, and worldwide wide web. Discussion of information issues: copyright, censorship, privacy, and access. F

466 Advanced Electronic Communications and Information Resources on the Internet (3) Exploration of advanced information and communications issues, resources, tools, forms, scripting, and search engines. Prereq: 490 or consent of instructor. F

490 Information Environment (3) Generation, production, management, dissemination, and use of information. Role of information in society, information seeking and information industry, economics of information products and services, technological and organizational change, information professions, and issues. E, A

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

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

520 Organization and Representation of Information (3) Principles of distinguishing, describing, and indexing for current-source cataloging procedures, descriptive classification, subject indexing, pre- and post-coordinate subject indexing, classification and categorization; authority control of index terms; standards. E, A

521 Cataloging and Classification (3) Basic library-oriented cataloging and classification techniques, tools, and supporting operations. Descriptive cataloging, choice and form of non-subject entries, subject heading work, general classification, authority control, bibliographic utilities, online library catalogs. F

522 Organization and Representation of Multimdia Information Resources (3) Principles and practice of describing and accessing information resources in non-print mediums and non-textual formats. Visual, auditory, and electronic (including Internet) resources. F

523 Abstracting and Indexing (3) Philosophies, standards, and procedures for manual and automatic indexing and bibliographic control, thesaurus construction, and abstracting. F

530 Information Access and Retrieval (3) Media for information storage and retrieval: logical and physical information structures, query languages, search strategies, and heuristics, user interfaces, evaluation of retrieval system performance. Search techniques for various types of databases including multi-media, full-text, numeric, bibliographic, E, A

531 Sources and Services for the Social Sciences (3) Information sources in political science, sociology, psychology, geography, history, anthropology, business, and education. F

532 Sources and Services for Science and Engineering (3) Information sources in engineering, physical, and life sciences. F

533 Sources and Services for the Humanities (3) Information sources in philosophy, religion, fine arts, performing arts, literature, language. Organization and management of regional collections. F

534 Government Information Sources (3) Selection, acquisition, organization, and utilization of government information in various formats from legislative, judicial, and executive branch of federal, state, local, and international government and international organizations. Sp

535 Advanced Information Retrieval (3) Bibliographic, non-bibliographic, full-text databases, e.g., non-bibliographic formula and structure databases, patent databases, contents-page/full-text databases, patents; document delivery alternatives, evaluation, and testing. Sp

537 Information Industry (3) Issues and trends concerning information industry; products and services; enabling technologies, choice of distribution media, entrepreneurial opportunities. Leg., ethical, and quality concerns. F

538 Economics of Information (3) Costing and pricing of information; value of information and value added services; cost-benefit analysis and trade-offs; policy issues related to economic aspects of information exchange and transfer. F

539 Information Policy (3) Role of government in information exchange; government policies, review of key national and international policy areas relevant to information creation, production, and distribution; development of information policy for organizations. F

540 Research Methods (3) Research methods in variety of information environments: primary and secondary research; research project design, research results interpretation, analysis of published research; techniques supporting research process. E

550 Management of Information Organizations (3) Supervision and management concepts, strategies, and techniques applicable to information professionals working in libraries, archives, record management, and other information organizations. F

551 School Library Media Centers (3) Planning, implementation, and evaluation of school library media centers. Curricular involvement, role of technology, site-based management, relationships with district and state service. F

552 Academic Libraries (3) Mission, status, and role of academic libraries in community colleges and universities. Trends in information, information technology, and government's impact on public, technical, and administrative services. Sp

553 Corporate Information Services (3) Development and present status, scope and objectives. Information resources external to organization. F

554 Public Library Management and Services (3) Development, roles, responsibilities, supervision, organization, service management, marketing, and performance evaluations. Sp

555 Scientific and Technical Communications (3) Basic and advanced technical and public communication; current transmissions; role of formal and informal communications; major S/T organizations and their roles. Sp

557 User Instruction (3) Theory, strategy, design, and practice in providing instructional services and technology for end-users of information and information systems. Includes practical experience. F

560 Development and Management of Collections (3) Selecting and preserving various items of tangible and intangible to meet needs of particular users: classification; policies and procedures; evaluation. Sp

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

563 Graphic Design and Media (3) Principles and practices in visual aspects of communications. Graphic design and typography, production techniques, and publication design, as these apply to electronic information delivery systems. F

564 Corporate Information Systems (3) Objectives and function elements of records systems, archival programs, management information systems and techniques within various types of organizations. Management of information internal to organizations. F


566 Business Intelligence for Information Professionals (3) Principles and practices of gathering and synthesizing business intelligence: competitive intelligence, environmental scanning, strategic information in modern organizations. F

567 Information Network Applications (3) Scholarly and community-based electronic communications. Networking, international standards, communication services, identification, analysis, evaluation, and management of tools and resources. Construction of local networks as developed and applicable. F, Sp

569 Advanced Production of Audiovisual Software (3) Same as Education in the Sciences, Mathematics, Research, and Technology 569. F, Sp


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

573 Programming for Children and Young Adults (3) Philosophy and objectives of public and school library services for children and young adults. Reading, library, and library activities for individuals and groups. Program analysis, programming, and evaluation. Prereq: 571 or 572. F

574 Adult Materials and Services (3) Popular informational and recreational materials and services made available to informational and historical services. Development of specialized collections. F

580 Foundations of Information Sciences and Technologies (3) Definitions of information, informa-
Institutional Technology, Curriculum, and Evaluation

(College of Education)

**DEGREES**

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>DEGREES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>M.S., Ed.S., Ed.D., Ph.D.</td>
</tr>
</tbody>
</table>

**MAJOR**

**EDUCATION**

**Track 1-curriculum**

- **Track 1-instructional technology**

**Educational Specialist**

**Education**

- Curriculum
- Instructional technology

**Doctor of Education**

- Curriculum
- Educational research, and evaluation

**Doctor of Philosophy**

- Education
- Curriculum, educational research, and evaluation

**Graduate Courses**

475 Utilization of Instructional Media (3) Basic concepts of communication and instructional development for improving instruction through use of media.

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


515 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Techniques of Research in Education (3) Study and application. F

532 Computer Applications in Classroom (3) Computer applications and peripheries in school and classroom. Appropriate for all grades and subjects as well as non-school instructional situations. Prerequisite: Microcomputer and Instructional Design, Applications of Instructional Technology in Elementary and Middle School Teaching. E

532 Instructional Research: Analysis and Application (3) Analysis of research on instruction. Translation and application of research findings into instructional performance.

533 Program Evaluation in Education (3) Issues and practices in planning and conducting program and curriculum evaluation in variety of settings. Fundamentals to be used in educational research. Prerequisite: Consent of instructor. E

541 The High School Curriculum (3) Identification of problems associated with curriculum study. Tennessee curriculum framework, assessment of trends in programs of local, regional, and national significance. Sp

552 School Law for Educators (3) Case and statutory material for public school educators; problems concerning law and public education.

557 The Junior High and Middle School Curriculum (3) Curriculum and instructional design for junior high and middle school. Characteristics of students, curriculum designs, instructional patterns, and organization and structure of junior high and middle school.

558 Curriculum Planning and Development (3) Foundations and principles of curriculum planning and development. Historical analysis of curriculum theory, principles of planning and development, and classroom applications for improved learning. E

560 Student Assessment (3) Processes for assessing and reporting student progress; interpretation and use of available assessment data. Methods of analysis other than tests and measurements: portfolios, performance tasks, exhibitions. F

561 Educational Statistics (3) Applications of descriptive and inferential statistics to educational and instructional problems. Use of electronic calculators in educational research. Prerequisite: One year of college mathematics, an elementary course in statistics, or consent of instructor. E

566 Administering Instructional Media Programs (3) Leadership roles and responsibilities of professional media administrator in a variety of organizational settings.

569 Advanced Production of Audiovisual Software (3) Hand and mechanical lettering, flat picture mounting, overhead projection, audio production, and other aspects of production. E

571 Desktop Publishing for Educators (3) Use of computer-based desktop publishing and graphics software and related hardware in designing and producing instructional and informational products.

573 Designing and Producing Interactive Multimedia (3) Selected multimedia authoring tools to design and produce interactive instructional materials based on specified learner characteristics and objectives: Internet and stand alone applications.

575 The Internet: Implications for Teaching and Learning (3) Projects and survey studies for using Internet as information, research, and instructional tool. Variety of browsers, search engines, and web page construction software.

577 Introduction To Data Processing in Curriculum and Instruction (3) Analysis of current activities in educational computing and data processing. Curricular, instructional, research, and classroom manage-
ment applications from microcomputers to supercomputers. Prereq: Consent of instructor.

580 Techniques for Research In Curriculum and Instruction (3) Fundamentals of research methodology applicable to curriculum, instruction, and other areas of educational inquiry. Critical reading of research and development of skills needed for proposal development. E

588 Instructional Theory and Design (3) Relationship of curriculum to instruction; examination of instructional and related learning theories; instructional models and teaching styles. F, Su

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

594 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E

595 Special Topics (1-3) May be repeated. S/NC or letter grade. E

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

604 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/NC only. E

623 Using Research for Curriculum Improvement (3) Research methodology; application to descriptive survey curriculum materials. Critical reading of research, methodological development in descriptive and survey areas. Sp

630 Seminar in Assessment and Evaluation (3) Trends and issues in student/curriculum assessment, personnel evaluation, and program evaluation; examination of current state, regional and national assessment and evaluation projects. Prereq: Consent of instructor.

631 Application of Assessment/Evaluation (3) Systems design, instruments, procedures, reporting formats used in personnel and program evaluation and student assessment; analysis, synthesis and interpretation of data sets. Prereq: 630.

669 Instructional Media Research (3) Identification, location, and collection of developmental and experimental research on instructional media. Application of research.

671 Advanced Educational Statistics (3) Applications of parametric and non-parametric statistical inference to educational and instructional problem. Use of microcomputers in educational research. Prereq: 561. F, Sp

672 Interpretation and Application of Curriculum and Instruction Research (3) Analysis of research in curriculum and instruction, new methodologies and strategies. Utilization of research to improve curriculum and instruction practice, application of research principles in context of specific professional assignments. Prereq: Consent of instructor.

674 Designing and Implementing Personnel (3) Models and methods for assessing performance of educators and other professionals. Critique of systems currently in use and design of evaluation system.

675 Curriculum Evaluation: Theory and Application (3) Evaluation trends and issues. Theoretical frameworks to design evaluation studies for various educational programs.


677 Instructional Systems Design (3) Educational theory and research concerning design, development and evaluation of instructional products based on specified goals, objectives, and audience characteristics.

678 Seminar in Instructional Technology (1-3) Readings and discussions based on current literature, research, theories, and practices in instructional technology.


689 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

694 Supervised Reading (1-3) May be repeated. S/NC or letter grade. E

695 Special Topics (1-3) May be repeated. S/NC or letter grade. E

Interdisciplinary Programs

The College of Arts and Sciences offers a series of interdisciplinary undergraduate majors and minors through its Interdisciplinary Programs. These programs include African and African-American Studies, American Studies, Ancient Mediterranean Civilizations, Asian Studies, Cinema Studies, Comparative Literature, Environmental Studies, Latin American Studies, Legal Studies, Judaic Studies, Linguistics, Medieval Studies, Urban Studies and Women's Studies. Certain courses within these programs are available for graduate credit as listed below. See the Undergraduate Catalog for program descriptions and directors.

African and African-American Studies

GRADUATE COURSES


452 Black African Politics (3) (Same as Political Science 452.)


483 African-American Women in American Society (3) Historical and contemporary socio-eco-political factors in American society as related to Black women. (Same as Women's Studies 483.)

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Comparative Literature

GRADUATE COURSES

401-02 Special Topics in Comparative Literature (3,3) Content varies. May be repeated. Maximum 9 hrs.

402 Latin American Studies Seminar (3) Selected topics. May be repeated. Maximum 6 hrs.

510 Special Topics (3) May be repeated. Maximum 6 hrs.

Judaic Studies

405 Modern Jewish Thought (3) (Same as Religious Studies 405.)

425 Early Christian and Byzantine Art, to 1350 (3) (Same as Art History 425.)

431 Medieval Art of the West, 800-1400 (3) (Same as Art History 431.)

Latin American Studies

GRADUATE COURSES

510 Special Topics (3) May be repeated. Maximum 6 hrs.


**Linguistics**

**GRADUATE COURSES**

400 Topics in Linguistics (3) Content varies. May be repeated. Maximum 6 hrs.

411 Linguistic Anthropology (3) (Same as Anthropology 411.)

420 The Development of Diachronic and Synchronic Linguistics (3) Development of Western linguistic thought from Hebrews and Greeks through modern times. Readings from Boas, Sapir, Bloomfield, and others. Prereq: 9 hrs of courses required for Linguistics major (300-level or above) or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, and Spanish 425.)

426 Methods of Historical Linguistics (3) (Same as German 426, French 426, and Spanish 426.)

429 Romance Linguistics (3) (Same as French 429 and Spanish 429.)

435 Structure of the German Language (3) (Same as German 435.)

436 History of the German Language (3) (Same as German 436.)

471 Sociolinguistics (3) (Same as English 471 and Sociology 471.)

472 American English (3) (Same as English 472.)

474 Teaching English as a Second or Foreign Language I (3) (Same as English 474.)

475 Teaching English as a Second or Foreign Language II (3) (Same as English 475.)

476 Second Language Acquisition (3) (Same as English 476.)

485 Special Topics in Language (3) (Same as English 485.)

490 Language and Law (3) (Same as English 490.)

510 Special Topics (3) May be repeated. Maximum 6 hrs.

---

**Medieval Studies**

**GRADUATE COURSES**

510 Special Topics (3) May be repeated. Maximum 6 hrs.

---

**Urban Studies**

**GRADUATE COURSES**

401 The City in the U.S. (3) (Same as Planning 401.)

441 Urban Geography of the United States (3) (Same as Geography 441.)

444 Journalism as Literature (3) Study of writers from 17th century to modern era whose works have endured as both journalism and literature. Emerging genres called literary journalism: means of cultural reporting with personal narrative style. Prereq: Consent of instructor.

450 Writing About Science, Technology, and Medicine (3) Writing workshop to analyze examples of successful science writing and write series of articles for general public based on scientific journals, news conferences, technical meetings, and interviews. Prereq: Consent of instructor. (Same as Information Sciences 450.)

451 Environmental Reporting (3) Writing for news media on such environmental issues as strip-mining, water pollution, air pollution, allergens, nuclear power, fossil fuel power, and solid wastes. Presentations from and interviews of experts in environmental science and reporting. Exemplary popular literature in environmental reporting. Prereq: Editing. Editing for majors; consent of instructor for non-majors.

455 Issues in Science Communications (3) Topics vary. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

465 Science Writing as Literature (3) Survey of important science writing for general public across spectrum of science, engineering, and medicine. Works by authors such as Arthur C. Clarke, Stephen J. Gould, and Richard Selzer. Analysis of literary qualities in quest to understand why some science writing succeeds. Prereq: Consent of instructor.


663 Women and Mass Media (3) Media effects on women. Media coverage and portrayal of women. Historical and current status of women in mass communication industries.

690 Advanced Photojournalism (3) Advanced principles and methods of black-and-white photography. Introduction to color photography. News and feature photographs and photo essays. Prereq: Photojournalism or consent of instructor.

520 Press-Government Relations (3) Development of adversary relationship between journalists and government officials. Philosophical and legal basis for open reporting of government. Use of press by candidates and incumbents. (Same as Public Relations 520.)

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

---

**Women's Studies**

**GRADUATE COURSES**

400 Topics in Women's Studies (3) Content varies. May be repeated. Maximum 6 hrs.

410 Gender Role Development: Implications for Education and Counseling (3) (Same as Counselor Education and Counseling Psychology 410.)

422 Women Writers in Britain (3) (Same as English 422.)

425 Women's Health (3) (Same as Health 425.)

434 Psychology of Gender (3) (Same as Psychology 434.)

466 Rhetoric of the Woman's Rights Movement to 1930 (3) (Same as Speech Communication 466.)

469 Sexuality and Cinema (4) Exploration of issues surrounding sexuality, gender and cinema from points of view of feminist film criticism. (Same as Cinema Studies 469.)

476 Rhetoric of the Contemporary Feminist Movement (3) (Same as Speech Communication 476.)

483 African-American Women in American Society (3) (Same as African and African-American Studies 483.)

510 Special Topics (3) May be repeated. Maximum 6 hrs.

593 Independent Study (1-6) Prereq: Consent of Chair of Women's Studies.
Public Relations

GRADUATE COURSES

412 Opinion Writing (3) (Same as Journalism 412.)

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

470 Public Relations Campaigns (3) Research, planning and communication of major public relations campaigns. Oral and written presentation of public relations project from inception to completion. Prereq: 320 Public Relations Communications and 370 Public Relations Cases or consent of instructor. F, Sp.

516 Seminar In Public Relations Issues (3) Topics vary. May be repeated. Maximum of 6 hrs.

520 Press-Government Relations (3) (Same as Journalism 520.)

525 Public Opinion (3) (Same as Journalism 525.)

530 Fund Raising and Proposal Writing (3) History, philosophy and practice of philanthropy in U.S. Sources of funds from foundations, corporations and public agencies. Research and preparation of fund-raising proposals.

560 Publishing on World Wide Web (3) (Same as Journalism 560.)

571 Public Relations Management (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.

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

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

Large Animal Clinical Sciences

See College of Veterinary Medicine and Comparative and Experimental Medicine

Law

(= College of Law =)

MAJOR

Law........................................J.D., J.D.-MBA, J.D.-M.P.A.

Thomas C. Galigian, Jr., Dean

Professors:

Ansel, Frances Lee, LL.M..............Harvard
Best, Reba, M.L.S......................Florida
Blaze, Douglas A., J.D..............Georgetown
Cohen, Neil P., LL.M................Harvard
Cook, Joseph G., LL.M..............Yale
Galigian, Jr., Thomas C., LL.M......Columbia
Hardin, Patrick J., J.D.............Chicago
Hees, Amy M., J.D....................Virginia
James, Durward S. (Emeritus), J.D.
King, Joseph H., J.D.................North Carolina
Lacey, Forrest W. (Emeritus), S.J.D.
Le Clercq, Frederic S. (Emeritus), LL.B., Duke
Lloyd, Robert M., J.D..............Michigan
Overton, Elvin E. (Emeritus), S.J.D...........Harvard
Phillips, Jerry J., J.D...............Yale
Piquet, Cheryn, M.S.L.S.............Tennessee
Reynolds, Glenn H., J.D.............Yale
Rivkin, Dean H., J.D................Vanderbilt
Sewell, Toxey H. (Emeritus), LL.M..............George Washington
Sobieski, John L., J.D..............Pennsylvania
Starke, Barbara J.D...............New York
Wirtz, Richard S., J.D.............Stanford
Zwier, Paul J., LL.M..............Temple

Associate Professors:

Aarons, Dwight, J.D................UCLA
Anderson, Gary L., LL.M............Harvard
Bentzma, William J., J.D...........Miami
Black, Jerry P., Jr., J.D............Vanderbilt
Cormett, Judy M., J.D...............Tennessee
Davis, Thomas Y., J.D..............Northwestern
Gray, Grayfred B., J.D.............Vanderbilt
HKimway, Joan M., J.D..............New York
Kennedy, Desiree A., LL.M...........Temple
Leatherman, Don A., LL.M...........New York
McAlpine, Janice E., J.D.............Michigan
Medill, Colleen E., J.D............Kansas
Parker, Carol M., J.D..............Illinois
Pierce, Carl A., J.D..............Vanderbilt
Plank, Thomas E., J.D...............Maryland
Stein, Gregory M., J.D..............Columbia
Thorpe, Steven R., J.D.............Mercer
White, Penny J., LL.M..............Georgetown
Williams, Paulette J., J.D........New York

Assistant Professors:

Cochran, Cathleen R., M.S...........Tennessee
Davis, Melinda D., M.S.L.S........North Carolina
Marshall, Sibyl D., J.D..............Loyola
Price, Loretta, M.S.L.S............Tennessee

The College of Law offers the Doctor of Jurisprudence degree program; a dual degree program with the College of Business Administration leading to the J.D. and the Master of Business Administration degree; and a dual degree program with the Department of Political Science, College of Arts and Sciences, leading to the J.D. and

Master of Public Administration. In addition graduate students may be eligible to take a limited number of law courses to count toward a graduate degree.

Current information regarding admission, financial aid, course requirements, academic policies, extracurricular activities, and student services is available from the Admissions Office, The University of Tennessee, College of Law, 1505 W. Cumberland Ave., Knoxville, Tennessee 37996-1810. Completed application should be received before February 1 of the year of requested admission.

DEGREE OF DOCTOR OF JURISPRUDENCE

The degree of Doctor of Jurisprudence will be conferred upon candidates who complete, with the required average, six semesters of resident law study and who have 89 semester hours of credit, including all required courses. The required average is 2.0 and that average must be maintained on the work of all six semesters and also for the combined work of the grading periods in which the last 28 credit hours taken in residence were earned. Averages are computed on weighted grades. Grades are on an alphabetical scale and not on a point system.

Eligible law students may receive up to six (6) semester hours of credit toward the J.D. degree for acceptable performance (a grade of B or higher) in upper-level courses that materially contribute to the study of law and which are taken in other departments at The University of Tennessee. Course selection and registration are subject to guidelines approved by the law faculty which include the requirement that any such course be acceptable for credit toward a graduate degree in the department offering the course.

Refer to the Law Catalog and Student Handbook for current degree requirements.

Concentration in Business Transactions

Students interested in a concentration in business transactions must complete all of the following law courses:

818 Fundamental Concepts of Income Taxation

826 Introduction to Business Transactions*

827 Business Associations

972 Income Taxation of Business Organizations

940 Land Finance Law

840 Commercial Law

842 Contract Drafting Seminar

833 Representing Enterprises

None of the above courses may be taken on an S/NC basis (with the exception of 826).

*This course is not required for students who have an undergraduate major in accounting, finance, or business administration, who hold the MBA degree, or who are enrolled in the dual J.D.-MBA program. Waivers may also be granted to students who have acquired the requisite business knowledge through other coursework or through practical experience.
Concentration in Advocacy and Dispute Resolution

Students interested in a concentration in advocacy and dispute resolution must complete all of the following courses:

- 813 Evidence
- 815 Introduction to Advocacy and Professional Responsibility
- 905 Advocacy Clinic
- 920 Trial Practice
- 921 Pretrial Litigation
- 922 Advanced Trial Advocacy
- 928 Case Development and Resolution

Students electing a concentration in advocacy and dispute resolution may not take any of the above courses on an S/NC basis.

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 conferment 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 studies must be started prior to entry into the last 28 hours required for the J.D. degree and the last 16 hours required for the MBA degree.

Curriculum

A dual degree candidate must satisfy the graduation requirements of each college. Dual degree students withdrawing from the dual degree program before completion of both degrees will not receive credit toward graduation from either college for courses in the other college, except as such courses qualify for credit without regard to the dual degree program. For students continuing in the dual degree program, the J.D. and MBA degrees will be awarded upon completion of requirements of the dual degree program.

The College of Law will award a maximum of nine (9) semester hours toward the J.D. degree for acceptable performance in approved graduate-level courses offered by the College of Business Administration. Three of the 9 semester hours must be earned in Accounting 501, 503, or a more advanced accounting course.

The College of Business Administration will award credit toward the MBA for acceptable performance in a maximum of 9 semester hours of approved courses offered by the College of Law.

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 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 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 C+ 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.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science in the College of Arts and Sciences offer a coordinated dual degree program leading to the conferment of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the M.P.A. and J.D. degrees in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science 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 any of the last 28 semester hours required for the J.D. degree and prior to entry into the last 15 hours required for the M.P.A. degree.

Curriculum

A dual degree candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees, as well as the requirements for the dual program. The College of Law will award a maximum of 4 semester hours of credit toward the J.D. degree for successful completion of approved graduate level courses (300 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. Grades for which credit is awarded must be approved by the J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law 282 and are encouraged to take Local Government 282. An internship is strongly recommended for students in the dual program, as it is for all M.P.A. candidates, but an internship is not required.

During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the M.P.A. program. During those first two years, students may not take courses in the opposite area without the approval of the J.D.-M.P.A. coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the J.D. or the M.P.A. degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Awarding of Grades

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student's GPA or class standing. The College of Law will award a grade of Satisfactory for an approved 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 C+ or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

POLICY FOR GRADUATE STUDENTS TAKING LAW COURSES

Students pursuing a graduate degree in another college may, upon approval of the College of Law and the major chairperson, take up to 6 semester hours of law courses and receive credit toward the graduate degree. The graduate student must register for the law course during regular registration at the College of Law requesting an S/NC
grade only. If a C or above is earned in a law course, an S will be recorded on the transcript. If a student earns below a C, an NC will be recorded, and the course cannot be used toward meeting degree requirements. Grades for law courses will not be reflected in the cumulative average. Law courses may be taken for credit only by students enrolled in a graduate degree program.

Different rules apply to the student enrolled in the Dual J.D.-MBA or J.D.-M.P.A. Programs. Grades must be earned according to the grading system of the respective college, e.g. numerical grades for law courses, letter grades for graduate courses. Refer to section (3) above. Grades for the grading scale acceptable toward meeting degree requirements. Cumulative GPA for law courses only will be carried until graduation, at which time both the graduate and the law cumulative will be shown on the permanent record.

PROFESSIONAL COURSES

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


803 Contracts I (3) Basic agreement process and legal protections afforded contracts; offer and acceptance, consideration and other factors 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.

804 Contracts II (3) Continuation of Contracts I. Issues arising after contract formation; interpretation, duty of good faith; conditions, imprecision, frustration of purpose; remedies; third party beneficiaries; assignment and delegation. Considerable coverage of Article 2 of the Uniform Commercial Code with respect to remedies, anticipatory repudiation, impracticability and good faith.

805 Legal Process I (3) Lawyer-like use of cases and statutes in public process and persuasion. Analysis and synthesis of case law, public policy, decision making and statutory interpretation; fundamentals of expository legal writing and legal research.

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

807 Torts I (3) Intentional torts, defenses and privileges related to intentional torts; negligence; standard of care, professional malpractice, and liability of owners and occupants of land; defenses based on plaintiff's conduct; contributory and comparative negligence; assumption of risk, failure to take precautions, and avoidable consequences; causation, proximate cause; duty rules; and questions of joint and several liability.

808 Torts II (3) Vicarious liability and related concepts; strict liability for dangerous animals and abnormally dangerous activities; products liability; nuisance, defamation, invasion of privacy; economic torts; misrepresentation and interference with contract and prospective opportunities; immunities; those of government; governmental employees, charities and family members; and damages.

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

810 Property (4) Introductory course treating issues of ownership, possession, and 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.

812 Constitutional Law (4) Fundamental principles of American constitutional law; federalism, separation of powers, equal protection of law, and constitutional protection of other fundamental individual rights.

813 Evidence (4) Rules regulating introduction and exclusion of oral, written and demonstrative evidence at trials and other proceedings, including relevancy, impeachment, hearsay, privilege, expert testimony, authentication, and standards of proof. Coreq: 920 for students electing concentration in advocacy.

814 Legal Profession (3) Legal, professional and ethical standards applicable to lawyers. Not open to students who have taken 815.

815 Introduction to Advocacy and Professional Responsibility (3) Introduction to basic statutory analysis, fundamental principles of federal individual income tax, and personal income tax concerns that arise in practice. Federal concept of gross income, pattern of exclusions, exemptions and deductions, and the tax code used to arrive at tax base, special treatment of capital gains and losses, and rate structure.

819 Economic Principles of Income Taxation (3) Survey of time value of money and related economic principles in federal income taxation. Taxation and employment compensation arrangements and of various financial arrangements and products, and introduction to tax accounting. Economic analysis and the legal, ethical and professional standards applicable to lawyers and especially lawyers as advocates.

820 Fundamental Concepts of Income Taxation (3) Introduction to basic statutory analysis, fundamental principles of federal individual income tax, and personal income tax concerns that arise in practice. Federal concept of gross income, pattern of exclusions, exemptions and deductions, and the tax code used to arrive at tax base, special treatment of capital gains and losses, and rate structure.

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 (intentional and administrative procedures 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 realist and legislative process and applicable constitutional principles.


827 Business Associations (4) Legal problems associated with formation, operation, and dissolution of unincorporated and incorporated business firms; legal rights of duties of firm members; shareholders, financial matters, executives, creditors and partners; and limited partners; members, managers, and governors of limited liability companies, and corporate shareholders, directors, and officers; and others with whom members interact in connection with firm's business.

828 Corporate Finance (3) Legal issues arising in conjunction with corporate financial transactions: issuance of debt and various types of equity securities, distributions to shareholders, mergers and other corporate acquisitions. Legal valuation of corporate securities.

830 Securities Regulation (3) Basic structure of federal securities law; legal problems associated with raising of capital by new and growing enterprises; securities transactions by promoters, officers, directors and others; regulation of public-concerned companies; litigation under Regulation D and other antifraud provisions; and provision of law and other professional services in connection with securities transactions. Recommended prereq: 827 (Basic Corporate Finance).

833 Representing Enterprises (5-6) Capstone course for concentration in business transactions. Simulated business transactions and completion of major planning and drafting project. Issues include formation of new business, acquisition of existing business, development of real estate project, various financing transactions and corporate reorganization. Prereq: Comple-
penses of legal system to environmental problems: environmental litigation; Clean Air Act; Clean Water Act; National Environmental Policy Act; and selected regulatory issues.

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

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

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

879 Law and Economics (3) Relationship between legal and economic thought; application of basic economic concepts to legal problems; economics in legal decisionmaking; scholarly support for and criticism of economic analysis of law. Designed for students with no undergraduate background in economics or mathematics.

881 Law and Literature (3) Reading literary works, development of philosophic and reading techniques applicable to both law and life.

886 Public International Law (3) Law-creating processes and doctrines, principles and rules of law that appertain to both law and life.

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 on a procurement or amendment of contracts or concessions.

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

895 Labor Relations Law (3) Political, social and economic influences in development of federal labor relations law; collective bargaining; 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; enforcement of statutory 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.

898 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: 885.

899 Labor Relations Seminar (2) Selected labor relations law problems. Prereq: 885.

905 Advocacy Clinic (6) Supervised fieldwork requiring students to assume substantial responsibility for representing clients in various civil and criminal legal problems. Exploration and development of fundamental professional skills involved in practicing law: interviewing and counseling clients, negotiation of contract terms, preparation of pleadings for transactions and dispute resolution, initiating and defending claims, conducting factual investigations, and presenting evidence. Prereq: 920 and third-year standing.

908 Mediation Clinic (3) Mediation process, theory, strategy, tactics and skills through readings, simulations, and service as mediators in general sessions court and other settings: mediation ethics, relationship of mediation to other dispute resolution methods, rules of attorneys in mediation, and writing of mediation agreements.

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 of various remedies; comparison of contract, tort and property-related remedies.

920 Trial Practice (3) Litigation through simulation, trial problems and preparation: basic trial strategy; professional responsibility; fact investigation and witness examination; pattern for trial; organization of evidence; selection and instruction of jurors; opening and closing arguments. Written work: pleadings, motions, interrogatories or memoranda. Coreq: 913 for students electing continue in advocacy. Prereq: 913 for all other students.

921 Pre-Trial Litigation (3) Civil pre-trial process. Drafting of actual pre-trial documents in civil cases: complaint, motions, answers, objections, discovery, testimony, certification papers, motions to dismiss and for summary judgment, and various discovery papers.

922 Advanced Trial Advocacy (3) Study and development of trial skills: trial preparation, advanced direct and cross-examination, expert witnesses, jury selection, jury instruction, technology in courtroom, and motion practice. Prereq: 920.


926 Business Law Seminar (2) Selected topics of business law including liability and insurance, property, wills, and trust and estates. Prereq: 920.

927 Interviewing, Counseling and Negotiation (3) Development of conceptual and practical frameworks for interviewing, counseling and negotiation, and lawyer's role in tasks. Readings of different methods, strategies and perspectives from recent literature involving lawyer-client interactions. Simulations and videotape critiques of different strategies. Relevant ethical issues and techniques of dispute resolution. Not open to students who have taken 927.

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


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 equity of redemption and/or statutory right of redemption; mechanics' and materialmen's liens; construction of various types of future interests; construction of limitations; application of the rule against perpetuities.

941 Land Acquisition and Development Seminar (2) Land development problems: ownership to estate planning of land and property of real estate developers; laws of insurance, property, wills, and trusts, corporations, and partnerships. Required of students planning to implement land development projects. Limited enrollment. Prereq: 935 and 973. Recommended prereq: 918.

943 Land Use Law (3) Development and planning problems: zoning, subdivision controls, eminent domain, regulatory takings. Prereq: 920 and third-year standing.

943 Land Use (3) Private land use controls: nuisance, easements, real covenants, equitable servitude and home owner associations; public land use controls: zoning, subdivision controls, eminent domain, and regulatory takings. Prereq: 920 and third-year standing.

950 Computers and Law (3) Impact of computers on law and practice of law: expert systems; legal skills required in building expert systems; common law office uses of computers; and computerized research. Preparation of lawyers to think effectively concerning use of computers. Prior computer experience not necessary.

956 Employment Law (3) Role of lawyer and lawyering in entertainment industry. Course content varies. Music Industry, Theatre and Film Law. Prereq: 956 or 957 or 958. Recommended other seminars for group study.

957 Law, Science and Technology (3) Legal implications of advanced technologies; adaptation of law to challenge posed by new knowledge, new technologies, and new ways of doing things. Biotechnology, regulation of scientific research, space law, legal issues relating to new inventions, new technologies, new scientific research, and new technologies, and new ways of doing things.

958 Women and The Law (3) Employment and status of women in American legal system: women as corporate actors, as family members, as participants in workforce, as targets of violence, as members of legal profession; introduction to current competing approaches to gender justice.

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


962 Law and Medicare 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; informed consent and patient autonomy; choice of treatment, and death and dying; control of communicable diseases; organ transplantation and medical resource allocation.

970 Income Tax II (3) Corporate reorganizations and distributions, transactions among corporations and shareholders. Prereq: 918.

971 Income Taxation of Business Organizations (3) Survey and comparative analysis of federal patterns of income taxation of partnerships, S corporations, C corporations, and other limited liability companies; introduction to transactional analysis and business planning. Required written exercises; drafting partnership agreements, opinion letters, and legal memoranda. Prereq: 918.

973 Wealth Transfer Taxation (3) Taxation of gratuitous transfers of wealth during life (gift tax) and at death (estate tax) and of generation skipping transfers. Prereq or coreq: 936.

975 Tax Theory (3) Method and purposes of government revenue collection through examination of economic and political theory; comparative analysis of various actual and proposed patterns of taxation; income tax, consumption tax, sales tax, and value-added tax. Required preparation of an essay on the theoretical work of an expert in tax policy.

978 Transactional Tax Planning (3) Advanced study of taxation of business organizations; tax treatment of business acquisitions, tax planning for financially troubled entities, and review of recent transactions involving cutting-edge tax planning. Prereq: 977. Not open to students who have taken 975.

980 Insurance (3) Insurers' and insureds' rights and responsibilities under insurance contracts; duties of insurers; warranties and representations; coverage and exclusions; duties of agents; excess liability; subrogation; and bad faith actions. Study of 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 regulatory limitations on recovery; damages; causation; and defenses.
985 Social Legislation (3) Systems other than traditional tort remedies for compensating victims of work-related accidents and diseases, and for compensating disabled persons. Work-related compensation requirements for covered employer-employee relationships; accidental injuries or occupational diseases arising out of and in the course of employment; nature of medical, disability, and death benefits; exclusiveness of compensation remedy against employer and co-employees. Rights and liabilities of non-employees; administration and procedural aspects of Workers' Compensation practice; and various law reform measures. Brief introduction to and sampling of cases involving Social Security disability claims.

990 Issues in the Law (3) Selected topics. May be repeated.

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

993 Directed Research (1-2) Independent research and writing under direct supervision of faculty member. Proposal must be approved by supervising faculty member and by the Dean or the Dean's designee. Maximum of once each semester during last two years of study. Prereq: Second-year standing.

994 Independent Study (1-4) Independent study under direct supervision of faculty member. Proposals must be approved by supervising faculty member and by the Dean or the Dean's designee. Maximum of once each semester during last three semesters of study.

996 Law Review (1) Performance of duties as staff member and editor of Tennessee Law Review. Responsibilities vary each semester as specified in Tennessee Law Review Policy Manual: writing of casenote, comment or article, and/or performance of other assigned duties related to operations of Tennessee Law Review. Completion of potentially publishable comment or article for Tennessee Law Review satisfies exposure to law review requirement. May be repeated. S/NC only. (Does 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) 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.

Life Sciences

(College of Arts and Sciences)

MAJOR DEGREES

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

W.F. Harris, Chair

The program leading to the M.S. and Ph.D. degrees in Life Sciences is interdepartmental and intercollegiate and is designed to augment offerings of individual departments in two concentrations: genome science and technology, and plant physiology and genetics. Students interested in these areas should contact the Life Sciences chairperson or the director of the area of interest. Each concentration is administered separately and has unique admission requirements.

CONCENTRATIONS

Genome Science and Technology

The University of Tennessee-Oak Ridge National Laboratory Graduate Program in Genome Science and Technology (GST) is a unique and multidisciplinary program for full-time graduate study leading to the M.S. or Ph.D. degree. The program focuses on development of the biological and computational sciences relating to genome sequences, and the program is designed to take advantage of collaboration of The University of Tennessee and the Oak Ridge National Laboratory. Students will be trained in emerging areas of genome science, with emphasis on genomics, structural biology, computational and bioinformatic technologies. Scientists from both campuses participate in teaching. Research projects pursued for either the M.S. or Ph.D. degrees are mentored jointly by a faculty member from each campus. A yearlong introductory course in Genome Science and Technology focuses on inquiry conducted on a genomewide scale. Laboratory rotations during the first year offer students hands-on experience in a variety of focus areas.

Applicants are expected to have a background in the biological, physical, or computational sciences. Requirements for admission are one year of general biology or the equivalent; two years of chemistry, including one year of general chemistry and one year of introductory organic chemistry; and one year of calculus; one year of high school physics; at least eight semester hours of study approved by the student's committee, a thesis, and a formal seminar with the dissertation reporting the results of original and significant scientific research (a minimum of 24 semester hours of course 600 is required). A final oral and written examination on the dissertation, and a formal seminar presentation of the dissertation research. Participation in at least one seminar during each semester of residence after the first year is strongly recommended. 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.

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. Solutions of problems concerning the interactions of physiology and genetics in applied and fundamental aspects of plant science are the focus.

Admission requirements are a Bachelor's degree with a major in a biological, behavioral, or physical science; GRE (general) score; three letters of recommendation, and coursework including a year of calculus (differential and integral), one year of chemistry and a year of physics. Specific coursework deficiencies may be corrected during the first year.

Required courses are Life Sciences 510; Botany 521, 522; Biochemistry and Cellular and Molecular Biology 511, 512; Plant and Soil Science 471 or Ecology and Evolutionary Biology 560; Plant and Soil Science 552; Microbiology 410. 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. The minimum requirements for the doctoral degree include at least 6 hours above the 600 level, 24 semester hours of course 600 courses approved by the student's committee, a comprehensive examination, a doctoral dissertation, and a defense of dissertation.

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 for faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Graduate Research Participation (3-12) Special advanced research project not related to dissertation research. Topics chosen with consent of Instructor. May be repeated. Maximum 3 hrs.

505 Research Rotation (2) Laboratory rotations with faculty member on clearly defined projects. Written proposal and oral report. May be repeated. Maximum 6 hrs.

506 Computational Biology and Genome Informatics (3) Computational basis of nucleotide and protein sequence analysis; pairwise sequence comparison, multiple sequence alignments; gene and species trees; Genome annotation and feature finding; Computational protein structure analysis; threading, homology modeling, ab initio methods. Prereq: Computer Science 140 Data Structures or consent of instructor.

509 Biotechnology Seminar (2-9) Topics of importance to biotechnology. May be repeated. Maximum 6 hrs.

510 Special Topics in Life Sciences (1-3) Specializations in biotechnology, cellular, molecular, developmental biology, environmental toxicology, physiology, plant physiology and genetics, and physiology. May be repeated. Maximum 9 hrs.

515-16 Introduction to Genome Science and Technology I, II (1,1) 516—Introduction to research in genome science & technology concentration. 516—Science and ethics of practice of science. S/NC only.

520-21 Genome Science and Technology I., II (3, 3) 520—Overview of genomics, advanced genetics principles, computational biology and bioinformatics. 521—Computational biology and informatics, analytical technologies, and special techniques.

540-41 Colloquium (1,1) Invited speakers. Topics announced in advance. Required every semester in residence after first year. May be repeated. Maximum 6 hrs.

550 Mammalian Genetics (3) Genetic variation, inheritance, phenotypic traits, molecular genetics and genomics, mutation in laboratory rodents and other mammals. Prereq: 520-21.

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

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

593 Independent Study (1-15) See College of Arts and Sciences.
Logistics
See Marketing, Logistics and Transportation

Management
(College of Business Administration)

MAJOR DEGREES

Business Administration .......... MBA, Ph.D.

Oscar Fowler, Head

Professors:
Boling, Ronald W. (Emeritus), Ph.D., Stanford
Dewhurst, H. Dudley (Emeritus), Ph.D., Texas
Gilbert, Kenneth C., Ph.D., Tennessee
Hake, David A. (Emeritus), Ph.D., Tennessee
James, Lawrence R. (Pilot Chair of Excellence), Ph.D., Louisiana
Keally, A. H. (Emeritus), MBA .. Pennsylvania
Ladd, Robert T., Ph.D., Georgia
Larsen, John M., Jr., (Emeritus), Ph.D., Purdue
Miller, Alex W. (B. Stokely Prof.), Ph.D., Washington
Neel, C. Warren, Ph.D., Alabama
Noo, Charles E., Ph.D., Michigan
Reese, Don (Emeritus), Ph.D., Iowa
Rush, Michael C., Ph.D., Akron
Srinivasan, M. M., Ph.D., Northwestern
Stahl, Michael J., Ph.D., Pennsylvania
Tan, C. S. (Emeritus) (W. B. Stokely Prof.), Ph.D., Pennsylvania
Wagoner, George A. (Emeritus), M.S. Indiana
Whitlock, G. H. (Emeritus) (Distinguished Prof.), Ph.D., Tennessee

Associate Professors:
Bowers, Melissa R., Ph.D., Clemson
Edirisinghe, Chenaka P., Ph.D., British Columbia
Fowler, Oscar S., Ph.D., Georgia
Haley, Usha C., Ph.D., New York
Judge, William O., Ph.D., North Carolina
Maddox, Robert C., Ph.D., Texas
Rentisch, J. R., Ph.D., Maryland
Woehr, D. J., Ph.D., Georgia Tech

BUSINESS ADMINISTRATION CONCENTRATIONS

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

MBA Concentrations: Management, Forest Industries Management, Environmental Management, Manufacturing Management. Minimum course requirements for management-Three courses from the following: 511, 521, 522, 531, 541, 542, 551, 571, 581, 593, Business Administration 510, 559. Selection must be approved by the Management Department MBA advisor. For forest industries management—911; Forestry 560, 565. For environmental management- 561 plus two approved courses from the following list: Ecology and Evolutionary Biology 520, 555; Environmental Engineering 510, 555, 556; Chemical Engineering 581; Economics 677, 678; Agricultural Economics 570; Sociology 560, 665; Law 866, 867; Geography 577. For manufacturing management—541, 542, Management Science 526, and an Industrial Engineering/Management Science course approved by the appropriate department. Additional courses may be approved subject to approval by the Management Department Chairperson or designated faculty. Ph.D. Concentration: Management. Minimum course requirements are: For operations management—541 and 542; two semesters of 640 (may be repeated for credit); one additional semester of approved doctoral seminar work. For strategic management—610, 611, 612, 613.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

GRADUATE COURSES

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

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

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

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.

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

541 Operations Management I (3) Operations management—Planning and control function. Application of models to real-world systems.

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

571 International Management (3) Analysis of environmental issues, problem solving for international business planning and decision making. Preparation of a written case analysis.

581 Environmental Management: Analysis of environmental issues, problem solving for international business planning and decision making. Preparation of a written case analysis.

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

595 Selected Topics in Current Management Issues (3) In-depth consideration of current issues. May be repeated. Maximum 6 hrs. S/N or letter grades.
Admission Requirements

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

Core Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Science 531, 532, 533, 534, and 691 or 692</td>
<td>16</td>
</tr>
<tr>
<td>Statistics 563</td>
<td>9</td>
</tr>
</tbody>
</table>

Applied specialization area (approved by advisor)

Technical elective:

- Statistics (500 level or above as approved by advisor)
- Mathematics (400 level or above as approved by advisor)
- Industrial Engineering (400 level or above as approved by advisor)

Other elective (as approved by advisor)

Electives selected from mathematics, statistics, computer science, business, management science, industrial engineering, or other approved area

Total 40

A thesis option is available to qualified students. The Management Science Committee will work closely with the student in tailoring a program to his/her needs. The committee must approve a tentative overall program during the student's first semester and must approve all courses on a semester-by-semester basis.

Recognizing the diverse backgrounds and needs of Management Science M.S. students, the Management Science Committee is prepared to waive some of the above requirements on an individual basis. The total course load will remain 40 hours for all students.

THE DOCTORAL PROGRAM

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

1. To provide, through management science coursework, a thorough knowledge of common management science operations research mathematical models and their uses;
2. To provide sufficient advanced study in a supporting area to qualify the graduate for a joint faculty position in the supporting area and 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); and
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 applicant recommendation forms and the GRE or GMAT, in addition to the Graduate School’s requirements.

Coursework

A minimum of 48 semester hours of coursework taken for graduate credit (exclusive of thesis or dissertation) is required. Some of this may be the coursework from a master's program although a master's is not a prerequisite for the doctorate. The candidate must complete a minimum of 24 semester hours at The University of Tennessee, at least 6 of which must be at the 600 level. Both of these requirements are also exclusive of thesis or dissertation credits. Entering students who have completed graduate studies in applicable fields will be granted course credits for work which is equivalent to required 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. Mastery of 12 to 14 semester hours in mathematics coursework must be demonstrated by passing a written qualifying examination. Topics normally include numerical analysis, either Mathematics 471, 472, 453, and 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 two semesters of coursework as established by the graduate program for full-time students and the next two semesters of coursework as established by the degree program for part-time students.

PREREQUISITES FOR MANAGEMENT SCIENCE COURSES

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

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 the student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

526 Systems Modeling and Simulation (3) (Same as Industrial Engineering 526)

531 Mathematical Programming (3) Linear programming solution procedures, duality, sensitivity, and parametric analysis, linear fractional, piecewise-linear, separable and integer programming, transportation linear programs, Prereq: Fundamentals of matrix algebra. (Same as Industrial Engineering 529)

532 Stochastic Models in Management Science (3) Discrete-time Markov chains, Poisson processes, continuous-time Markov chains, renewal theory, and queuing theory. Prereq: Statistics 563 and Mathematical Analysis or consent of instructor. Sp

533 Computational Mathematical Programming (3) Computational aspects of mathematical programming models, in particular for large systems. Prereq: 531 and proficiency in computer language

534 Management Science Methods in Business (3) Application of methods from 531, 532, and 533 to real world problems in business/industry.

593 Management Science Problems (1-6) Directed study on subject of mutual interest. E

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

621 Network Flows (3) Treatment of network optimization algorithms, transportation and transshipment models and primal-dual and primal-basis tree methods. Prereq: 531 or equivalent.

631 Integer Programming (3) Theoretical and computational aspects of linear programming with integer variables, branch and bound, cutting plane, and group theoretic algorithms. Prereq: 531 or equivalent.

651 Nonlinear Optimization (3) Kuhn-Tucker theory in nonlinear programming: necessary conditions for constrained and unconstrained nonlinear programs, search techniques, quadratic programming, duality and sensitivity analysis. Prereq: 531 or equivalent, proficiency in computer language. (Same as Industrial Engineering 602)

681 Special Topics (3) Prereq: 531, 532 and consent of instructor. May be repeated. Maximum 9 hrs.

691-92 Management Science Seminar (1,1) Subjects selected from current literature. S/NC only.
Marketing, Logistics and Transportation

(College of Business Administration)

MAJOR

Business Administration .......... MBA, Ph.D.

Richard C. Reizenstein, Acting Head

Professors:

Barnaby, D. J., Ph.D. .......... Purdue
Cadotte, E. R., Ph.D. .......... Ohio State
Davis, F. W., Jr., Ph.D. .......... Michigan State
Dier, G. N., DBA .......... Indiana

Langley, C. J. (Dove Prof.), Jr., Ph.D. .......... Penn State
Mantzer, J. T. (Harry J. Bruce Chair of Excellence), Ph.D. .......... Michigan State
Mundy, R. A. (Taylor Prof.), Ph.D. .......... Penn State
Schumann, D. W., Ph.D. .......... Missouri

Woodruff, R. B. (Proffitt's Prof.), DBA .......... Indiana

Associate Professors:

Dahbolkar, P. A., Ph.D. .......... Georgia State
Foggion, J. H. (Liaison), DBA .......... Indiana
Gardial, S. F., Ph.D. .......... Houston
Holcomb, M. C., Ph.D. .......... Tennessee
Reizenstein, R. C., Ph.D. .......... Cornell
Rentz, J. O. (Liaison), Ph.D. .......... Georgia

Assistant Professors:

Moon, M. A., Ph.D. .......... North Carolina
Norek, C. D., Ph.D. .......... Ohio State

BUSINESS ADMINISTRATION

CONCENTRATIONS

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

MBA Concentration: Logistics and Transportation, Marketing.

Minimum course requirements for logistics and transportation—12 hours to include 516, 508, 506, 507, 508, 511, and 514. For marketing—12 hours from among the following courses: 501, 511, 512, 514, 516, 514, 516, 517, 520.

Ph.D. Concentration: Logistics and Transportation, Marketing.

Minimum course requirements for logistics and transportation—12 hours to include 511, 512, and 514. For marketing—12 hours from among the following courses: 501, 511, 512, 514, 516, 517, 520.

Logistics and Transportation

GRADUATE COURSES

501 Survey of Logistics and Transportation (3) U.S. logistics and transportation: physical, economic, social, and political environment; financing, managing, maintaining, and enhancing U.S. transport infrastructure.

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

504 Freight Carrier Systems and Management (3) Design of freight carrier management's efforts to provide services demanded by customers in logistics and transportation marketplaces.

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 Global Marketing (3) Strategic issues related to international and multi-national marketing operations. Identification and evaluation of opportunities in overseas markets; coordination of strategies in world markets.

510 Principles of Marketing Management for Non-MBA Students (3) For students from other disciplines interested in obtaining knowledge of marketing discipline at graduate level.

511 MBA Marketing Concentration I (6) Determination of consumer values. Principles of consumer behavior, marketing research, and purchasing organization values. Prereq: Business Administration 504 and 505 or consent of instructor.

512 MBA Marketing Concentration II (3) Analysis of marketing strategies and providing customer responsive organizations. Prereq: Business Administration 504 and 505 or consent of instructor.

Marketing Science

GRADUATE COURSES

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

504 Freight Carrier Systems and Management (3) Design of freight carrier management's efforts to provide services demanded by customers in logistics and transportation marketplaces.

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 Global Marketing (3) Strategic issues related to international and multi-national marketing operations. Identification and evaluation of opportunities in overseas markets; coordination of strategies in world markets.

510 Principles of Marketing Management for Non-MBA Students (3) For students from other disciplines interested in obtaining knowledge of marketing discipline at graduate level.

511 MBA Marketing Concentration I (6) Determination of consumer values. Principles of consumer behavior, marketing research, and purchasing organization values. Prereq: Business Administration 504 and 505 or consent of instructor.

512 MBA Marketing Concentration II (3) Analysis of marketing strategies and providing customer responsive organizations. Prereq: Business Administration 504 and 505 or consent of instructor.

Materials Science and Engineering

(grade of College of Engineering)

MAJORS

Materials Science and Engineering .......... M.S., Ph.D.

Polymer Engineering .......... M.S., Ph.D.

Joseph E. Spurlin, Head

Professors:

Benson, R. S., Ph.D. .......... Florida State
Brooks, C. R., Ph.D. .......... Tennessee
Buchanan, Raymond A., Ph.D. .......... Vanderbilt
Clark, Edward S. (Emeritus), Ph.D. .......... Pennsylvania

White, J. F., Ph.D. .......... Akron

Liu, P. K. (Rachef Chair of Excellence), Ph.D. .......... Northwestern

Lowndes, Douglas H., Ph.D. .......... Colorado

Lundin, Carl D., Ph.D. .......... Pennsylvania

McPherson, Carl J., Ph.D. .......... Kentucky

Oliver, Ben F., Ph.D. .......... Penn State
Pedraza, A. J., Ph.D. ....... National (Argentina)
Phillips, Paul J., Ph.D. ............. Liverpool (UK)
Spruiell, Joseph E. (Liaison), Ph.D. Tennessee
Stansbury, E. E. (Emeritus), Ph.D. .... Cincinnati

Associate Professors:
Becker, William T., Ph.D. ............ Illinois
Meek, Thomas T., Ph.D. ............. Ohio State

Assistant Professor:
Kit, Kevin, Ph.D. .............. Delaware

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

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

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

THE MASTER’S PROGRAM

Thesis Option
A total of 30 semester hours is required for the M.S. degree in either Metallurgical Engineering or Polymer Engineering.

Additional requirements include:
1. A major consisting of at least 12 semester hours of graduate courses in metallurgical engineering or polymer engineering. The polymer engineering major must include 540, 541, 543, 546, 549, 550 and 572 unless similar material has been covered in prior coursework.
2. Additional courses up to 12 hours total in related areas.
4. Satisfactory performance on a comprehensive oral examination administered by the faculty committee.

All resident students are required to register for and participate in the graduate seminar in metallurgical engineering or polymer engineering, as appropriate, during each semester in which it is offered. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements.

Non-Thesis Option
Any candidate may apply for a non-thesis option. Upon acceptance, a supervisory committee of three will be appointed. At least two members of the committee will be from the faculty in the major area, either metallurgical engineering or polymer engineering. The requirements for completion of the non-thesis option are as follows:
1. Completion of a total of 30 hours of graduate coursework. At least 12 of those hours must be in the department, and up to 12 hours may be in related areas. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. The polymer engineering major must include the same courses required for the thesis option. The candidate’s degree program must be approved by the faculty committee.
2. Satisfactory completion of a culminating experience such as MEE 580 (Critical Review).
3. Satisfactory performance on a comprehensive examination administered by the faculty committee.

THE DOCTORAL PROGRAM

After one year in residence and with the approval of the doctoral committee, the student may proceed directly to the doctoral program without completion of a master’s degree.

Departmental requirements for completion of the doctoral degree are:
1. A. For students proceeding directly to the Ph.D. from the baccalaureate degree: 48 graduate course credit hours with at least six hours of 600-level courses. Six hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. At least 12 credit hours must be coursework taken in the department. The polymer engineering major must include the same courses required for the master’s thesis option.
   a. For students having a master’s degree in Metallurgical Engineering, Polymer Engineering, or Materials Science and Engineering: 18 additional graduate course credits with at least six hours of 600-level courses. Three hours of MSE 503 or 504, Seminar, graded Satisfactory/No Credit, may be counted toward degree requirements. At least 12 credit hours must be courses in the department.
   b. Students must complete at least 24 hours of dissertation credits.
   3. Satisfactory performance on a comprehensive examination, usually given in two parts, and covering such topics as materials science and engineering, metallurgical or polymer engineering operations and processes, thermodynamics, technology, mathematics, physics, chemistry, and other related fields.
   4. Active participation in graduate seminars conducted by the department. Resident students must register for the appropriate 503 or 504 every semester offered.

GRADUATE COURSES

405 Structural Characterization of Materials (4) X-ray diffraction and fluorescence; scanning and transmission electron microscopy; microanalytical techniques.
421 Mechanical Behavior of Materials II (3) Description of stress and strain; linear elastic constitutive equations; isotropic and anisotropic moduli in various materials; yield criteria, brittle fracture; crazing; plastic strain constitutive equations, forming operations and
525-26 Welding Metallurgy (3.3) Welding processes; physical metallurgy of welding; phase transformations, heat flow; residual stresses; theories of hot cracking; cooling rate and porosity formation; applications to process utilization.

529 Ceramic Matrix Composites: Material and Mechanics (3) (Same as Engineering Science 529).

529 Diffusion in Solids (3) Phenomenology and atomic mechanisms of diffusion in solid state. Solution and application of diffusion equations; random walk problem and mechanisms of diffusion; diffusion in dilute and concentrated alloys; Kirkendall effect; high-diffusivity paths.

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

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


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

541 Fluid Mechanics and Polymer Processing (3) Navier-Stokes equations and illustrative problems; applications to 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 of polymer solutions, packed and fluidized beds, multiphase systems. Basic concepts in rheology; applications in polymer processing; screw extrusion, fiber spinning, injection molding. (Same as Chemical Engineering 542.)

546 Mechanical Properties of Solid Polymers (3) Types of mechanical behavior; Hook's law and rubber elasticity, plastic deformation; fracture, linear viscoelasticity, dynamic mechanical behavior and testing, loss tangent; experimental methods. Introduction to mechanical properties of polymeric composites.

549-50 Laboratory Methods in Polymer Engineering (1,2) Basic experimental techniques and instrumentation associated with characterization, x-ray and light scattering, calorimetry, rheometry, mechanical properties of solid polymers and polymer processing operations. Coreq: 540 or consent of instructor. 549-S/N only.

560 Principles of Ceramic Processing (3) (Same as Engineering Science 560) Treatment of ceramic processing, raw materials preparation and characterization; mechanical, thermal, and electrical properties of ceramics; sintering, sintering processes, and sintering techniques; kinetics and mechanisms. Prereq: 360 or equivalent.

561 Inorganic Glass Forming Systems (3) Physical and chemical nature of inorganic glasses; structural theories of glass forming; major glass forming systems: silica, other oxide glasses, nitrate glasses, water glasses, and chalcocite glasses. Prereq: 360, Chemistry 371.

571 Electron Microscopy (3) Operation of electron microscope, kinematical and dynamical diffraction theories; structure determination; analysis of lattice defects. Prereq: 405 or equivalent.

572 X-Ray Diffraction (3) Symmetry of crystals, space group theory, reciprocal lattice and application to definition of structural powder patterns, single crystal x-ray techniques; introduction to crystal structure determination; characterization of orientation; application to inorganic, metallic and polymeric structures.

576 Special Topics in Materials Science and Engineering (3) Topics of current significance and interest. Prereq: Consent of instructor. May be repeated.


600 Doctoral Research and Dissertation (3-15) Prereq: Not applicable. May be repeated.

621-22 Theoretical Metallurgy (3.3) Topics in solid state physics as applied to metallurgy; introduction to quantum theory, specific heats, electron theory of solids, electrical and thermal conductivity, magnetic properties, theories of alloy formation. Prereq: Consent of instructor.

623 Solidification and Crystal Growth (3) Theory of solidification, fluid flow effects, magneto-hydrodynamics of incompressible fluids, growth, stability theory, thermodynamic applications, rapid solidification. Prereq: Consent of instructor.

641 Advanced Rheology and Viscoplastic Theory (3) Continuum mechanics, formulation of viscoelastic theories for describing deformation and flow of polymeric materials. Application to polymer processing problems. Recommended for MS candidates working in rheological areas. Prereq: 541.

642 Advanced Topics in Polymer Processing (3) Application of theories of rheological behavior and structure development to analysis of polymer processing operations. Prereq: 541. (Same as Chemical Engineering 642.)

643 Phase Transformations in Polymers (3) Glass transition and glassy state; annealing of polymeric glasses; crystallization of polymers; nucleation, growth and morphology; secondary nucleation theory; solidification of copolymers; crystallization under stress. Prereq: 543.

647 Quantitative Microscopy (3) Principal acoustic, optical, x-ray, neutron, electron beam, and field-ion techniques for examination of microstructures of materials. Prereq: 405.

678 Advanced Topics in Materials Science and Engineering (3) Latest developments and advanced topics. Prereq: Consent of instructor. May be repeated.

678 Seminar in Recent Advances in Materials Science and Engineering (3) Directed and independent study of advanced topics. Prereq: Consent of instructor. May be repeated.

---

Mathematics

(Majors of Arts and Sciences)

**MAJOR DEGREES**

Mathematics M.M., M.S., Ph.D.

John B. Conway, Head

**Professors:**


**Associate Professors:**


**Assistant Professors:**

Matthews, Gretchen, Ph.D. .......... Louisiana State Timothy Schulze, Ph.D. .............. Northwestern

The Mathematics Department has three graduate degrees: (1) the Master of Mathematics degree, intended primarily for teachers, (2) the Master of Science degree, designed to prepare students for industrial employment and for teaching, and (3) the Doctor of Philosophy degree, designed to prepare students for industrial employment and for college and university teaching and research. Contact the department office for additional information.

A student offering mathematics as a minor for the master's degree is required to obtain at least 6 hours of resident graduate credit in courses numbered above 400 and approved by both the major department and the Department of Mathematics.

For additional information, please visit the graduate website on the Department of Mathematics' homepage at www.math.utk.edu.
THE MASTER OF MATHEMATICS PROGRAM

Before admission to the Master of Mathematics program, the applicant must have either (a) certification for teaching secondary mathematics in at least one state, or (b) three years of elementary school, secondary school, or community college teaching experience. Applicants must have successfully completed one year of calculus (141-42 or equivalent) and a course in matrix algebra (251 or equivalent).

The following requirements must be met:
1. Complete 30 hours of coursework of which 21 must be at the 500 level. The coursework must include 504, 505, 506, 507, and 6 hours in 509. At most, 6 hours may be outside the Department of Mathematics (selected in consultation with the advisor).
2. Pass a final examination upon completion of all coursework.

In exceptional circumstances, part of the admission requirement (b) might be satisfied concurrently with coursework. Normally, Master of Mathematics degree students will start the program by taking 504 during the summer.

THE MASTER OF SCIENCE PROGRAM

The department offers two options for the Master of Science degree. The first option requires a thesis for which 6 hours must be earned along with 24 additional hours of work in acceptable courses numbered above 400. Of the additional hours, 6 may be in an area outside the department and 15 must be in courses in mathematics numbered above 500.

After one semester of graduate study, a student whose advisory committee gives its approval may choose the second option, which is non-thesis. Of the additional hours, 6 may be in an area outside the department and 15 must be in mathematics.

Concentration in Applied Mathematics

For this concentration, available under the thesis or the non-thesis option, the student must complete the following:
2. Two hours of Seminar in Applied Mathematics 519 or Seminar in Mathematical Ecology 589.
4. Electives: 6 hours in an area not covered by the above requirements.

THE DOCTORAL PROGRAM

For the Ph.D. program in Mathematics, the student must meet the following four requirements in addition to those of The Graduate School:
1. Satisfy either the standard program or the interdisciplinary mathematical ecology concentration. A student intending to work in mathematical ecology may complete either but is encouraged to complete the interdisciplinary mathematical ecology concentration.
2. Demonstrate proficiency in one foreign language, normally French, German or Russian. This requirement must be met prior to the examination in the area of specialization. A student's doctoral committee may require the student to pass a second language examination.
3. Pass an examination in the field of specialization. After the requirements in 1. and 2. have been met, this examination will be given by the department head. A student may take this specialty examination only twice.
4. Pass an exam in a 600-level sequence in mathematics outside the student's area of specialization. The sequences selected to fulfill this requirement must be approved by the department head and the student's doctoral committee. (Such approval may occur after completion of the sequence.)

Requirements 1-4 must be completed no later than the start of a student's seventh year (as a mathematics graduate student at LIT).

Standard Program

Demonstrate knowledge in five subjects selected from the groups listed below by passing written examinations in three subjects and by earning grades of B+ or better each semester in the courses associated with two additional subjects. The three subjects selected for written examinations must be from Groups I, II, III. At least two groups must be represented in the three examinations. At least three groups must be represented in the five examination subjects. Groups I, II, III.

A student's five subjects may not include both Real Analysis and Applied Linear Analysis or both Mathematical Principles of Continuum Mechanics and Mathematical Principles of Fluid Mechanics. A student may not count examinations in both Ordinary Differential Equations and Partial Differential Equations, but both may be included in a student's five subjects. With prior approval of the graduate committee, a student may utilize as a Group IV course a year-long graduate-level sequence from outside the Department of Mathematics. At most one such utilization may be made.

A student may take as many written examinations as desired at any time the examinations are given, subject to the following conditions:
1. The examinations to be taken must be approved in advance by the student's advisory committee.
2. At any one time a student may take at most only the number of examinations necessary to complete the requirements.
3. A student may have a maximum of three attempts at each written examination, counting possible repetitions, without taking another examination. An exception is that a student who does not have a master's degree in mathematics and who has been enrolled in a UT graduate program in mathematics no longer than one year may take written examinations at one time during that year without having that sitting for the examinations or any incurred failure(s) count toward the limits in condition c.
4. At least two examinations must be taken and at least one must be passed before the start of a student's fourth year.

Mathematical Ecology Concentration

The student must pass written examinations in three subjects:
2. A subject from Groups I, II, and III of the standard program.
3. A subject represented by a year-long graduate-level sequence from outside the Department of Mathematics. The sequence must be approved in advance by the mathematical ecology faculty and by the departmental Graduate Committee. At least one member of the mathematical ecology faculty must be involved in the grading of the examination. The examination in this subject may be taken only twice.
443 Complex Variables I (3) Theory of functions of complex variables: residue theory and contour integrals.

445-46 Advanced Calculus I, II (3, 3) Theory of sequences, series, and continuity, and Riemann integration of functions of one or more variables. Complete sets and functional analysis. Prerequisites: Calculus III and Introduction to Abstract Mathematics, or consent of instructor.

447-48 Honors Advanced Calculus I, II (3, 3) Honors version of 445-46. Prerequisites: Calculus III and Introduction to Abstract Mathematics, or consent of instructor.

453 Matrix Algebra II (3) Matrix theory including Jordan canonical form. Prerequisite: Matrix Algebra I.

455-56 Abstract Algebra I, II (3, 3) Algebraic structures: groups, rings, fields, vector spaces and linear transformations. Prerequisites: Calculus III, or consent of instructor. Algebra I may be used to fulfill the prerequisites for Algebra II.

457-58 Honors: Abstract Algebra I, II (3, 3) Honors version of 455-56. Prerequisite: Matrix Algebra I and Introduction to Abstract Mathematics, or consent of instructor.

460 Geometry (3) Axiomatic and historical development of neutral, Euclidean, and hyperbolic geometry. Prerequisites: Calculus III and Linear Algebra.

471 Numerical Analysis (3) Computation, instabilities, and rounding. Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary differential equations. Prerequisite: Calculus III.

475 Industrial Mathematics (3) Modeling, analysis, and computation applied to scientific/technical/industrial problems. Prerequisite: 445-46 or consent of instructor.


480 Modern Analysis (3) Measure theory and algebras. Prerequisite: 445-46.

481 Probability (3) Probability theory, random variables, and stochastic processes. Prerequisite: 445-46.

482 Mathematical Statistics (3) Statistical inference, estimation, and hypothesis testing. Prerequisite: 445-46.


484 Mathematical Modeling of Social Phenomena (3) Mathematical models of social phenomena, including the study of the influence of ideas in society. Prerequisite: 445-46.


509 Seminar for Teachers (3) Seminar in applied mathematics for school teachers. Prerequisite: 445-46.

510 Applied Mathematics Laboratory (1) Computer applications in applied mathematics: software packages for matrix analysis, symbolic algebra, and differential equations. Prerequisite: Calculus III.

511 Methods in Applied Mathematics (3, 3) Pertinent facts from probability and statistics; formulation of statistical models; sufficiency, Fisher-Neyman factorization theorem, exponential families. Prerequisite: 445-46.


519 Seminar in Applied Mathematics (1-3) Seminar in applied mathematics. Prerequisite: 445-46.

521-22 Enumerative Combinatorics (3) Sieve methods, inclusion-exclusion, generating functions, and permutation groups. Prerequisite: 445-46.

525-26 Statistics (3, 3) Pertinent facts from measure theory, definition of almost sure convergence, Kolmogorov's existence theorem; series of independent random variables and laws of large numbers; general theory of distributions; characteristic functions; weak convergence concept; weak compactness and Levy's continuity theorem in Euclidean spaces; infinitely divisible distributions and central limit theorem; general concept and properties of conditional expectation, martingales, Doob's martingale and optional sampling theorems. Prerequisites: 445-46, 448-449.


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

535-36 Partial Differential Equations (3,3) First order equations, classification of equations and properties of elliptic, hyperbolic, and parabolic equations in several variables. Prereq: 445-46 and 531 or consent of instructor.

537-38 Mathematical Principles of Continuum Mechanics (3,3) Conservation principles, equations of equilibrium, kinematics of fluids and solids, constitutive relations and stress, convexity properties, bifurcation phenomena, existence theory. Prereq: 431, 435, 446 or 444, or consent of instructor.

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


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

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 463 and programming ability.


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

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

561-62 Topology (3,3) Topological spaces; metrization; homeomorphic invariants of pointed sets; mappings and homotopies. Covering spaces and fundamental group.

567-68 Differential Geometry (3,3) Classical differential geometry in two and higher dimensions: curves and surfaces in Euclidean space; curvature, Gaussian and mean curvature, Gauss-Bonnet theorem, hyperbolic geometry, Manifolds and Riemannian metrics; connections, geodesics, Jacobian and integral curvature forms, Differential forms and moving frames. Prereq: 445-46 or consent of instructor.

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


577 Optimization (3) Major topics in optimization with problems developed from real-world applications including constrained and unconstrained optimization with analysis of active set algorithms and utilization of appropriate software. Prereq: Numerical Algorithms, 453, 445-46.

578 Numerical Methods for Partial Differential Equations (3) Numerical approximation of partial differential equations including conservation laws and hyperbolic, parabolic, and elliptic problems. Derivation, physical meaning, and implementation of schemes. Prereq: 453 or 512 or 515, or consent of instructor.

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

581-82 Mathematical Physics (3,3) Deterministic and stochastic models of populations, communities, and ecosystems. Prereq: 431, 453 or consent of instructor. (Same as Ecology and Evolutionary Biology 581-582.)

583 Mathematical Evolutionary Theory (3) Population genetics and evolutionary ecology. Prereq: 431, 453 or consent of instructor. (Same as Ecology and Evolutionary Biology 585.)

585 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.

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

598 Graduate Reading in Mathematics (1-3) Independent study with faculty guidance. Prereq: Graduate standing and consent of instructor. May be repeated. Maximum 8 hrs.

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

617 Lie Algebras in Mechanics and Physics (3) Analytical tools of mechanics and physics arising from differential manifolds, tensors, Lie derivatives, Lie algebra, groups, differential forms, Lie algebras, applications to Hamiltonian mechanics, Lie algebras and Lie groups.

619 Seminar in Applied Mathematics (1-3) May be repeated. Maximum 12 hrs.


627 Advanced Differential Geometry (3,3) Selected topics from Riemannian geometry and analysis on manifolds, Lie groups, metric geometry, spectrum of Laplacian, Hodge Theory, problems of topology and geometry, and analysis on manifolds. Prereq: 567-68 or consent of instructor. May be repeated. Maximum 12 hrs.

629 Seminar in Topology (1-3) May be repeated with consent of department. Maximum 12 hrs.

631-32 Advanced Ordinary Differential Equations (3,3) Theory of ordinary differential equations from advanced viewpoint. Topics from current literature. Subject matter varies according to interests and preparation of students. Prereq: 531 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

635-36 Advanced Partial Differential Equations (3,3) Selected topics in classical and modern theoretical partial differential equations. Prereq: 541-42 or 547-48 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.


643-44 Harmonic Analysis (3,3) Fourier series and transforms on Euclidean spaces or topological groups: convergence, summability, uniqueness, inversion, duality, Plancherel transform, Hilbert transform, Hardy-Littlewood maximal function, interpolation of operators, and maximal functions. Prereq: 541-42 and 543. May be repeated with consent of department. Maximum 12 hrs.

645 Seminar in Analysis (1-3) May be repeated with consent of department. Maximum 12 hrs.

651-52 Advanced Modern Algebra (3,3) Selected topics in modern algebra or number theory. Prereq: 551-52 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

659 Seminar in Algebra (1-3) Prereq: Consent of Instructor. May be repeated with consent of department. Maximum 12 hrs.

661-62 Modern Topology (3,3) Technical background to current literature in algebraic topology. May be repeated with consent of department. Maximum 12 hrs.

663-64 Algebraic Topology (3,3) Homology, cohomology and homology theories: duality theorems and Hurewicz isomorphism theorem. Prereq: 561-62 and 1 yr of abstract algebra. Prereq: 453, 455 or consent of instructor. (Same as Mathematics 563-64.)

667-68 Advanced Differential Geometry (3,3) Selected topics from Riemannian geometry and analysis on manifolds, Lie groups, metric geometry, spectrum of Laplacian, Hodge Theory, problems of topology and geometry, and analysis on manifolds. Prereq: 567-68 or consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

669 Seminar in Topology (3) May be repeated with consent of department. Maximum 12 hrs.


679 Seminar in Numerical Mathematics (1-3) May be repeated with consent of department. Maximum 12 hrs.

681-82 Advanced Mathematical Ecology (3,3) Selected topics in theoretical and applied mathematical ecology: population, community, ecosystem ecology and applied topics such as demography, ecotoxicology, mathematical modeling, environmental change, and resource management. Prereq: 581-82. May be repeated (Same as Ecology and Evolutionary Biology 681-82.)

695 Seminar in Combinatorics (1-3) May be repeated with consent of department. Maximum 12 hrs.
Mechanical and Aerospace Engineering and Engineering Science

(Engineering College)

MAJOR DEGREES

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

D. W. Dareing, Head

Professors:
Antar, B. (UTSI), Ph.D. ........................................ Texas
Arnold, R. V., Ph.D. ............................................ Virginia
Baker, A. J., Ph.D. ............................................ New York
Carley, T. G., Ph.D. .......................................... Illinois
Caruthers, J. E. (UTSI), Ph.D. ......................... Georgia Tech
Collins, F. G. (UTSI), Ph.D., PE, Ph.D. ....... California
Crawford, R. A. (Emeritus) (UTSI), Ph.D. ........ Tennessee
Dareing, D. W., Ph.D., Ph.D. ......................... Illinois
Edmondson, A. J. (Emeritus), Ph.D., PE, Ph.D. ........ Tennessee
Engels, R. C. (UTSI), Ph.D. ........................... West Virginia
Flandro, G. (UTSI), Ph.D., PE, Ph.D. .......... Cal Tech
Forrester, J. H., Ph.D., PE, Ph.D. ............... Iowa State
Fortey, J. W. (Emeritus), Ph.D. ....................... Auburn
Frankel, J. J., Ph.D. ......................................... VPI
Garrison, G. W. (UTSI), Ph.D., NC State .......... Georgia Tech
Hedgeman, J. W. (Fisher Prof.), Ph.D., PE, Ph.D. ........ Tennessee
Holland, R. W., Ph.D. (Emeritus), Ph.D. ...... Georgia Tech
Jendrucko, R. J., Ph.D., PE, Ph.D. ............... Virginia
Johnson, W. S., Ph.D., PE, Ph.D. .................. Clemson
Keefe, D. R. (UTSI), Ph.D. ............................ Florida
Keyhani, M. (Liaison), Ph.D. ...................... Ohio State
Kim, K. H., Ph.D. ......................................... NC State
Kratz, R. H., Ph.D. ......................................... Oklahoma
Landes, J. D., PE, Ph.D. ................................. Lehigh
Lee, C. W. (Emeritus), Ph.D. ........................ Illinois IT
Lo, C. F. (UTSI), Ph.D. .................................. Cornell
McCoy, M. H. (UTSI), Ph.D., PE, Ph.D. .... Florida
McCoy, T. D. (UTSI), Ph.D., PE, Ph.D. .... Auburn
Maxwell, R. L. (Emeritus), Ph.D. .......... Case Western
Merke, C. L., Ph.D. ....................................... Princeton
Milligan, M. W., Ph.D., PE, Ph.D. .............. Tennessee
Parag, M., Ph.D., PE, Ph.D. ......................... Oklahoma
Parsons, J. R., PE, Ph.D. .............................. NC State
Peters, C. E. (Emeritus) (UTSI), Ph.D. ...... California (San Diego)

Associate Professors:
Aoki, M. (Emeritus), Ph.D. ......................... Tennessee
Arnold, J. M., Ph.D. ........................................ Stanford
Cezeaux, J. L., Ph.D. ..................................... Rensselaer
Eisenbarth, J. W., Ph.D. .............................. Tennessee
Hamel, W. R., Ph.D. ...................................... Tennessee
Hopkins, J. A. (UTSI), Ph.D. ......................... Tennessee
Iannelli, G. S., Ph.D. .................................... Tennessee
Kawiecki, G., Ph.D. ..................................... West Virginia
Lyne, J. M., Ph.D., NC State ......................... North Carolina
Madhukar, M. S., Ph.D. ................................. Drexel
Maleski, L., Ph.D. ......................................... Illinois
Mouland, T. H. (UTSI), Ph.D. ....................... Colorado
Nguyen, K., Ph.D. ........................................ VPI
Riggs, D. W., Ph.D. ...................................... VPI
Sarikaya, A., Ph.D. ........................................ VPI
Shimo, M. (UTSI), Ph.D. .............................. California
Speckhart, F. H. (IBM Prof.), Ph.D. .......... Georgia Tech
Stahl, W. K. (Emeritus), M.S. ............... Tennessee
Steinhoff, J. S. (UTSI), Ph.D. ............... Chicago
Stokey, J. E., PE, Ph.D. ............................... Illinois
Vakili, A. D. (UTSI), Ph.D. ......................... Tennessee
Wright, M. (UTSI), Ph.D. .............................. Texas
Young, R. L. (Emeritus) (UTSI), Ph.D. ...... Tennessee
Wilson, C. C. (Emeritus), Ph.D. ....................... Purdue
Associate Professor:
Boulet, P. D., Ph.D. ....................................... Georgia Tech

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy are available with majors in Mechanical Engineering, Aerospace Engineering, and Engineering Science. Changing from one of these programs to another requires departmental approval. Each applicant is advised as to any prerequisite courses before entering a program.

In Mechanical Engineering, program concentrations include energy conversion and utilization; propulsion; heat transfer and fluid mechanics; thermodynamics; space engineering; gas dynamics; machine design; dynamics, control, and robotics; power generation; and stress analysis.

In Aerospace Engineering, program concentrations include energy conversion and utilization; propulsion; heat transfer and fluid mechanics; thermodynamics; space engineering; gas dynamics; flight and aerospace mechanics; aerodynamics and structures; and stress analysis.

In Engineering Science, program concentrations include solid mechanics, fluid mechanics, computer mechanics, mechanics of composite materials, applied artificial intelligence, biomedical engineering, industrial engineering, or electrical engineering (Ph.D. only), and optical engineering (UTSI only). In each of these concentrations, interdisciplinary programs are arranged to meet individual needs or interests. The flexibility and interdisciplinary aspect of the program concentrations are intended to be of particular interest to prospective students currently employed in research, development, or design activities and whose interests in continuing education (either full-time or part-time) lie at one of the interfaces between science and engineering or can best be met by interdisciplinary study in engineering. The program's course offerings and research activities are also intended to meet the needs of students who seek preparation for employment in engineering areas requiring specialization in mechanics or in related interdisciplinary studies such as biomechanics.

In Mechanical Engineering or Aerospace Engineering, 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. A program application is required in addition to the Graduate School application. Admission to the doctoral program will be granted to those applicants who have demonstrated superior achievement in their engineering backgrounds. The general GRE is required of all international applicants for admission.

In Engineering Science, entrance into the graduate program is available to graduates of recognized curricula in engineering, mathematics, or one of the physical or biological sciences. A program application is required in addition to the Graduate School application. The names and addresses of four references must be included with the program application. The general GRE is required of all international applicants for admission.

Each student must satisfactorily complete a program of study that has been approved by his/her advisory committee and comply with the requirements of the Graduate School. In Engineering Science, the student's major professor may be selected from a department other than the Department of Mechanical and Aerospace Engineering and Engineering Science; however, at least one member of the student's graduate advisory committee must be on the faculty of the Department of Mechanical and Aerospace Engineering.

THE MASTER'S PROGRAM

In Mechanical Engineering, Aerospace Engineering, and Engineering Science, two M.S. options are offered. Option I requires a thesis and is the normal program for graduate students. Option II does not require a thesis and provides graduate students, including co-op and other off-campus students, the opportunity to focus their programs in special areas through extended coursework.

Credit requirements for these two options in Mechanical Engineering and Aerospace Engineering are:

<table>
<thead>
<tr>
<th>Course Areas</th>
<th>Hours Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option I: Thesis credit</td>
<td>6 n/a</td>
</tr>
<tr>
<td>Coursework</td>
<td>24 30</td>
</tr>
<tr>
<td>Courses in program (500-level or above) (min.)</td>
<td>12 18</td>
</tr>
<tr>
<td>Mathematics (400-level or above)</td>
<td>6 6</td>
</tr>
<tr>
<td>590 Selected Engineering Problems (max.)</td>
<td>n/a 6</td>
</tr>
<tr>
<td>Total</td>
<td>30 30</td>
</tr>
</tbody>
</table>
Credit requirements for these two options in Engineering Science are:

<table>
<thead>
<tr>
<th>Course Areas</th>
<th>Hours Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option</td>
<td></td>
</tr>
<tr>
<td>Thesis credit</td>
<td>6/3</td>
</tr>
<tr>
<td>Coursework</td>
<td>24/30</td>
</tr>
</tbody>
</table>

Engineering courses (Major concentration may include but is not restricted to course offered by the Department): (min.) 15

Mathematics (400 level or above) 6

Related courses (May include additional courses in mathematics, computer science, or the physical and life sciences as well as engineering courses.) (max.) 6

580 Selected Engineering Problems (max.) 6

Total 30

All program options require participation in the departmental graduate seminars program, and passing a final examination on all work submitted for degree. The final examination in Option II will include comprehensive coursework. The thesis option, Option I, requires submission and defense of a written thesis that demonstrates the ability to conduct and report an independent investigation.

THE DOCTORAL PROGRAM

All students must complete a minimum of 72 semester hours beyond the Bachelor's degree, exclusive of credit for the master's thesis. These must include a minimum of 24 semester hours in Doctoral Research and Dissertation and a minimum of 48 semester hours in other courses.

In Mechanical Engineering or Aerospace Engineering, the courses must include:

1. A minimum of 12 semester hours of graduate credit in mathematics in courses numbered 400 or above with a minimum of 6 semester hours numbered 500 or above.

2. A minimum of 24 semester hours in the department in courses numbered 500 and above, with at least 12 of these semester hours in the major. A minimum of 9 semester hours of courses required at the 600 level.

These are exclusive of thesis, problems, or dissertation credit. The student's advisory committee can approve a student's petition to replace one 600-level course with one or more 500-level courses(s) that are more appropriate.

In Engineering Science, the courses must include:

1. A minimum of 24 semester hours in engineering graduate courses, exclusive of thesis and dissertation credit. These courses will normally be numbered 500 and above, with at least 9 semester hours of 600-level courses, which constitute one or two areas of concentration selected by the student. The number of courses in this group to be taken will depend on the program selected by the student and the approval of his/her advisory committee.

2. A minimum of 12 semester hours in mathematics or computer science in courses numbered 400 and above, exclusive of a first course in ordinary differential equations.

Additional requirements for all students include:

1. Registration and participation in the graduate seminar in the major program.

2. Meet all departmental examination requirements, which include passing a written and oral comprehensive examination.

3. Presentation of a dissertation proposal to the student's advisory committee and approval of that proposal by that committee.


ACADEMIC COMMON MARKET

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

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

Students majoring in Mechanical Engineering or Aerospace Engineering may not normally use more than one 400-level engineering course to meet their advanced degree requirements. For students majoring in Engineering Science, four hundred-level courses in engineering may be used for graduate credit at the discretion of the advising committee. However, at least two-thirds of minimum required credit hours in a master's degree program must be at or above the 500 level. With the approval of the student's major department, a student whose major is outside the Department of Mechanical and Aerospace Engineering and Engineering Science may take senior (400-level) courses in the department for graduate credit. Such students should consult with instructors regarding prerequisites for undergraduate courses.

Aerospace Engineering

NOTE: Not all the courses listed below are available at both the UT and the UTSI campuses.

GRADUATE COURSES


424 Astrodynamics (3) Special mechanics, propulsion, atmospheric reentry of space vehicles; reentry thermal protection materials, human factors in space flight, space environment and current topics. Prereq: 351 Compressible Flow, 370 Airplane Performance; Mechanical Engineering 344 Heat Transfer. F

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

426 Introduction to Aerospace Design (2) Design process, synthesis, safety, reliability, patents, productivity, economics, analysis, optimization, design standards, design studies. Individual design report. Prereq: 351, 370, 363 Coreq: Mechanical Engineering 344 F

429 Aerospace System Design (4) Synthesis and design of complete aerospace system, economic and technical aspects. Participation in team design effort, formal presentations and design report. Prereq: 422, 425, 426. Sp

449 Aerospace Engineering Laboratory (3) Design, conducting, and reporting results of experiment.
Metallurgical Engineering
See Materials Science and Engineering

Microbiology
(College of Arts and Sciences and College of Veterinary Medicine)

MAJOR

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

Robert Moore, Head

Professors:
Beck, Raymond W. (Emeritus), Ph.D.
Becker, Jeffrey M., Ph.D., D.V.M.
Brian, D.A., Ph.D., D.V.M.
Monte, T.C. (Emeritus), Ph.D.
Moore, R.N., Ph.D.
Riggsby, W. Stuart, Ph.D.
Rouse, B.T., Ph.D.
Savage, Dwayne C. (Emeritus), Ph.D.
Sayler, Gary S., Ph.D.
Stacey, G. (Liaison), Ph.D.
White, D.C. (Distinguished Scientist), Ph.D.
Woodward, J.M. (Emeritus), Ph.D.

Assistant Professors:
Hacker, David, Ph.D.
Wilhelm, Steve, Ph.D.
Zaghouani, Habib, Ph.D.

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 chemistry, including one year of organic, (3) 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 course work to 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 encourage creative and independent thinking. Two to three calendar years are usually required for the course of study that has the following requirements: (1) 30 hours including 6 thesis credits; (2) a 3.0 GPA in all courses taken for graduate credit; (3) 12 hours of credit have been earned in courses graded on a letter grade; (4) a complete course sequence in biochemistry or molecular biology; (5) presentation of a research thesis and its oral defense.

THE DOCTORAL PROGRAM

The program leading to the Ph.D. is designed to develop the student's ability to pursue independent and original research in microbiology and 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; (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 clinical medicine; (5) one course in statistics; (6) two semesters of microbiology or molecular biology; (7) satisfactory performance in a comprehensive examination that must be attempted before the end of the fifth semester in the program and passed before admission to candidacy; and (8) the presentation of a research dissertation and its oral defense.

GRADUATE COURSES

410 Bacterial Physiology (3) Modern concepts of structure and function of bacterial cell. Prereq: Introduction to Microbiology. F
411 Bacterial Genetics (3) Transmission and expression of genetic information by bacteria. Prereq: Introduction to Microbiology. Sp
420 Medical Microbiology (3) Disease-producing microorganisms, including bacteria, rickettsia, chlamydia, and fungi. Prereq: Introduction to Microbiology. Sp
429 Medical Microbiology Laboratory (2) Laboratory exercises in medically important areas of microbiology: microorganisms, pathogenesis and immunology. Prereq: Introduction to Microbiology Lab. 430. Coreq: 420. Sp
430 Immunology (3) Principles of inflammation and immunity; immunoglobulin structure and functions; complement, hypersensitivities, cell cooperation and recognition in immune mechanisms; soluble factors. Prereq: General Genetics. F
470 Microbial Ecology (3) Physiological diversity and taxonomy of microorganisms from natural environments. Functional role of microorganisms in natural and simulated ecosystems. Prereq: 310. F
500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (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
578 Applied Microbiology and Bioengineering (3) Same as Chemical Engineering 578, Environmental Engineering 578, and Biosystems Engineering 578.
591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
593 Independent Study (1-15) See College of Arts and Sciences.
595 General Seminar (1) Lectures and seminars by invited speakers, faculty, and graduate students. May be repeated. Maximum 18 hrs. S/NC only. E
596 Laboratory Rotation (1) Familiarization with research areas in department through series of rotations in laboratories of individual faculty members. May be repeated. Maximum 3 hrs. S/NC only. E
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601 Journal Club in Microbial Physiology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E
602 Journal Club in Microbial Pathogenesis (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E
603 Journal Club in Immunology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E
604 Journal Club in Virology (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E
605 Journal Club in Medical Genetics (1) Readings and discussions based on current literature. May be repeated. Maximum 18 hrs. S/NC only. E
611 Topics in Microbial Physiology (1-3) Prereq: 410 or consent of instructor. May be repeated. Maximum 12 hrs.
620 Topics in Microbial Pathogenesis (1-3) Prereq: 420, 430 or consent of instructor. May be repeated. Maximum 12 hrs.
630 Topics in Immunology (1-3) Prereq: 430 or consent of instructor. May be repeated. Maximum 12 hrs.
640 Topics in Virology (1-3) Prereq: 440 or consent of instructor. May be repeated. Maximum 12 hrs.
650 Topics in Microbial and Molecular Genetics (1-3) Prereq: 470 or consent of instructor. May be repeated. Maximum 12 hrs.
670 Advanced Topics in Environmental Microbiology (1-3) Prereq: 420 or consent of instructor. May be repeated. Maximum 12 hrs.

4014 Microbiology 149
Modern Foreign Languages and Literatures

(Majors of Arts and Sciences)

MAJORS

French

DEGREES

M.A.

German

M.A.

Spanish

M.A.

Modern Foreign Languages

Ph.D.

Assistant Professors:

Blackwell, Stephen H., Ph.D. ............... Indiana

Cruz-Camara, Nuria, Ph.D. ............... SUNY (Buffalo)

Essif, Les, Ph.D. ......................... Brown

Hoayng, Peter, Ph.D. ....................... Wisconsin

Kaplan, Gregory, Ph.D. ............... Pennsylvania

Maxim, Hiram H., Ph.D. .................. Texas

McAlpin, Mary K., Ph.D. ............... Columbia

Ohanesorg, Stefanie, Ph.D. ............ McGill

Silva-Filho, Eurides, Ph.D. .............. North Carolina

Williams, Juno, Ph.D. ............... Ohio State

Yim, Chi-hung, Ph.D. .................... Yale

The Department of Modern Foreign Languages and Literatures offers graduate programs leading to the Master of Arts degree with majors in French, German and Spanish, and the Doctor of Philosophy degree with a major in Modern Foreign Languages. Inquiries should be addressed to the head of the department.

THE MASTER'S PROGRAMS

French

Thesis Option:

1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500 Thesis. French 501 is required. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, and under certain conditions the student may take 600 level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major, 6 in the minor.

2. A thesis, with a minimum of 6 semester hours in course 500.

3. A written examination covering the coursework and selected items from a master reading list.

4. A final oral examination covering the thesis.

Non-Thesis Option:

1. Completion of at least 30 semester hours, with a maximum of 9 at the 400 level, the rest at the 500 level, including French 501. Under certain conditions, the student may take 600 level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours must be taken in the major, 6 in the minor.

2. Three term papers that have been accepted by the student's advisory committee.

3. A written examination covering the coursework and selected items from a master reading list.

4. A final oral examination to discuss the papers.

German

Thesis Option: The minimum requirements are 24 semester hours of coursework and 6 hours of Thesis 500. German 510 and 519-20 are required, as are three courses on German literature or culture, one of which may be at the 400 level. In addition, students must take three further courses, only one of which may be chosen from 411-12 or 485. All graduate teaching assistants should take 512, and other candidates may take 512 or any other course above 500. A maximum of three 400-level courses may be counted toward the 24 semester hours of course credit. All M.A. candidates must sit for a standardized language examination, such as the Zentrale Mitteleinspruffprüfung. Students who are interested in future Ph.D. level study are strongly advised to choose the thesis option.

Non-Thesis Option: The minimum requirements are 30 semester hours of coursework, including at least one 600-level course, for which a seminar paper is required. German 510 and 519-20 are required, as are three courses on German literature or culture, one of which may be at the 400 level. In addition, students must take three further courses, only one of which may be chosen from 411-12 or 485. All graduate teaching assistants should take 512, and other candidates may take 512 or any other course above 500. A maximum of three 400-level courses may be counted toward the 30 semester hours of coursework. A common written exam over the designated reading list is required, as is a standardized language exam, such as the Zentrale Mitteleinspruffprüfung. Each non-thesis M.A. candidate will have a committee of three faculty members in German to whom the student will submit a dossier consisting of the seminar paper and one paper previously submitted in a graduate course. The length and type of the papers is described in greater detail in the Manual for Graduate Students in German.

Spanish

Thesis Option:

1. Completion of a minimum of 24 semester hours in coursework plus at least 6 hours in course 500 Thesis. Spanish 550 is required. A maximum of 6 hours may be taken at the 400 level, the rest at the 500 level, and under certain conditions the student may take 600 level seminars. If the student chooses to have a minor (such as Italian or Portuguese), at least 24 hours (including 6 hours of thesis) must be taken in the major, 6 in the minor.

2. A thesis, with a minimum of 6 semester hours in course 500.

3. A written examination covering the coursework and selected items from a master reading list.

4. A final oral examination covering the thesis.

Non-Thesis Option:

1. Completion of at least 30 semester hours, with a maximum of 9 at the 400 level, the rest at the 500 level, including Spanish 550. 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. 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.

THE DOCTORAL PROGRAM

The Ph.D. in Modern Foreign Languages requires advanced training in a major language and either a second language or applied linguistics.
Admission Requirements
Applicants must have completed a B.A. in either French, German, or Spanish to be accepted into this program. Both graduates of institutions in the United States and those with undergraduate degrees from institutions outside the United States must have a grade point average of at least 3.0. Consideration will also be given to applicants who do not have an undergraduate degree in one of the three foreign languages but do have the equivalent of an undergraduate major in one of them.

Degree Requirements
Candidates must complete a minimum of 63 semester hours of coursework beyond the bachelor’s degree in addition to 24 hours of doctoral research and dissertation. For candidates with French or Spanish as a first concentration, two tracks are available:

The coursework for Track I must be distributed as follows: at least 39 hours in the first concentration; at least 18 hours in the second concentration; and at least 6 hours in a cognate field. The coursework for Track II must be distributed in this way: at least 45 hours in the first concentration; at least 12 hours in the second concentration; and at least 6 hours in a cognate field. Because Track II students will have taken 12 graduate hours instead of 18 hours in the second concentration, they will normally not be eligible to teach that field at institutions which follow SACS guidelines for college foreign language teaching.

The coursework for all concentrations must be distributed as follows:

1. First Concentration: German. A minimum of 39 hours of German courses beyond the bachelor’s degree, distributed as follows: 400 level: A maximum of 6 hours of 400-level classes taken for the M.A. may be applied. 500 level: A maximum of 21 hours must be taken. These must include German 512, 519, 520, and 560. Thesis hours are excluded. If 519 is used as part of a second concentration in applied linguistics, another course must be substituted in the first concentration. 600 level: A minimum of 12 hours must be taken, exclusive of dissertation hours. First Concentration: French or Spanish. A minimum of either 39 (Track I) or 45 (Track II) hours of French or Spanish courses beyond the bachelor’s degree, distributed as follows: 400 level: A maximum of 6 hours of 400-level classes taken for the M.A. may be applied. 500 level: A minimum of 21 hours must be taken. These must include German 512, 519, 520, and 550. Thesis hours are excluded. If 519 is used as part of a second concentration in applied linguistics, another course must be substituted in the first concentration. 600 level: A minimum of 12 hours must be taken, exclusive of dissertation hours.

2. Second Concentration: A minimum of 12 hours beyond the bachelor’s degree, taken in the field of applied linguistics or in a second language, either French, German, Italian, Portuguese (Track I only), Russian or Spanish. For Track I and German, 12 of these hours must be at the 500 level or above. For Track II, 12 of these hours must be at the 500 level or above.

French students choosing applied linguistics must take French 421 or 429; 425; 512; and 9 (Track I) or 3 (Track II) hours of appropriate electives in English or French. German students choosing applied linguistics must take German 425, 435, 510, or 512, 3 hours of German linguistics, such as 426, 436, 631, or 632, and 6 hours of linguistics electives in English or German. Spanish students choosing applied linguistics must take Spanish 421 or 429; 425; 512; and 9 (Track I) or 3 (Track II) hours of appropriate electives in English or Spanish. The student’s graduate advisor must approve the electives chosen.

3. Cognate Field. Six hours in graduate courses numbered 400 and above in a field outside the department or language family of the first concentration but related to the student’s principal area of research. Students choosing applied linguistics as a second concentration are strongly urged to take their cognate work in a second language.

4. Additional requirements: For any languages taken as a first or second concentration, a student must demonstrate competence by taking a test. The test will include reading, writing, listening, and speaking, and should be completed by the time the student reaches 40 hours of study beyond the bachelor’s degree. Standardized examinations that may be used for this purpose include applicable portions of either the National Teacher’s Examination, the M.A. Examination for Teachers and Advanced Students, or the proficiency standards of the United States Foreign Service Institute (FSI). If a student has not chosen a third language as his or her cognate area, basic competence (determined by a reading examination with translation into English administered by the department in a third language is required. If the student’s first and second languages are Romance languages, the third language should be chosen from another language family.

For students choosing applied linguistics as an area of second concentration, reading competence in a second language is required. Competence will be determined by translation of a text from the foreign language into English, the test to be administered by the department.

A comprehensive examination on the language and literature of the first and second concentrations must be passed before the student may be admitted to candidacy. The candidate is required to defend his/her dissertation in an oral examination. Central emphasis is put on the doctoral dissertation as a final test of the candidate’s scholarly qualifications.

Graduate Teaching Assistants with a second concentration in another language should have the opportunity and will be strongly encouraged to instruct in the languages of both their first and second concentration, subject to staffing needs.

Doctoral students are strongly encouraged to reside and study abroad and will be assisted in identifying potential sources of financial support (e.g., Fulbright, McClure, Rotary fellowships).
ITALIAN

GRADUATE COURSES

401 Dante and Medieval Culture (3) Introduction to significance of this great Italian writer. Prereq: 211 or consent of instructor.
402 Petrarch and Boccaccio (3) Prereq: 211 or consent of instructor.
403 Literature of the Rinascimento (3) From Pindar to Tasso, Quattrocento and Cinquecento. Prereq: 212 or consent of instructor.
405 Modern Italian Poetry (3) From Pascoli to Montale. Prereq: Italian 212 or consent of instructor.
406 The Modern Italian Novel (3) From Manzoni to Camillo. Prereq: 212 or consent of instructor.
409 Directed Readings (3)
410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present. Prereq: Intermediate Italian or consent of instructor.
421 Topics in Italian Literature and Cinema (3) Italian literature and cinema from 1930 to present, focusing on literature works translated into English and adapted into film. Investigation of relationship between literature and cinema and achievement of greater understanding of Italian culture since 1930. Films in Italian with English subtitles. May be repeated. Maximum 6 hrs. (Same as Cinema Studies 421.)
500 Studies in Italian Literature (3) Content varies. May be repeated. Maximum 9 hrs.
591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
593 Independent Study (1-15) See College of Arts and Sciences.

SPANISH

GRADUATE COURSES

421 Phonetics (3) Prereq: Intermediate Conversation and Composition or consent of instructor.
422 Advanced Grammar (3) Prereq: Intermediate Conversation and Composition or consent of instructor.
423 Advanced Conversation (3) Prereq: Intermediate Conversation and Composition or consent of instructor.
424 Advanced Composition (3) Prereq: Intermediate Conversation and Composition or consent of instructor.
425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, and Linguistics 425.)
426 Methods of Historical Linguistics (3) (Same as French 426, German 426, and Linguistics 426.)
429 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)
430 History of Spanish Language (3) Evolution of Spanish language from its origins to present. May be repeated. Maximum 9 hrs.
431 Spanish Civilization (3) Major social, political, and cultural achievements of Spanish people from the origin of their civilization until today. Prereq: Intermediate Conversation and Composition or consent of instructor.
432-36 Survey of Spanish Literature (3, 3) Spanish literature through Golden Age. Prereq: Spanish Language and Culture Literature or equivalent.
450 Hispanic Drama (3) Prereq: Spanish Language and Culture Literature or equivalent.
451 Hispanic Prose (3) Prereq: Spanish Language and Culture Literature or equivalent.
452 Hispanic Poetry (3) Major poets of each period, either Spanish or Spanish-American. Topics vary.

PORTUGUESE

GRADUATE COURSES

400 Portuguese for Speakers of Another Romance Language (3) Accenteded ideas for beginning students of Portuguese with strong background in another Romance language. Introduction to grammar, reading and culture of Portugal and Brazil. Prereq: 3 hours at 300-level in another Romance language or equivalent.
431-32 Topics in the Literature & Language of Portuguese-speaking World (3, 3) Outstanding works of literature and culture from Portuguese countries. Topics may vary. Prereq: At least one course at the 300 level or the equivalent. May be repeated. Maximum 12 hrs.
450-52 Senior Seminar (3, 3) Major social, political, and cultural achievements of Spanish people from the origin of their civilization until today. Prereq: Intermediate Conversation and Composition or consent of instructor. May be repeated. Maximum 6 hrs.
451 Golden Age Prose (3) Spanish literature through Golden Age. Prereq: Spanish Language and Culture Literature or equivalent.
452 Spanish American Literature (3) Spanish American literature from pre-Columbian era through 18th century. Prereq: Spanish Language and Culture Literature or equivalent.

RUSSIAN

GRADUATE COURSES

401-02 Advanced Grammar, Conversation, and Composition (3, 3) Prereq: Russian Composition and Conversation or equivalent. (Same as Russian and East European Studies 401-02.)
430 Selected Topics in Russian Literature (3) Content varies. May be repeated. Maximum 9 hrs.
451-52 Seminar Senior (3, 3) For majors in Russian minors admitted at discretion of instructor. Internship study of language, literary style, and literary criticism based on selected major novels. (Same as Russian and East European Studies 451.)
510 Russian Phonetics and Advanced Grammar (3) Prereq: Consent of instructor.
590 Studies in Russian Literature (3) Content varies. May be repeated. Maximum 9 hrs.
591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
593 Independent Study (1-15) See College of Arts and Sciences.

Modern Foreign Languages and Literatures 153
The concentration in music education is designed for persons who hold a Bachelor’s degree in Music or Music Education and certification to teach music in the public schools. Both theses and non-thesis options are available.

Music Education

GRADUATE COURSES

510 Foundations of Music Education (3) Historical, philosophical and aesthetic bases. Prereq: Consent of instructor.

520 Research in Music Education (3) Definition of research problems, data collection and analysis, and research report writing. Application of knowledge of research techniques to analysis of existing research literature in music education. Prereq: Consent of instructor.


590 Studies in Multicultural Music Education (3) Study of music literature, art and customs of various cultures appropriate for students in K-8. Strategies and techniques for teaching music at this level.

597 Musical Repertoire Laboratory (1) Performance of music from various cultures: production of musicals appropriate for students in grades K-8. Singing, dancing, acting, set design, traditional and non-traditional instrumental ensembles. Limited to students majoring or concentrating in art, dance or theatre. Prereq or coreq: 570. May be repeated. Maximum 2 hrs.


575 Professional Internship in Teaching (1-8) Teaching and teaching-related experiences in professional settings in public schools. Enrollment limited to post-baccalaureate students in professional year program. Prereq: Admission to Teacher Education program and consent of School of Music. May be repeated. Maximum 12 hrs. S/N/C only. F, Sp.

580 Seminar in Music Education (3) Class investigation and individual reporting of pertinent topics and issues in music education. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

590 Special Topics in Music Education (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

591 Special Problems in Music Education (1) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

593 Special Problems in Music Education (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

Music Ensemble

GRADUATE COURSES

503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hrs.

504 Jazz Ensemble (1) May be repeated.
Music in the Renaissance (3) From 1400 to 1600. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genres.

Music Bibliography (3) Bibliographic methodology in music.

Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.

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

Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.

Music in the Baroque Period (3) From c.1600 to 1750; rise of opera and oratorio, sacred and secular cantatas, instrumental forms, performance practice.

Music in the Classic Period (3) Evolution of classical style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.

Music in the Twentieth Century (3) From 1890, Debussy, to present, Stockhausen and others.

Music in the Baroque Period (3) From c.1600 to 1750; rise of opera and oratorio, sacred and secular cantatas, instrumental forms, performance practice.

Music in the Classic Period (3) Evolution of classical style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.

Music in the Twentieth Century (3) From 1890, Debussy, to present, Stockhausen and others.

Music Instrumental

GRADUATE COURSES

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

580 Band History and Literature I (3) Antiquity to 1900.

581 Band History and Literature II (3) 1900 to present.

583 Recitative for Instrumental Conductors (1) Problems in conducting recitatives. Prereq: Consent of instructor. S/N only.

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

590 Advanced Instrumental Conducting (2) Physical techniques of conducting, study and analysis of scores, rehearsal techniques. Attention to individual problems. Requires applied music fee. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

595 Instrumental Conducting Performance (1) Preparation and judged performance of band or orchestral work(s). Prereq: Consent of instructor.

Music Jazz

GRADUATE COURSES

410 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.

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

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

480 Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.

503 Flute (1-4)

505 Oboe (1-4)

510 Bassoon (1-4)

515 Clarinet (1-4)

520 Saxophone (1-4)

525 Trombone (1-4)

526 Euphonium (1-4)

530 Trumpet (1-4)

535 Tuba (1-4)

540 Horn (1-4)

545 Oboe (1-4)

550 Keyboard (1-4)

555 Piano (1-4)

560 Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.

570 Music in the Baroque Period (3) From c.1600 to 1750; rise of opera and oratorio, sacred and secular cantatas, instrumental forms, performance practice.

580 Music in the Classic Period (3) Evolution of classical style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

581 Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.

582 Music in the Twentieth Century (3) From 1890, Debussy, to present, Stockhausen and others.

583 Recitative for Instrumental Conductors (1) Problems in conducting recitatives. Prereq: Consent of instructor. S/N only.

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

585 Instrumental Conducting Performance (1) Preparation and judged performance of band or orchestral work(s). Prereq: Consent of instructor.

Music Keyboard

GRADUATE COURSES

420 Piano Literature I (3) From 1750 to middle 19th century; 430--Middle 19th century to present.

440-70 The Organ and Its Literature II (3) Development of organ and organ literature from Middle Ages to present; problems of style and interpretation; pedagogical literature and methods; organ design. Prereq: or coreq: Music History 220 and consent of instructor.

485-95 Suzuki Piano Method II (2,2) Psychology, procedures, and literature of Suzuki piano method. Must be taken in sequence. Prereq: Consent of instructor.

490-50 Advanced Piano Pedagogy I (2,2) Evaluation and study of methods and materials for teaching piano at all levels. Supervised laboratory teaching. Prereq: Consent of instructor. 550—Introduction and principles of Kodály, Orff, Suzuki, Dalcroze Eurhythmics, and class piano teaching. Prereq: Consent of instructor.
Music Voice

GRADUATE COURSES

410-20 Song Literature I, II (2,2) 410-German songs; 420-French, Italian, Russian, Scandinavian, Czechoslovakian, British, and American art songs. Graduate credit not available for students in vocal performance.

425 Functional Diction for Singers (3) Comprehensive survey of singing diction in six languages: English, French, German, Italian, Latin, and Spanish. Basic instruction in International Phonetic Alphabet; development of basic diction skills; overview of diction styles and traditions in each language; survey of diction resources and reference materials. Does not fulfill deficiency requirements for graduate students in voice or accompanying.

490 Church Music Methods, K-12 (3) Development of child’s voice through teenage years, vocal/choral techniques for various age groups through high school, choral literature for the youth church choir, non-vocal musical activities appropriate to various age groups as used in church music programs (e.g., Orff, handbells, rhythm activities, etc.).

510 Vocal Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hrs.

520 Music Theatre Performance Techniques (1) Improvisation, movement, and basic techniques for dramatic vocal performance. Prereq: Vocal major or consent of instructor. May be repeated for credit. Maximum 2 hrs.

530 Opera Performance (2) Prereq: Consent of instructor. May be repeated. Maximum 4 hrs.

540 Opera Production (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

550 Advanced Vocal Pedagogy I, II (2,2) 550- Study of vocal production, examination of different methods. Prereq: Study of teaching materials, observation of studio teaching, analysis of vocal problems in selected students, and supervised teaching.

570 Vocal Chamber Music Performance (2) Prereq: Consent of instructor.

580-85 Choral Literature I, II (2,2) Choral music from middle ages to present with consideration of historical development of major choral genres.

590 Advanced Choral Conducting (3) Expansions and continued refinement of conducting techniques; development of choral rehearsal skills. Prereq: Consent of instructor.

594 Project in Choral Conducting Performance (1-3) Public performance, critical document; recording project. Prereq: Consent of instructor. May be repeated.

595 Choral Conducting Seminar (3) Score reading and preparation; problems of interpretation, performance practices, and conducting techniques. Prereq: Consent of instructor. May be repeated.

Music Technology

GRADUATE COURSES

540 Computer Music Transcription (3) Projects in notation, playback, and publication of music incorporating elements of word processing, graphic design, sequencing, and page layout. Study of MIDI protocol as applied to computer music work station design. No credit toward M.M. concentration in Music Theory with technology emphasis. Prereq: Consent of instructor.

550 Computer Projects (3) High-level programming languages used to design and implement computer-managed instruction; Internet development tools; writing of documentation for computer programs. Prereq: 540 or equivalent.

560 Technology in Music Research (3) Use of technology for research projects in music analysis or pedagogy: development and execution of research project. Prereq: 550.

Music Theory

GRADUATE COURSES


450 Choral Arranging (2) Analysis of scores and writing of arrangements for choirs. Prereq: Theory IV or consent of instructor.

510 Musical Styles (3) Elements of design and their role in development of musical styles. Prereq: Consent of instructor.

520 Analytical Techniques (3) Analytical techniques, contemporary approaches. Tonal and non-tonal music. Prereq: Consent of instructor.

530 Music Theory Pedagogy (3) Techniques, methods, and materials involved in college-level theory programs. Use of technology and review of existing software. Prereq: Consent of instructor.

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

Nuclear Engineering

(College of Engineering)

MAJOR DEGREES

Nuclear Engineering M.S., Ph.D.

H. L. Dodds, Head

Professors:

Dodds, H. L., PE, Ph.D. Tennessee

Mihalcz, J. T., Ph.D. Tennessee

Miller, L. F., PE, Ph.D. Texas A&M

Mynatt, F. R., Ph.D. Tennessee

Shannon, T. E., Ph.D. Tennessee

Uhrig, R. E. (Distinguished Prof.), PE, Ph.D. Iowa State
Upadhyaya, B. R., PE, Ph.D. California

Associate Professors:

Groer, P. G., Ph.D. Vienna

Hines, J. W., Ph.D. Ohio State

Pevey, R. E., PE, Ph.D. Tennessee

Ruggles, A. E., Ph.D. Tennessee

Scott, T. H., PE, Ph.D. Florida

Townsend, L. W., Ph.D. Idaho

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 radiological engineering concentration at the master’s level.

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

All entering students must have, as a minimum, competency in mathematics through ordinary differential equations, competency in atomic and nuclear physics, and competency consistent with a course in introductory nuclear engineering. If these competencies do not exist, the student must take appropriate courses for undergraduate credit. The department head is the contact for all interested students, both those with nuclear engineering degrees and those from other disciplines.

THE MASTER’S PROGRAM

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

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

1. A major consisting of a minimum of 12 semester hours of graduate courses in nuclear engineering. This must include at least one of the following sequences: 511, 512, 551, 552, 571, 572.

2. A minor of 6 semester hours of elective courses in mathematics, statistics or computer science.

3. Six semester hours in either nuclear engineering or a related field.

The M.S. candidate must also demonstrate research or design capability. This requirement may be satisfied by a thesis project or engineering practice projects as described below:

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

Engineering Practice - The student performs independent research on two to four separate topics approved by his/her
graduate committee. Each project is similar to a thesis project but smaller in scope. He/She submits a report, in thesis format, on each project. The student must then pass an oral examination on his/her engineering practice report and an oral examination on his/her graduate coursework. The student must enroll for six semester hours of NE 598 (Nuclear Engineering Practice).

THE DOCTORAL PROGRAM

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

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

1. A minimum of 48 semester hours beyond the Bachelor's degree, exclusive of credit for the M.S. thesis or Nuclear Engineering Practice.
2. A minimum of 24 semester hours in doctoral research, NE 600.
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 500-level courses. These are exclusive of thesis or dissertation credit.
4. A minimum of 12 semester hours in mathematics, computer science, or statistics courses beyond nuclear engineering undergraduate requirements numbered 400 or above.
5. A minimum of 6 semester hours in courses numbered 500 and 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 prepared by the nuclear engineering faculty and consists of 12 hours of written examinations. All past examinations are filed in the library, and students are encouraged to review them. Students are invited to take the comprehensive examination after completing approximately 30 semester hours of coursework. A student who fails the written part of the examination must take and pass the examination the next time it is offered to remain in the Ph.D. program. Registration for NE 600 is not permitted until the written examination is passed. The comprehensive examination is completed with a successful oral defense of the dissertation proposal.

A candidate must successfully defend, in an oral examination, all material for the degree—coursework and the dissertation.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

400-level courses in nuclear engineering may be used for graduate credit. However, students must recognize that at least two-thirds of the minimum required hours (30) in a master's degree program must be taken in courses numbered 500 or above.

GRADUATE COURSES

403 Nuclear and Radiological Engineering Laboratory I (3) Cross section measurements, diffusion properties of neutrons, shielding, dynamics and control, fission and other beta spectroscopy, radiological and dosimetry. Prerequisite: Nuclear and Radiological Engineering Laboratory I.

404 Nuclear Fuel Cycle (3) Mining, milling, fabrication, in-core management, reprocessing, waste disposal, regulatory and health issues and requirements. Prerequisite: 470 or equivalent.

406 Radiation Shielding (3) Types of radiation sources, fundamental concepts of ray and neutron attenuation, biological effects, approximate methods of shielding, Monte Carlo, and Monte Carlo. Prerequisite: Physics 232.

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

431 Radiation Protection (3) External and internal dosage, biological effects of radiation, radiation detection, radiation assessment. Prerequisite: Introduction to Nuclear Engineering.

432 Radiation Risk Analysis (3) Radiation risk estimates for external and internal radiation, dose response models, dose rate effects, prediction of radiation risks, radiation safety standards.

463 Introduction to Fusion Energy I (3) Same as Electrical Engineering 463.

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

470 Nuclear Reactor Theory I (3) (Same as Electrical Engineering 470, Industrial Engineering 470, Chemical Engineering 470, Mechanical Engineering 470, Nuclear Engineering 470, Materials Science and Engineering 470, Chemical Engineering 471, Mechanical Engineering 471.) Fundamentals of reactor physics relative to cross sections, time evolution of elastic scattering, reactor kinetics, reactor systems and nuclear data. Introduction to nuclear reactors and nuclear data. Prerequisite: Calculus and linear algebra. Prerequisite: Introduction to Nuclear Engineering.

471 Nuclear Reactor Theory II (3) Thermal spectrum computational methods; heterogeneous effects in fast and thermal spectra; considerations in reactor core design; equations for reactor thermal and neutronic variables; power distribution calculations and reactivity control methods. Prerequisite: 470.

483 Introduction to Reliability Engineering (3) Probabilistic failure models, parameter estimation (maximum likelihood and Bayesian techniques), model identification and comparison, reliability of system life tests, failure prediction, system reliability, preventive maintenance and warranty. Prerequisite: Industrial Engineering 483.

484 Introduction to Maintenance Engineering (3) Principles of maintenance and reliability engineering, maintenance management, information extraction from machine, measurements, rotating machinery diagnostics, non-destructive testing, life prediction, failure models, lubrication oil analysis, establishing predictive maintenance programs, and computerized maintenance management systems. Prerequisite: Senior standing in engineering and consent of instructor. (Same as Materials Science and Engineering 484, Industrial Engineering 484, and Mechanical Engineering 484.)

494 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice. Prerequisite: Senior standing and consent of instructor. May be repeated. Maximum 6 hrs.

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

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

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

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

522 Experimental Methods in Reactor Dynamics (3) Introduction to time domain and frequency domain techniques. Measurement, analysis, and interpretation of process data for nuclear reactor design and control. Prerequisite: Introduction to time-series analysis.

541 Reactor Fuel Management (3) Topics related to reactor fuel management. Applicable topics in reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods. Prerequisite: 461.


543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental methods for enrichment, fabrication, storage, reprocessing, and transport applications; overview of safety practices and regulatory requirements. Prerequisite: 451 or consent of instructor.

550 Radiation Measurements Laboratory (3) Physics, electronics associated with radiation detection and measurement, methods for evaluation of effectiveness of radiation detection and measurement equipment. Prerequisite: 451.

551 Radiation Protection (3) Fundamental concepts and definitions used in the design and implementation of radiation protection techniques. Fundamentals of radiation protection monitoring and measurement techniques. Prerequisite: 541 or consent of instructor.

572 Radiological Assessment and Dosimetry (3) Transport of radionuclides, external and internal dosimetry, personnel dosimetry, exposure control. Prerequisite: 551 or consent of instructor.

573 Radiation Risk Analysis (3) Methods for risk assessment, risk analysis, parameter estimation, real data analysis, and decision techniques. Prerequisite: 552 or consent of instructor.

574 Radiation Detection and Measurement (3) Analytical and numerical techniques for characterization and modeling of nuclear radiation. Principles and applications of radiation detection and measurement techniques. Prerequisite: 451 or consent of instructor.

575 Nuclear Reactor Theory and Design (3) Analytical and numerical techniques for characterization and modeling of nuclear radiation. Principles and applications of radiation detection and measurement techniques. Prerequisite: 451 or consent of instructor.

576 Nuclear Systems Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of system design, system reliability and economic aspects of nuclear systems. Prerequisite: 451 or consent of instructor.

577 Expert Systems in Engineering (3) Application of expert systems in engineering: logic and rule-based knowledgebase systems, expert systems, advanced topics. Prerequisite: 575 or consent of instructor. (Same as Mechanical Engineering 576 and Engineering Science 576, Industrial Engineering 576, and Electrical Engineering 576.)

578 Fuzzy Systems in Engineering (3) Fuzzy numbers, fuzzy environment, uncertainty and randomness, approximate reasoning, fuzzy models and structures, decision processes in fuzzy environment, fuzzy computing, fuzzy logic controllers, fuzzy expert systems.
terms and other engineering applications. (Same as Engineering Science 578.)

579 Advanced Monitoring and Diagnostic Techniques (3) Fundamentals of machinery monitoring and diagnostic systems, and application of advanced statistical and artificial intelligence-based techniques such as ridge regression, principal component analysis (PCA), linear and non-linear partial least squares (PLS), neural networks, and fuzzy logic. Prereq: Graduate standing or consent of instructor.


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

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

598 Nuclear Engineering Practice (3-6) Experience in solving and reporting on engineering problems. Prereq: Approval of department. May be repeated. Enrollment limited to alternative plan students. S/N only.

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

611-12 Selected Topics in Reactor Theory (3.3) Transport theory, control rod theory, stochastic methods. Select topics from literature. Prereq: 572.

621 Selected Topics in Radiation Protection (3) Prereq: 551, 552. May be repeated with consent of department.

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

671 Advanced Topics in Applied Artificial Intelligence (3) Recent advances in engineering applications of artificial intelligence. Prereq: 577. (Same as Mechanical Engineering 671 and Engineering Science 671.)

697 Special Topics in Nuclear Engineering (3) Investigation of new developments. Prereq: Consent of instructor.

Nursing

(College of Nursing)

MAJOR

DEGREE

Nursing

M.S.N., Ph.D.

Joan L. Creasia, Dean
Martha Alligood, Director of M.S.N. Program
Sandra Thomas, Director of Ph.D. Program

Professors:

Alligood, Martha R., Ph.D. ............ New York
Creasia, Joan L., Ph.D. ............... Maryland
Droppelman, Patricia G., Ph.D. ....... Tennessee
Farr, Glen, Pharm.D. ................. Tennessee
Groer, Maureen, Ph.D. .............. Illinois
Mozingo, Johnie N., Ph.D. .......... Walden

Pierce, Joan U., Ph.D. ............... Utah
Seavor, Carol, Ed.D. ................. Massachusetts
Thomas, Sandra P., Ph.D. .......... Tennessee

Associate Professors:

Bowen, Sheila, Ph.D. ............... Tennessee
Davies, Mitzi, Ph.D. ................. Tennessee
Ellison, Kathy Jo, Ph.D. ............. Alabama (Birmingham)
Fenske, Mildred M., Ph.D. ........... Vanderbilt
Hall, Joanne, Ph.D. ................. San Francisco
McGuire, Sandra, Ed.D. ............ Tennessee
Smith, Helen, Ph.D. ................ Maryland
Wallace, Debra C., Ph.D. .......... South Carolina

Assistant Professors:

Brown, Alle J., M.S.N. ............ Alabama (Birmingham)
Brown, Mary Lynn, Ph.D. ............ Tennessee
Chen, Shu-Ii, Ph.D. ................ Utah
Conlon, Kathleen P., M.S.N. .......... SUNY (Buffalo)
Davis, Mitzi, Ph.D. ................. Tennessee
Fox, Marie X., M.S.N. .............. Tennessee
Helton, Sally M., M.S.N. ............ Texas Women's
Kollar, Mary, Ph.D. ................. Tennessee
Nalle, Maureen, Ph.D. ............. Tennessee
Pierce, Margaret, M.S.N. ........... Tennessee

THE MASTER'S PROGRAM

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, family nurse practitioner, maternal-child health nursing, nursing administration and nursing of women and children. The program is accredited by the National League for Nursing Accrediting Commission and is unconditionally approved by the Tennessee Board of Nursing.

The purpose of the Master's program in nursing is to prepare leaders, managers, and practitioners who facilitate and manage the delivery of high quality health care services. The program prepares advanced practice nurses for a career in adult health nursing, maternal-child health nursing, and mental health nursing as well as role preparation as nurse practitioners, clinical nurse specialists and nursing administrators.

The thesis option is available for interested students and is especially encouraged for those who are considering pursuit of a doctoral degree sometime in the future. Students who choose the non-thesis option must register for 582 Scholarly Inquiry for Advanced Practice Nursing.

Program Requirements

All students must complete a minimum of 33 semester hours distributed as follows:

Core (9 credits)

503 Health Promotion in Advanced Practice Nursing

510 Theoretical Foundations of Nursing

520 Advanced Practice Nursing and Health Delivery Systems

Advanced Practice Core (9 credits)

504 Advanced Health/Physical Assessment

505 Advanced Clinical Pharmacology

515 Advanced Pathophysiology for Nursing Practice

Hold a bachelor's degree in a discipline other than nursing (master's entry student or RN) from an accredited college or university.

a. Have a cumulative undergraduate GPA of at least 3.0 on a 4-point scale.

b. Have satisfactorily completed the following prerequisite courses: chemistry (8 hrs); microbiology (including lab); anatomy and physiology (6-8 hrs); nutrition (covering lifespan in health and illness); behavioral sciences (12 hrs in sociology, anthropology, growth and development, and at least one general psychology course); undergraduate research course or equivalent; 3 hours of graduate level statistics prior to enrollment in graduate research course.

5. New students normally are admitted to the program only at the beginning of fall semester. However, under special circumstances and on a space available basis, a B.S.N. graduate may be admitted at the beginning of spring or summer terms in a temporary non-degree status. Applications from full-time BSN and master's entry students for fall admission must be received by February 1. Part-time and post-master's applications must be received by October 1.

Special Requirements

1. Each student must hold personal professional liability insurance.

2. Registered nurses must be licensed to practice nursing in Tennessee.

3. Each student must present proof of the following vaccinations: Hepatitis B vaccination and rubella and rubeola immunization or sufficient titers for immunity; TB status.

4. Each student must present evidence of current 2-person CPR certification.

5. Non-registered nurse students must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 semester hours of behavioral sciences courses.

6. Contact student services for more detailed information about the application process: Student Services/MSN Program, UT College of Nursing, 1200 Volunteer Blvd., Knoxville, TN 37996-4180; phone: 865 574-7606.

Thesis and Non-Thesis Options

The thesis option is available for interested students and is especially encouraged for those who are considering a doctoral degree sometime in the future. Students who choose the non-thesis option must register for 582 Scholarly Inquiry for Advanced Practice Nursing.
Admission Requirements

1. Meet requirements for admission to The Graduate School.
2. Hold a master's degree in nursing from a program accredited by the National League for Nursing. Some outstanding applicants who are prepared at the bachelor's level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the doctoral program of doctoral degree requirements.
3. Have a minimum cumulative graduate grade-point average of 3.3 on a 4.0 scale for previous college work.
4. Have a combined score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination.
5. Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.
6. Have TOEFL scores of at least 550 if native language is not English.
7. Complete Graduate Program Data Form, College of Nursing.

Final Examination Requirements

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

Special Policies

1. If the clinical performance of any student for any course is found to be unsatisfactory, the student will receive a grade of "F" for the course.
2. If a student achieves a final grade of "D" or "F" for any required undergraduate or graduate nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.
3. If the clinical performance of any student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

The Doctoral Program

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

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:
1. Analyze, test, refine, extend, and expand the theoretical basis of nursing practice.
2. Conduct research that generates knowledge and advances nursing as a discipline.
3. Provide leadership as nurse researchers, educators, and/or administrators in current and emerging health care settings.
4. Collaborate with members of other disciplines in health-related research of mutual concern.
5. Analyze, develop, and recommend health care policy at various levels.

Admission Requirements

1. Meet requirements for admission to The Graduate School.
2. Hold a master's degree in nursing from a program accredited by the National League for Nursing. Some outstanding applicants who are prepared at the bachelor's level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the doctoral program of doctoral degree requirements.
3. Have a minimum cumulative graduate grade-point average of 3.3 on a 4.0 scale for previous college work.
4. Have a combined score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination.
5. Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.
6. Have TOEFL scores of at least 550 if native language is not English.
7. Complete Graduate Program Data Form, College of Nursing.

Special Policies

1. A maximum of 6 graduate hours taken before acceptance into the doctoral program may be applied toward the degree.
2. If the clinical performance of any student for any course is found to be unsatisfactory, the student will receive a grade of "F" for the course.
3. If a student achieves a final grade of "D" or "F" for any required undergraduate or graduate nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.
4. If a student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

THE DOCTORAL PROGRAM

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

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:
1. Analyze, test, refine, extend, and expand the theoretical basis of nursing practice.
2. Conduct research that generates knowledge and advances nursing as a discipline.
3. Provide leadership as nurse researchers, educators, and/or administrators in current and emerging health care settings.
4. Collaborate with members of other disciplines in health-related research of mutual concern.
5. Analyze, develop, and recommend health care policy at various levels.

Admission Requirements

1. Meet requirements for admission to The Graduate School.
2. Hold a master's degree in nursing from a program accredited by the National League for Nursing. Some outstanding applicants who are prepared at the bachelor's level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the doctoral program of doctoral degree requirements.
3. Have a minimum cumulative graduate grade-point average of 3.3 on a 4.0 scale for previous college work.
4. Have a combined score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination.
5. Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.
6. Have TOEFL scores of at least 550 if native language is not English.
7. Complete Graduate Program Data Form, College of Nursing.

THE DOCTORAL PROGRAM

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

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:
1. Analyze, test, refine, extend, and expand the theoretical basis of nursing practice.
2. Conduct research that generates knowledge and advances nursing as a discipline.
3. Provide leadership as nurse researchers, educators, and/or administrators in current and emerging health care settings.
4. Collaborate with members of other disciplines in health-related research of mutual concern.
5. Analyze, develop, and recommend health care policy at various levels.
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.N. program in Nursing is available to residents of the state of Oklahoma (concentration in nursing of women and children). The Ph.D. program is available to residents of the state of Arkansas. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
501 Nursing Research: Methods, Design, and Analysis (3) Basic principles of research process in application to clinical questions; critical evaluation of nursing and health-related research. Prereq or coreq: 510, graduate level statistics. F, Sp
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities. Prereq: 501, 510, 515. S/NC or letter grade. F, Sp
503 Health Promotion in Advanced Practice Nursing (3) Principles of health promotion, education, and innovative strategies for achieving wellness of individuals, families, groups, and communities. F, Sp
504 Advanced Health/Physical Assessment (3) Development of advanced clinical reasoning and assessment skills to determine client health status and needs. Application of psychological, pathological, and psychosocial concepts with implications for advanced practice nursing. Didactic (2.5) and lab (5). F, Sp
505 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems; indications, contraindications, side and interactive effects of commonly prescribed drugs. Prereq: 301 or equivalent or consent of instructor. F, Sp
509 Graduate Seminar in Public Health (1) Same as Public Health 509, Exercise Sciences 509, Nutrition 509, and Social Work 509. F
510 Theoretical Foundations of Nursing (3) Historical evolution of the profession; nursing as a metaparadigm and selected philosophies; conceptual and theoretical models and theories as structures which guide critical thinking in analysis, reasoning, and decision making for advanced practice nursing. F, Sp
511 Statistical Applications to Nursing Research (3) Descriptive and inferential statistics: statistical concepts and applications to clinical settings and their applications to advanced practice nursing. F, Sp
515 Advanced Pathophysiology for Nursing Practice (3) Advanced physiologic and pathophysiologic concepts, principles, and theories applied to deviations of human systems. Sp
520 Advanced Practice Nursing and Health Delivery Systems (3) Nursing's role in dynamic health care delivery system: health and illness, organizational, social, ethical, political, economic, and technological factors which impact advanced practice nursing and delivery of health care. Sp
530 Adult Health Nursing I (4) Advanced practice for health promotion, restoration, and maintenance of young, middle-aged, and older adults. Theoretical and research to advanced practice with clinical application in various settings. Prereq: 504, F, Sp
531 Adult Health Nursing II (6) Continuation of 530. Preparation, provision, and management of health care for adult groups and communities. Prereq: 530. Didactic (2) and practicum (4). F, Sp
532 Nurse Practitioner (9) Exploration and application of holistic nursing concepts to management of common chronic health problems. Role redefinition and exploration of major issues in delivery of holistic primary nursing care. Clinical experiences vary depending on student's intent to pursue certification as family or adult nurse practitioner. Prereq: MSN in clinical concentration, 505 or equivalent, and consent of instructor. 3 hrs and 5 labs. Su
550 Nursing of Women and Children I (5) Advanced practice nursing for women and children; clinical experience in role of nurse practitioner or clinical nurse specialist in variety of settings. Health promotion and nursing interventions for actual or potential health problems of women and children. Prereq: 504, F, Sp
551 Nursing of Women and Children II (6) Continuation of 550. Role redefinition of nurse practitioner or clinical specialist in health maintenance and restoration for women, children, and families. Prereq: 550, Didactic (3) and practicum (5). F, Sp
552 Parent Child Nursing Field Work and Seminar (3) Seminar and clinical practicum designed to facilitate further development of specialized knowledge and skills utilized for advanced parent-child nursing practice. Prereq or coreq: 551. 1 hr and 3 labs. F
553 Nurse Midwifery Seminar I (1) Exploration of art and science of midwifery, nature and scope of midwifery practice, nursing philosophies, and professional ethical issues in advanced practice nursing. Prereq or coreq: 510, 515, 570. F
555 Nurse Midwifery Seminar III (1) Exploration of state of science in nurse midwifery, innovative practice options, and role of the nurse-midwife in midwifery practice. Prereq: 570, 571, Coreq: 500, 580 or 582. F
556 Mental Health Nursing I (6) Theories of advanced therapeutic interventions for clients experiencing actual and potential mental health problems; advanced practice nursing in specialty of mental health; clinical practice with clients of various ages in acute care and community settings. Prereq: 504. F, Sp
557 Mental Health Nursing II (6) Continuation of 556. Advanced practice nursing in community settings for families and groups with actual and potential mental health problems. Prereq: 560, Didactic (2) and practicum (4). F
558 Mental Health Nursing III (4) Advanced practice nursing in specialty of mental health; clinical practice with clients of various ages in acute care and community settings. Prereq: 504. Didactic (2) and practicum (4). F
559 Nurse Midwifery Seminar III (1) Exploration of state of science in nurse midwifery, innovative practice options, and role of the nurse-midwife in midwifery practice. Prereq: 570, 571, Coreq: 500, 580 or 582. F
560 Mental Health Nursing I (6) Theories of advanced therapeutic interventions for clients experiencing actual and potential mental health problems; advanced practice nursing in specialty of mental health; clinical practice with clients of various ages in acute care and community settings. Prereq: 504. Coreq: 501. F, Sp
561 Mental Health Nursing II (6) Continuation of 560. Advanced practice nursing in community settings for families and groups with actual and potential mental health problems. Prereq: 560, Didactic (2) and practicum (4). F
562 Teaching Practicum (1-6) Individually designed teaching experience in collegiate nursing program or alternative settings. Prereq: 564 or consent of instructor. F, Sp
563 Family Nurse Practitioner I (4) Application of advanced health/physical assessment and diagnostic reasoning in nursing management and primary care of and individuals and their families with actual and potential acute health problems; clinical experience in role of family nurse practitioner in variety of settings. Prereq: 504, 515, Coreq: 520, Didactic (2) and practicum (2). F, Sp
564 Family Nurse Practitioner II (6) Continuation of 563. Nursing management and primary care of individuals and their families in all developmental life stages; clinical experience in variety of settings. Prereq: 540, F, Sp
565 Family Nurse Practitioner III (7) Continuation of 564. Nursing management of chronic health problems of individuals and families in all developmental life stages; role redefinition and exploration of major issues in daily practice of family nurse practitioner; clinical experience in variety of settings. Prereq: 571, Didactic (2) and practicum (5). F, Sp
566 Special Topics (1-3) Topic is determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E
567 Scholarly Inquiry for Advanced Practice Nursing (3) Utilization of research process through experience in research, critical evaluation of research in area of interest. Conducted under faculty guidance and culminating in scholarly paper. Coreq: 501. May be repeated. Maximum 6 hrs. E
568 Directed Clinical Practice (1-9) Additional opportunities for advanced practice nursing. Prerequisites to be developed collaboratively by student and faculty. Prereq: Completion of or in progress towards advanced practice nursing and graduation in a specialized area of interest. Coreq: 501. F
580 Theory Analysis and Construction I (3) Nursing theory development; analysis of existing health and nursing theories; theory building from existing knowledge. Prereq: 510 or equivalent or consent of instructor. F
590 Nursing Administration I (6) Exploration, analysis, and application of selected organizational, management, and leadership theories and financial principles to delivery of nursing services. Structure, functions, organization, behavior, and adaptive processes of health care organizations. F, Sp
591 Nursing Administration II (6) Continuation of 590. Utilization of human and financial resources, conflict resolution, and organizational development with application to mid-level and top-level nursing administration positions. Prereq: 550. 2 hrs and 4 labs. F
593 Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E
600 Doctoral Research and Dissertation (3-15) P/NP only. E
601-02 Theory Analysis and Construction I, II (3,3) Nursing theory development; analysis of existing health and nursing theories; theory building from existing knowledge. Prereq: 510 or equivalent or consent of instructor. F, Sp
605-06 Nursing Research Seminar I, II (2,2) Selected topics pertaining to dissertation research process, research experience, and defense. Prereq: Completion of core courses. F, Sp
607 Qualitative Nursing Research (3) Exploration and analysis of philosophical bases, theoretical implications, methods, and data analyses of qualitative nursing research. Sp
608 Quantitative Nursing Research (3) Exploration and analysis of philosophical bases, theoretical implications, methods, and data analyses of quantitative nursing research. Prereq: F
609 Research Practicum I (1-3) Supervised individual or group research experience under guidance of faculty. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. F, Sp
610 Nursing Science Seminar (2) Critical analysis and synthesis of literature in selected focus area within nursing science. Prereq: Admission to doctoral program in nursing or consent of instructor. F
611 Advanced Nursing Seminar I (2) Exploration of historical and current issues of interest to doctorally prepared nurses. F
Nutrition
(College of Human Ecology)

MAJORS

DEGREES

Human Ecology ........................................Ph. D.
Nutrition .............................................M.S., M.S.-M.P.H.

Michael B. Zemel, Head

Professors:
Beauchene, Roy E. (Emeritus), Ph. D. .......... Kansas State
Rentfrow, Betty Ruth, Ph. D. ...................... Missouri
Namey, T. C., M.D. .................................. Washington (St. Louis)
Sherman, Deilee S., Ph. D. ......................... Illinois
Skinner, Jean D., Ph. D. ............................. Oregon State
Smith, John, Ph. D. ................................. Washington (St. Louis)
Zemel, Michael (Liaison), Ph. D. ............... Wisconsin

Associate Professors:
Bailey, James W., Ph. D. ......................... Iowa State
Brooks, M. D. (Memphis), M.S. ............... Alabama
Haughton, B., Ed.D. ............................... Loyola
Karstad, Michael, Ph. D. ......................... Iowa State
Moussa, Naime, Ph. D. ............................. Paris
Whelan, Jay, Ph. D. ............................... Penn State
Zemel, Paula, Ph. D. ............................... Wayne State

Assistant Professors:
Bittle, Joyce (Memphis), Ph. D. ............... Tennessee
Chencharick, Judith (Memphis), Ed.D. ........ Maryland

The Master of Science program is available in Nutrition, with a concentration in nutrition science or public health nutrition. A graduate degree combined with a Dietetic Internship (D.I.) beyond the baccalaureate degree qualifies the graduate to apply for the Registration Examination to become a Registered Dietitian (R.D.). Students may request more information from the department about the D.I. program. The Dietetic Internship is currently granted accreditation by the Commission on Accreditation for Dietetics Education of The American Dietetic Association, 216 W. Jackson Blvd., Chicago, IL 60606-6995, Tel: 312 899-5400. Students may also select an interdisciplinary minor in gerontology.

ADMISSION REQUIREMENTS

A complete file for review includes the Graduate School application form, Graduate Record Examination (GRE) scores for the General section, and three Graduate School Rating Forms completed by individuals who can attest to the applicant's potential for graduate education. Forms may be obtained from the Departmental Office, 229 Jesse Hall Building, University of Tennessee, Knoxville, 37996-1900. Forms may also be obtained from the Department's website at http://nutrition.he.utk.edu.

Admission into the graduate program in the department is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. Required undergraduate courses include: general and organic chemistry, physiological chemistry/biochemistry, physiology, statistics, and advanced nutrition. Admission to the Ph.D. program in Human Ecology with a concentration in Nutrition Science requires a master's degree. Applicants to all programs with related experience may be given preference.

THE MASTER'S PROGRAM

Students may choose a thesis or non-thesis option in Nutrition. Attendance at Nutrition 540 is required every semester.

Thesis Option: The program consists of a minimum of 33 hours with at least 18 hours of coursework in the department. NTR 511, 512, 540, 541 and 3 hours of graduate level statistics are required. Students in public health nutrition must take NTR 511, 512, 513, 514, 515, 541 and the minor in public health. Six hours of Thesis 500, and 6 hours outside the department are required. A minimum of 22 hours at the 500 or 600 level is required.

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

Non-Thesis Option: The program consists of a minimum of 36 hours with at least 20 hours of coursework in the department. NTR 511, 512, 540, 541, 2 hours from 542-544 and 3 hours of graduate level statistics are required. Students in public health nutrition must take NTR 511, 512, 513, 514, 515 and the minor in public health. Six hours in one area outside the department are required. A minimum of 24 hours at the 500 and 600 level is required.

A written comprehensive examination is required for completion of the program.

DUAL M.S.-M.P.H. PROGRAM

The College of Human Ecology offers a coordinated dual program leading to the conferral of both the Master of Science with a major in Nutrition (public health nutrition concentration) and the Master of Public Health. This program allows students to complete both degrees in less time than would be required to earn both degrees independently.

The program is designed to meet the needs of students who are interested in the benefits of majors in both nutrition and public health. Therefore, it accommodates the different needs of students who: 1) plan a career in public health nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional; 2) plan a career in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional; or 3) plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission Requirements

Applicants for the M.S.-M.P.H. program must make separate application to, and be competitively and independently accepted by, the Department of Nutrition for the M.S. degree and the Department of Health and Safety Sciences for the M.P.H., and the Public Health Academic Program Committee.

Students who have been accepted by both departments may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both departments. Such approval will be granted, provided that dual program studies be started prior to entry into the fourth semester of the M.S. and M.P.H. programs.

Curriculum

A dual degree candidate must satisfy the requirements for both the M.S. (public health nutrition concentration) and the M.P.H. degrees, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Health and Society (PH 555), two credits of Seminar in Public Health (PH 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of 9 semester hours of credit toward the M.S. degree for successful completion of approved graduate level courses offered in the Department of Health and Safety Sciences. The Department of Health and Safety Sciences will award a maximum of 11 semester hours of credit toward the M.P.H. degree for successful completion of approved courses offered in the Department of Nutrition. All courses for which cross-credit is awarded must be approved by the Public Health Academic Program Committee and the student's graduate committee. A single block field experience (or public health internship) is required of all students and the analytical field paper incorporates public health nutrition and the student's public health concentration.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit towards the M.S. or M.P.H. degree for courses taken in the other program, except as such courses qualify for credit without regard to the dual program.

Approved Dual Credit

M.S. courses to be counted toward the M.P.H. program must include 10 semester hours of Field Study in Community Nutrition (NTR 515) and 1 semester hour of Graduate Seminar in Public Health (NTR 509). M.P.H. courses to be counted toward the M.S. degree include Public Health Administration (PH 520), Biostatistics (PH 530), and Epidemiology (PH 540).
THE PH.D. CONCENTRATION

The nutrition science concentration enables students to study the science of nutrition from the cellular level to the application of nutritional principles by people in a changing environment.

The doctoral program emphasizes cellular/molecular nutrition, human nutrition, nutritional epidemiology, and experimental nutrition. Cognate areas may include anthropology, biochemistry, chemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and/or toxicology.

Minimum requirements include:
1. Sixteen hours in nutrition including 4 hours at the 600 level (exclusive of dissertation);
2. NTR 511, 512, 541, and 2 hours from either 542-544;
3. Four hours of NTR 540, attendance required every semester;
4. Six hours of statistics;
5. Six hours in a cognate area;
6. Nine hours at the 600 level;
7. Students without college teaching experience are required to take the fall semester teaching seminar for GTAs and NTR 548 comprising a faculty-supervised program in college teaching.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when the student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
506 Culture, Food, and Nutrition (3) Food-related behavior of individuals and groups in the United States. Sociocultural, economic, and technological influences. Nutrition and food surveys, public policy. Prereq: Advanced Nutrition or consent of instructor. F/A
509 Graduate Seminar in Public Health (1) Same as Public Health 509, Exercise Science 509, Nursing 509, and Social Work 509. F/A
511 Advanced Physiological Chemistry (4) Bioenergetics, flux control and hormonal interactions. Prereq: Advanced Nutrition or equivalent. F
513 Community Nutrition I (3) Orientation to community: assessment of nutrition problems, needs, and resources; functional roles of public health nutritionist. Concurrent field experiences. Prereq: Advanced Nutrition or consent of instructor. F
514 Community Nutrition II (3) Planning, implementation, and evaluation of public health nutrition programs. Concurrent field experiences. Prereq: 513 or consent of instructor. Sp
515 Field Study in Community Nutrition (1-12) Personal participation in and analysis of state or regional community nutrition program. Location of in-depth study to be selected in consultation with instructor. Prereq: 513, 514 and consent of instructor. S/NC only. Su
516 Maternal and Child Nutrition (3) Nutrition principles related to growth and development during pregnancy, infancy, and childhood to age 5, high risk conditions. Prereq: Advanced Nutrition or consent of instructor. F
517 Childhood and Adolescent Nutrition (3) Application of nutrition principles to school age children; effects of diseases on growth and health maintenance; nutritional assessment and counseling for nutrition.

Ornamental Horticulture and Landscape Design

(College of Agricultural Sciences and Natural Resources)

MAJOR

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

Robert N. Trigiano, Interim Head

Professors:

Albrecht, M. L., Ph.D. ................. Ohio State

Augé, R. M., Ph.D. ................. Washington State

Callahan, L. M. (Emeritus), Ph.D. ....... Rutgers

Crater, G. D., Ph.D. ................. Ohio State

Graham, E. T. (Emeritus), Ph.D. ....... Penn State

McDaniel, G. L., Ph.D. ............... Iowa State

Samples, T. J., Ph.D. ............... Oklahoma State

Trigiano, R. N., Ph.D. ............... NC State

Williams, D. B. (Emeritus), Ph.D. ....... Penn State

Associate Professors:

Day, J. W., Ph.D. ................. Mississippi State

Rogers, S. M., M.L.A. ............... Georgia

Starman, T. W. (Liaison), Ph.D. ....... Texas A&M

Witte, W. T., Ph.D. ............... Maryland

Assistant Professors:

Hamilton, S. L., Ed.D. ............... Tennessee

Klingerman, W. E., Ph.D. ............... Georgia

Menendez, G. L., M.S. ............... Tennessee

The Department of Ornamental Horticulture and Landscape Design offers the Master of Science degree with concentrations in horticulture, landscape design, turfgrass, woody ornamentals, and public horticulture. Various interests may be emphasized in any of these commodity areas, including micropropagation, innovative production and maintenance systems, and the molecular biology, genetic, ecology and stress physiology of ornamentals.

THE MASTER'S PROGRAM

Admission Requirements

Students having bachelor's degrees in fields both related and unrelated to ornamental horticulture may apply, although acceptance may require some prerequisite courses. For admission to the M.S. degree program, a student must meet all of the requirements of The Graduate School and must have completed (in semester hours): 12 hours of upper level courses in other fields; 6 hours of biology; 6 hours of chemistry; 6 hours of communication; 6 hours of sociology; 6 hours of economics; 6 hours of mathematics; 6 hours of social science; and 12 hours of professional courses. The student may substitute for some or all of these 12 hours with 6 hours of chemistry, 6 hours of biology, 6 hours of sociology, 6 hours of economics, 6 hours of mathematics, and 6 hours of social science. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields. The student must also have completed a minimum of 30 hours of college work, including 15 hours of upper level courses in other fields.
these hours may be satisfied by Botany 412, 521, 522, Plant and Soil Sciences 471, 522, Animal Science 571, Ecology and Evolutionary Biology 520, or Information Sciences 560. Human Resource Development 521, 522, 526, Art 481, and Anthropology 496.

3. Attendance at all graduate seminars each semester enrolled.
4. Preparation of a publication-ready, written or oral communication.

**Thesis Option:**
1. Satisfactory preparation of a written thesis proposal and its oral defense to the student's committee, prior to enrolling in 500.
2. Successful completion of 30 hours of graduate credit, which must include 6 hours of 500. At least 14 of these hours must be at the 500 level or above.
3. Preparation of a written thesis and its oral defense

**Non-Thesis Option:**
1. Successful completion of 34 hours of graduate credit, which must include 2-4 hours of 500. At least 22 of these hours must be at the 500 level or above.
2. Completion of a project and preparation of a written report summarizing the project.
3. Passing written and oral examinations covering the project and coursework.

**GRADUATE COURSES**

- **410 Nursery Management and Production (3)**
  Modern greenhouse 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. 3 hrs and 1 lab. Sp

- **426 Public Horticulture (2)**
  In-depth study of public horticulture industry. Diversity of public horticulture institutions, careers, and opportunities. Discussion of current topics and issues. Prereq: Senior standing in OHLD or consent of instructor. Sp

- **440 Advanced Turfgrass Management (4)**
  Principles and scientific basis of turfgrass culture: adaptation, ecology, physiology, soil fertility, and grass nutrition. Climatic influences, environmental interactions, turfgrass physiology of clipping and water management; design, construction, and management of golf courses and invertebrates, pest management. Prereq: 340 or consent of instructor. 4 hrs and 1 lab. Sp

- **451 Plant Disease Fungi (4)**
  (Same as Entomology and Plant Pathology 510.)
  Introduction to plant disease and fungi, including host-parasite interactions, disease epidemiology, and control strategies. Prereq: 220, 330, and Plant and Soil Science 210, or consent of instructor. 4 hrs and 1 lab. Sp

- **452 Stress Physiology (1)**
  (Same as Entomology and Plant Pathology 516.)
  Introduction to abiotic plant stress physiology: drought, flooding, salinity, pollutants, other stresses. Prereq: Introductory Plant Physiology or equivalent. 1 hr weekly for 5 weeks. Sp, A

- **455 Plant Pathology (1)**
  (Same as Entomology and Plant Pathology 515.)
  Introduction to plant disease and fungi, including host-parasite interactions, disease epidemiology, and control strategies. Prereq: 340 or consent of instructor. 4 hrs and 1 lab. Sp

- **456 Professional Practices in Landscape Construction and Management (2)**
  Professionalism, salesmanship, and management of landscape services industry. Interaction with industry representatives through special presentations. Prereq: Consent of instructor. F

- **460 Professional Practices in Landscape Construction and Management (2)**
  Professionalism, salesmanship, and management of landscape services industry. Interaction with industry representatives through special presentations. Prereq: Consent of instructor. F

- **485 Computer Aided Landscape Design (3)**

- **494 Professional Horticultural Communications (3)**
  Communication for public horticulturists through oral and written media. Communication skills using proper writing techniques and grammar, print media, brochure design using desktop publishing, slide show development, oral presentations, and video for educational and informational presentations in ornamental horticulture. Prereq: Agriculture 290 Microcomputer Applications to Problem Solving and senior standing.

- **500 Thesis (1-15)**
  (1-15) Library, field, or laboratory project under supervision of faculty member. Not for thesis candidates. May be repeated. Maximum 4 hrs. E

**Thesis Option:**
1. Successful completion of 30 hours of graduate credit, which must include 6 hours of 500. At least 14 of these hours must be at the 500 level or above.

**Non-Thesis Option:**
1. Successful completion of 34 hours of graduate credit, which must include 2-4 hours of 500. At least 22 of these hours must be at the 500 level or above.
2. Completion of a project and preparation of a written report summarizing the project.
3. Passing written and oral examinations covering the project and coursework.

**GRADUATE COURSES**

- **525 Plant Microtechnique (1)**
  Practicalsection of light and scanning electron microscopy methods for investigating aspects of plant and animal morphology and physiology. Prereq: 340 or consent of instructor. 1 hr and 4 labs weekly for 5 weeks. Sp, A

- **526 Public Garden Operations and Maintenance (3)**
  Principles and practices of summer annuals production and maintenance. Prereq: 220, 330, and Plant and Soil Science 210, or consent of instructor. 3 hrs and 1 lab. Sp

- **528 Public Garden Operations and Maintenance (3)**
  Principles and practices of summer annuals production and maintenance. Prereq: 220, 330, and Plant and Soil Science 210, or consent of instructor. 3 hrs and 1 lab. Sp

- **529 Internship (1-2)**
  Application of horticulture and design principles and practices in supervised, professional setting approved by department. S/NC or letter grade. E

- **530 Problems in Ornamental Horticulture and Landscape Design (1-3)**
  Independent study. Current topic related to technology, science or design. May be repeated. Maximum 6 hrs. E

**Pathology**

See College of Veterinary Medicine and Comparative and Experimental Medicine

**Philosophy**

(College of Arts and Sciences)

**MAJOR**

**DEGREES**

- Philosophy ............................................ M.A., Ph.D.
- Charles Reynolds, Acting Head

**Professors:**

- Aquila, Richard E., Ph.D. ........ Northwestern
- Cohen, Sheldon M., Ph.D. ........ Northwestern
- Davis, John W. (Emeritus), Ph.D. ...... Emory
- Edwards, Rem B. (Emeritus), Ph.D. .... Emory
- Graber, Glenn C., Ph.D. .............. Michigan
- Nelson, James L., Ph.D. .............. SUNY (Buffalo)
- Postow, Betsy C., Ph.D. .............. Yale
- Van de Vate, Dwight, Jr. (Emeritus), Ph.D. ......... Yale

**Associate Professors:**

- Bennett, James O., Ph.D. .......... Tulane
- Bohstedt, Kathleen Emmett (Liaison), Ph.D. .......... Ohio State
- Nolt, John E., Ph.D. ............... Ohio State

**Assistant Professor:**

- Hamlin, H. Phillips, Ph.D. .......... Georgia
- Kaplan, Jonathan, Ph.D. .......... Stanford

The Department of Philosophy offers graduate study leading to the Master of Arts and Doctor of Philosophy. The M.A. program includes thesis and non-thesis options and offers a concentration in medical ethics and in religious studies. The Ph.D. program also has a concentration in medical ethics. Detailed information may be obtained from the Director of Graduate Studies in Philosophy.

**THE MASTER'S PROGRAM**

The department offers both a thesis and a non-thesis option. The course requirements for an M.A. with thesis are 30 hours, including 6 hours in Philosophy 500. Of non-thesis hours, at least two-thirds must be in courses at or above the 500 level. No philosophy course numbered under 400 may be taken for graduate credit. There are no particular courses that M.A. students are required to take. The nature of the student's coursework should be determined in consultation with the student's faculty committee. The non-thesis M.A. requires 30
hours of coursework of which at least two-thirds must be in courses at or above the 500 level. Students seeking the non-thesis option must also pass a final written examination on all work offered for the degree. An additional oral examination may be required. As a part of the Master's degree, and in addition to a final comprehensive examination, a culminating (capstone) experience is expected.

Examples of culminating experiences include presenting a paper at a refereed national or regional philosophy conference, or presenting a paper at a departmental colloquium.

THE DOCTORAL PROGRAM

Students must hold an M.A. with a major in Philosophy or an equivalent degree when entering the Ph.D. program. Twenty-seven hours of coursework beyond the M.A. is required, of which 6 hours will be in courses numbered above 600. See the Philosophy Department Graduate Student Procedures for specific course requirements.

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, or multilingual (normally, foreign) students, whose native language (other than English) is one in which there is a significant body of philosophical literature, are exempted from the foreign language requirement. Students receiving the Ph.D. with concentration in medical ethics are also exempted.

CONCENTRATIONS

Medical Ethics

The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Detailed information concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Director of the Medical Ethics Program.

Religious Studies

The department has an M.A. program of graduate study with a concentration in religious studies. Details concerning the program may be obtained from the Director of Graduate Studies in the Department of Religious Studies.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.A. and Ph.D. programs in Philosophy are available to residents of the states of Alabama, Kentucky, or Texas; the Ph.D. program to residents of Louisiana, Mississippi, Virginia or West Virginia; and the M.A. program to residents of Delaware or Oklahoma. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

400 Special Topics (3) May be repeated when topic varies. Maximum 6 hrs.

411 Modern Religious Philosophies (3) (Same as Religious Studies 411.)

420 Topics in History of Philosophy (3) Figures or movements from antiquity through mid-twentieth century. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

435 Intermediate Formal Logic (3) Metatheory of formal logic and philosophy of logic. Prereq: Consent of instructor.

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.

462 Philosophy of Biology (3) Current issues: nature of natural selection, adaptation, and fitness; level of selection debate; nature of species; interaction of environment and organism, and others. Prereq: upper division coursework in philosophy or biology or consent of instructor.

472 Philosophy of Language (3) Problems of meaning, reference and truth. Relation between words and world. How sentences manage to be about the world. What is true? Prereq: 3 philosophy courses 200 level or above.

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.

479 Studies in Recent Continental Philosophy (3) Selected thinkers or topics: existentialism, phenomenology, hermeneutics, structuralism, post-structuralism. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

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

520 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when 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 Philosophical Research (3) Paper workshop (writing, revising papers, preparing papers ready to publish). Does not count toward hours required for degree. May be repeated. S/NC only.

520 Topics in Ancient or Medieval Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

522 Topics in Modern Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

524 Topics in Twentieth-Century Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

528 Topics in Contemporary Philosophy (3) Intensive critical work on themes in late 20th-century philosophy. May be repeated. Maximum 9 hrs.

540 Topics in Ethics or Value Theory (3) May be repeated. Maximum 9 hrs.

542 Topics in History of Ethics (3) Dominant movement and history of ethics. May be repeated. Maximum 9 hrs.

544 Topics in Applied Ethics (3) Single author, tradition, or topic in ethical theory, application to issues in health, business, technology, ecology, and other practical fields. May be repeated. Maximum 9 hrs.

546 Orientation to Medical Ethics (3) Survey of ethical theories in application to issues in medical ethics.

547 Ethical Issues in Mental Health (3) Values in "mental health" and "mental illness," informed consent in psychiatry, competence, patients' rights, involuntary hospitalization and treatment, and behavior control therapies.

548 M.A. Clinical Practicum (3) Series of clinical rotations at one or more local health care institutions. Open only to graduate students concentrating in medical ethics. Prereq: 547 and consent of Medical Ethics Committee and the UT MCK Graduate Education Committee

577 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

585 Special Topics (3) May be repeated. Maximum 9 hrs.

587 Advanced Clinical Medical Ethics (3) Critical concepts in medical ethics, relationship of theory to practice, and professional roles and responsibilities for health care ethics consultant. Open only to Ph.D. students concentrating in medical ethics. Prereq: Consent of Medical Ethics Committee.

590 Topics in Social and Political Philosophy (3) Philosophical problems concerning social and political life: family, freedom, justice; major theoretical responses: anarchism, social contract, Marxism. May be repeated. Maximum 9 hrs.

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

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

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

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

620 Topics in Ancient or Medieval Philosophy (3) May be repeated. Maximum 9 hrs.

622 Topics in Modern Philosophy (3) May be repeated. Maximum 9 hrs.

624 Topics in Contemporary Philosophy (3) May be repeated. Maximum 9 hrs.

640 Topics in Ethics or Value Theory (3) May be repeated. Maximum 9 hrs.

646 Topics in Applied Ethics (3) Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 9 hrs.

675 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

Physics and Astronomy

(College of Arts and Sciences)

MAJOR

Barnes, C. L. Ph.D. .................. California
Bingham, C. R. Ph.D. .............. Tennessee
Bliss, W. E. Ph.D. ........................ Michigan State
Breinig, M., Ph.D. .................. Oregon
Bugg, W. M., Ph.D. .................. Tennessee
Burgoon, J. (Distinguished Prof.), Ph.D. ........................................... Frie Universitat Berlin

DEGREES

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

Lee Riedinger, Head

Professors:

Lee Riedinger, Head
Departmental graduate programs leading to the M.S. and Ph.D. are also available at The University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in quantum optics and laser physics, atomic and molecular spectroscopy, fluid physics, and theoretical physics. For additional information, contact the department head.

ADMISSION REQUIREMENTS

A student who enrolls in The Graduate School with the intention of attaining an advanced degree in Physics will have completed an undergraduate major in Physics or an equivalent. Physics 311-12, 321, 361, 431-32, 421, 461, and 411-12 constitute the minimum courses prerequisite to graduate study.

A student who intends to present Physics as a graduate minor will have completed an undergraduate minor in Physics or an equivalent. Physics 311 and 431-32 constitute the minimum coursework prerequisite to a minor in Physics.

All first-year graduate students are required, for advising purposes only, to take a qualifying examination in undergraduate physics during the fall semester registration period.

THE MASTER'S PROGRAM

Thesis Option

This program is designed primarily for students intending to go into industrial or governmental laboratories as physicists. The course requirements include 24 semester hours of physics courses, which must include 12 semester hours taken in Physics 311-12, 511-12, 521-22, 531-32, 541-42, or 571-72. Each candidate must pass an acceptable thesis, 6 hours of 500 level or above, and 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 completion of 30 hours of coursework composed of 18 semester hours taken in Physics 311-12, 511-12, 521-22, 531-32, 541-42, and 571-72; 6 semester hours in a minor field; and for advanced students, 6 semester hours from other courses numbered above 400 (preferably of advanced laboratory nature). At least 15 hours must be taken at the 500 level or above. In addition, the candidate must pass a written examination administered by his/her committee.

THE DOCTORAL PROGRAM

All students are expected to take Physics 521-22, 531-32, 541-42, 551, 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 631-32 of students specializing in theoretical high-energy physics; Physics 671-72 of students in condensed matter and surface physics; and Physics 681-82 of students specializing in molecular spectroscopy. Students specializing in astrophysics may substitute Chemistry 572 for Physics 551, and should complete at least 6 semester hours from Chemistry 580, 670.

The courses Physics 531-32, 571-72, 521-22, 541-42 constitute the core curriculum. They are the usual basis for the departmental comprehensive examination which is normally taken by a well-prepared student after two years of graduate study.

The dissertation topic will be chosen with reference to one of the fields in which research facilities can be made available either at the University of Tennessee Space Institute laboratories in Knoxville; The University of Tennessee; or at other research facilities used by the University faculty.

Astronomy

GRADUATE COURSES

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary, consideration of quasars, pulsars, black holes, black holes, and other phenomena in the universe. Prereq: Physics 411 and 421 or equivalent.

414 Stellar 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, black holes, and other phenomena in the universe. Prereq: Physics 411 and 421 or equivalent.

421 Modern Optics (4) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces; mathematics of wave motion and interference effects. Rudiments of Fourier optics and holography. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

Physics

GRADUATE COURSES


421 Modern Optics (4) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces; mathematics of wave motion and interference effects. Rudiments of Fourier optics and holography. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.

431-32 Electricity and Magnetism (3,3) Electromagnetism, magnetostatics, coupled electric and magnetic fields, Maxwell’s Equations, electromagnetic waves and radiation. Prereq: 411. Introduction to Physics for Physical Science and Mathematics Majors or Permission of Instructor.
461-62 Modern Physics Laboratory (3,3) 461. Introduction to fundamental and modern techniques in experimental physics, and to theory and practice of data analysis. Selected experiments in nuclear, magnetic, and solid state physics, and modern optics. Prereq: Electronics Laboratory and either Fundamentals of Physics; Modern Physics 411, 461, or equivalent. Advanced laboratory experiments and experimental techniques in modern physics; experimental team work. Thorough quantum mechanical interpretation of results. Staff and report presentation of scientific reports. Prereq: 461. 6 hr lab per week.

490 Senior Seminar (1-3) Topic of current interest. May be repeated with consent of department. Maximum 6 hrs.

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

501 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose research area comittes with interests of student. Open to all graduate students in good standing. Prereq: Consent of department and research director. May be repeated with consent of department. Maximum 16 hrs. S/NC only. E

502 Registration for Use of Facilities (1) 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 to meet degree requirements. May be repeated. S/NC only. E

503 Physics of Fluids (3) Fluid physics, overview of fluid mechanics and associated computational techniques; general description of laminar and turbulent flows; subsonic and supersonic flows; boundary layers; jet flows; effects of gravity; steady flow; unsteady flow; potential flow, vorticity, vortex streets, Kelvin-Helmholtz instability; free surface flows; capillarity; wave propagation; viscosity; and stress, lubrication; and dye lasers.

506 Experimental Methods (3) Principles, real operational behavior, and hazards of laser systems, photodetectors, photon counting, interferometry, holography, image converters, image sensors, streak cameras, and fast framing cameras; high vacuum systems including cryogenic technology, data acquisition, and signal conditioning; specific laser systems; applications of laser interferometry, projection, and recording on photographic films; use of computers for analysis of data and interpretation of results. Prereq: 522. 3 hr lab per week.

507-508 Contemporary Optics (1-3) Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Use of computers for calculations and design of practical and sophisticated optical systems.

511-12 Theoretical Physics (3,3) Classical and quantum theories of physical systems, with limited use of mathematics. Prereq: 512, 513, 514, 515, advanced calculus, differential equations, and vector analysis.


525 Advanced Classical Mechanics (3) Canonical transformations, Hamilton-Jacobi theory and action-angle variables, KAM theorem and Hamiltonian chaos, dissipative chaos, smooth and fractal Brownian motion, relativistic scattering and threshold problems. Prereq: 531.


551 Statistical Mechanics (3) Ergodic theory, classical and quantum mechanics, entropy and temperature, statistical mechanics, probability theory, statistical thermodynamics, Bose-Einstein statistics, Planck statistics, Fermi-Dirac statistics, grand canonical ensembles, partition function, free energy, entropy, entropy of ideal gases, entropy of real gases, entropy of phase transitions, entropy of black holes, entropy of black holes in the AdS/CFT correspondence. Prereq: 522 or consent of instructor.

555 Solid State Physics (3) Elementary solid state physics. Crystal structures, reciprocal lattice, bonding in solids, energy bands, semiconductors, phonons, free-electron gas theory of metals, superconductivity, magnetism, and other forms of broken symmetry. Prereq: 522 or consent of instructor.

571-72 Mathematical Methods in Physics (3,3) Linear vector spaces, matrices, tensors, curvilinear coordinates, coordinate transformations, partial differential equations and boundary value problems, Green's functions, integral transformations, integral equations, spherical harmonics, Bessel functions, calculus of variations. Advanced calculus and differential equations. Must be taken in sequence. (Same as Mathematics 571-572.)


574 Group Theory for Physicists (3) Introduction to abstract group theory, discrete and continuous groups, representation theory, group symmetries and degeneracies, application of group-theoretical methods to atomic physics, solid-state physics, and particle physics. Prereq: 571-72.

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

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

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

594 Special Problems (3) Especially assigned theoretical or experimental work on problems not covered in other courses. May be repeated. Maximum 9 hrs. E


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


605 Laser Spectroscopy (3) Applications of lasers to spectroscopy of atomic and molecular systems; absorption, laser-induced fluorescence, and Raman spectroscopy; molecular angular and spherical harmonics, quantum beats, resonance fluorescence, photon echoes, self-induced transparency; saturation and Doppler-free spectroscopy; laser cooling and trapping. Prereq: 541.

606 Nonlinear Optics (3) Nonlinear optical susceptibilities, wave propagation in nonlinear media, sum-frequency and difference frequency generation, harmonic generation, parametric amplification and oscillation, stimulated Raman processes, two- and multiphoton processes, four-wave mixing and phase conjugation, transient coherent optical effects and free induction decay, optical breakdown and nonlinear effects in plasmas. Prereq: 522.

610 Quantum Optics (3) Theory of emission and absorption by atoms, quantum beats, Einstein's independent susceptibility, coherencetheory, field quantization and coherent photon states; interaction of radiation with atomic systems, counting and higher-order coherence, atomic coherent states. Prereq: 521.

611 Advanced Quantum Mechanics & Field Theory (3) Second quantization, quantization of relativistic field theory, quantum field theory methods for many-body problems and quantum fields, topics vary according to interest of student, instructor, and availability of physical resources. Prereq: 561 or 611 and consent of instructor.

613-14 Quantum Field Theory (3,3) Modern formulation of quantum field theory and its applications: second quantization of free and interacting fields; third quantization of field theory; quantum field theory in QED; perturbative methods; higher-order processes and renormalization; path integrals; general quantization of gauge fields; supersymmetry and QED and in SSU/CL x (1,1) theory; Quantum chromodynamics (QCD) and grand unified theories; TOE's (theories of everything, including quantum gravity). Prereq: 522 or consent of instructor.

621-22 Nuclear Structure (3,3) General properties of nucleus; two-body scattering problems; statistical and symmetry properties of nuclear forces; theory of light nuclei, nuclear spectroscopy; special nuclear models; nuclear reactions; theory of beta-decay. Prereq: 571-72.

626-27 Elementary Particle Physics (3,3) 626-27 Survey in elementary particle physics covering experimental results, conservation laws, invariance principles, and models of interactions. 627-Advanced topics: quark models, electroweak interactions and unification of elementary forces. Prereq: 522.

641 Advanced Topicals in Classical Theory (3) To meet special needs of students. Angular-momentum theory, beta-ray theory, theory of atomic spectra, introductory molecular theory, theory of radiation, electric and magnetic susceptibility, high energy processes, scattering and collision processes, or theory of fields. Prereq: 522. May be repeated with consent of department. Maximum 9 hrs.

642 Advanced Topicals in Quantum Theory (3) To meet special needs of students. Analogous-momentum theory, beta-ray theory, theory of atomic spectra, introductory molecular theory, theory of radiation, electric and magnetic susceptibility, high energy processes, scattering and collision processes, or theory of fields. Prereq: 522. May be repeated with consent of department. Maximum 9 hrs.


651 Collision Interactions (3) Interactions of electromagnetic radiation and charged particles with atoms and nuclei, capture of particles, scattering, ionization, transport and capture, collective effects, electron and ion stopping power. Prereq: 522.

663 Advanced Plasma Physics (3) (Same as Electrical Engineering 663.)

671-72 Advanced Solid State Physics (3,3) Lattice dynamics, phonons, Brillouin zone, dielectric constant, heat capacity. Energy band structure of solids, conduction and valence band structure, Fermi surfaces, superconductivity, Wannier and electron scattering from phonons, electrons, and defects. Excitations, polarons, surface
Planning

(College of Arts and Sciences)

MAJOR DEGREE
Planning ........................................ M.S.P.

David A. Patterson, Director

Professors:
Johnson, David A. (Emeritus), Ph.D. ... Cornell
Kenney, Kenneth B. (Emeritus), Ph.D. ... North Carolina
Prochaska, J. M. (Emeritus), M.U.P. ... Michigan State
Shouse, Walter L. (Emeritus), M.C.P. ... Harvard
Spencer, James A. (Liaison), M.C.P. ... Ohio State

Associate Professors:
Bowen, George E., M.A. ... George Washington
Patterson, David, D.B.A. ... Indiana
Tonn, Bruce, Ph.D. ... Northwestern

Assistant Professors:
Shupp, Terese, M.S.P. ... Tennessee
Zanetta, Maria C., Ph.D. ... Ohio State

The School of Planning offers a program of studies leading to the professional degree of Master of Science in Planning. The degree is the normal route for entry into professional positions in urban and regional planning or related positions. Graduates are candidates for positions in regional, city, county, and metropolitan planning agencies; in local, state, and federal agencies concerned with physical, economic, and administrative planning; in private business and organizations dealing with development problems; and in private consulting.

The Master of Science in Planning program is accredited by the Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners and the Association of Collegiate Schools of Planning.

THE MASTER'S PROGRAM

Admission Requirements
Applicants are to submit an application for admission to The Graduate School, and two letters of reference from faculty familiar with their prior academic work and a statement describing personal career objectives directly to the School of Planning. If the applicant has prior work experience in planning, a reference letter should also be provided by the work supervisor. Graduate Record Examination scores are requested of all applicants whose undergraduate GPA is below 3.0. Other applicants are encouraged to submit them. Students who have not taken an appropriate undergraduate statistics course will be required to take one.

Degree Requirements
The M.S.P. requires completion of at least 48 hours of graduate credit, at least 30 of which must be in planning. The following courses are the core curriculum required of all students: 510, 511, 512, 513, 520, 521, 523, 530, 531, 532, 540 and 570.

Students should plan to enter the program in the fall term to take core courses in the proper sequence.

Each student is required to develop an area of concentrated competence beyond the core curriculum. After selecting the area of concentration, usually by the end of the second semester, the student takes a minimum number of courses or hours from a prescribed set of courses in the subject area. Further enhancement of the concentration is gained by focusing the thesis or major study on the subject. Concentration courses are drawn from the planning curriculum and from other departments in the University. Concentrations are available in land use planning, environmental planning, real estate development planning, and transportation planning.

Students have the latitude to propose an alternate specialization consisting of at least 9 hours of coursework, subject to approval of a faculty committee. Each student is required to demonstrate competence in individual research. This may be done in one of two ways:

Thesis Option—Complete a thesis for 6 hours credit.

Non-Thesis Option—Complete a major study with acceptable documentation. To be eligible for the major study option, the student must have completed at least 12 hours of graduate coursework in planning with at least a 3.5 cumulative grade-point average. The student meeting these criteria may present a proposal to his/her committee for a major study that will include at least 6 hours of subsequent coursework. The proposal shall justify the selection of the topic, describe the approach to the study, and list the nature of the final product. The topic will normally be expected to reinforce or complement the student's concentration.

Successful completion of a comprehensive exam is required before graduation. The exam will normally be given after completion of the core requirements in the major field.

Based on the material generally used by the American Institute of Certified Planners (AICP), this requirement provides an additional capstone experience as well as preparation for meeting AICP professional certification requirements.

Student academic progress is monitored by the faculty. A student failing to maintain an acceptable grade-point average may be placed on probation or dismissed from the program.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

ACADEMIC COMMON MARKET

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

GRADUATE COURSES

401 The City in the U.S. (3) Development and character of U.S. cities. Contemporary issues and selected case studies. (Same as Urban Studies 401.)

402 Survey of Planning (3) History of city development and of planning; U.S. experience in urban and other levels of planning. State of the art, process, comprehensive plan, implementation devices. Planning issues in society. Not for credit for M.S.P. degree.


500 Thesis (1-15) PNP 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 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)

512 Community Planning Process (1) Planning process, policy process and development process. Field reconnaissance of study community and development approaches for assessing community.

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) Overall structuring of social science research in planning practice; familiarity with structure of planning literature; information sources, systematic retrieval techniques, processes and tools, practice in posing research questions relevant to planning.

521 Information Systems and Networks in Planning (3) Use and impact of computer-based information systems and global networks in planning and public management. Development of practical skills in design of planning and decision support systems, databases, Internet based tools and geographic information systems (GIS). Prereq: Basic experience with computer hardware and/or consent of instructor.

523 Statistics for Planners (3) Applications of statistical techniques. Intuitive explanations and practical applications. Computer analysis to explore concepts.


530 Policy and Land Use Analysis (4) Basic methods of policy analysis and planning. Concept and framework for land use planning. Population, employment, and economic base studies, and forecasting techniques. Coreq: 520 or consent of instructor.

531 Urban and Regional Analysis (3) Past, present and possible future patterns of urban and regional structures drawing on contemporary theories, models, and empirical research.

532 Planning Methods (4) Preparation of comprehensive plans for urban areas or regions. Development of baseline data and forecasting; formulation of alternative plans and strategies, and development of plan implementation programs. Extensive laboratory experience. Preq: 510, 512, 520, 530 and 531 or consent of instructor.
Plant and Soil Sciences

(College of Agricultural Sciences and Natural Resources)

MAJOR DEGREES

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

Fred L. Allen, Head

Professors:
Allen, Fred L., Ph.D. .................. Minnesota
Ammore, J. Tom, Ph.D. .............. West Virginia
Bell, Frank F., Emeritus, Ph.D. .... Iowa State
Coffey, David L., Ph.D. .............. Purdue
Conger, Bob V. (Distinguished Prof.), Ph.D. ......... Washington State
Deyton, Dennis E., Ph.D. .......... NC State
Foss, John E., Emeritus, Ph.D. ...... Minnesota
Fribourg, Henry A., Ph.D. .......... Iowa State
Hayes, Robert M., Ph.D. .......... Illinois
Howard, Donald D., Ph.D. .......... Auburn
Lewis, Russell J. (Emeritus), Ph.D. ...... NC State
Mullins, Charles A., Ph.D. ........ Tennessee
Parks, William L. (Emeritus), Ph.D. ...... Purdue
Reynolds, John H., Ph.D. .......... Wisconsin
Sams, Carl E., Ph.D. .............. Michigan State
Springer, Maxwell E. (Emeritus), Ph.D. ........ California
Swingle, Homer D. (Emeritus), Ph.D. ....... Louisiana State
Tyler, Donald D., Ph.D. ............ Kentucky
West, Dennis R., Ph.D. ............ Nebraska

Associate Professors:
Essington, Michael E. (Liaison), Ph.D. ........ California (Riverside)
Gwathmey, C. Owen, Ph.D. (Davis) ....... California
Lessman, Gary M., Ph.D. .......... Michigan State
Logan, Joanne, Ph.D. .............. Nebraska
Mueller, Thomas C., Ph.D. .......... Georgia
Mullen, Michael D., Ph.D. .......... NC State
Reich, Vernon H., Ph.D. .......... Iowa State
Wyatt, Jim E., Ph.D. ............. Florida

Assistant Professor:
Gale, Paula M. (UT Martin), Ph.D. .... Arkansas

Research Professors:
Lee, S. Y., Ph.D. .................. Wisconsin
Miller, Robert D., Ph.D. .......... Kentucky

Research Assistant Professor:
Pantalone, Vincent R., Ph.D. ........... NC State

The Department of Plant and Soil Sciences 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

Thesis Option

A written thesis based on original research is required. A graduate advisory committee will be assembled at the beginning of the student's program. The committee consists of the major professor, who acts as chair of the committee, and at least two other faculty members. Prior to conducting research, the student must develop a detailed written research proposal that shall be approved by the student's committee. Upon completion of the thesis, this committee will also conduct the final oral examination that integrates the thesis and coursework.

Six hours of 500 Thesis are required. In addition to the thesis hours, a minimum of 24 hours of graduate coursework is required. At least 14 of these hours must be taken in courses numbered 501 and above. The student must take at least 12 of the 24 hours in Plant and Soil Sciences courses, excluding 500. The student's committee may require additional coursework beyond the 24 hours if the student's progress or background indicates a need or deficiency. All students pursuing the M.S. degree must take the following courses: 509 Scientific Communication (1 hr); 503 Seminar (1 hr); 511 Soil-Plant Relations (3 hrs). The student must also complete a seminar in the Department and the research project.

All students pursuing a concentration in soil science must also take at least three of the following courses: 512, 513, 514, and 516. All students a concentration in plant breeding and genetics or in crop physiology and ecology must take two of the following courses: 552, 551, and 553.

A student who has started a degree under the thesis option is not eligible to transfer to the non-thesis option after the end of the first semester of graduate study or at the end of the first semester of graduate study or after receiving a graduate assistantship stipend for more than one semester. A student who has started under the non-thesis option may transfer to the thesis option upon approval of a potential major professor and the department head.

Non-Thesis Option

A student desiring the non-thesis option should declare this intention at the beginning of the first semester of graduate study, and must declare it before the beginning of the second semester. In lieu of a thesis, students are required to complete three hours of 593 for satisfactory participation in a single research program for a period of 12 weeks and the writing of an original, creative, and well-written report.

A graduate advisory committee will be assembled at the beginning of the student's program. The committee consists of the major professor, who acts as chair of the committee, and at least two other faculty members. This committee approves the student's plan of study and the participation and report on research activity from 593. In addition, this committee administers and evaluates a comprehensive written examination that serves to integrate the student's coursework.

In addition to three hours of 593, a minimum of 30 hours of graduate coursework is required. At least 20 hours must be taken in courses 501 or above. The
412 Soil Genesis and Classification (3) Soil genesis and formation; description and mapping of soil horizons; pedogenic processes; soil physical and chemical properties; soil classification. 3 weeks of field trips. Prereq: Soil Science. 2 hrs and 1 lab. F

413 Environmental Soil Chemistry (3) Composition and chemical properties of soils and processes that govern the behavior of chemicals in soil environment: clay mineralogy; soil organic matter; mineral weathering and stability; aqueous speciation; surface chemistry; ion exchange; and molecular interactions; soil redox; and soil acidity. Prereq: Soil Science or consent of instructor. F

414 Soil, Land Use, and the Environment (3) Soil as an environmental component and its properties affecting land use. Soil as resource in development planning: consideration of nonengineering aspects of soil site selection for land use; soil survey and resource data in land use; recognition and prevention of soil pollution. Prereq: Soil Science or consent of instructor. Sp

415 Soil Hydrology (3) Physical processes and conditions of soil water system. Relationships of soil properties to processes governing water movement. Prereq: Soil Science. 2 hrs and 1 lab. Sp

421 Physiology and Ecology in Agroecosystems (3) Plant physiological and ecological relationships to crop production from seedling to harvest. Interaction of crops with environment and sustainable agroecosystems. Prereq: Crop Science. 2 hrs and 1-2 hr lab. F

432 Bioclimatology (3) Earth systems and biotic interactions: interactions between global, regional, and local climates and biological systems; quantification of macroclimate and microclimate; albedo and heat exchange; interception and evaporation; and energy use of vegetation, soil, and water bodies. Prereq: Soil Plant Relations (3 hrs)

All students pursing a concentration in plant and soil sciences must also take at least three of the following courses: 512, 513, 514, and 516. All students pursing a concentration in plant breeding and genetics or in soil and plant physiology and ecology must take two of the following courses: 532, 551, and 553.

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 taken in Doctoral Research and Dissertation 600. A minimum of 26 hours must be completed in courses numbered above 500 exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 600. A minimum of 9 hours of graduate course work taken during the doctoral program must be outside the department in one or more cognate areas.

The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from outside the department. The committee must approve all coursework applied toward the degree, certify the student's mastery of the major field and any cognate fields, direct the research, and recommend the dissertation for approval and acceptance by the Graduate School.

GRADUATE COURSES

410 Soil Genesis and Classification (3) Soil genesis and formation; description and mapping of soil horizons; pedogenic processes; soil physical and chemical properties; soil classification. 2 weeks of field trips. Prereq: Soil Science. 2 hrs and 1 lab. F

411 Soil-Plant Relationships (3) Principles of mineral nutrition of higher plants; plant physiological characteristics that influence uptake of water and nutrients; functions of nutrient elements in plants; soil factors influencing nutrient availability to plants; important relationships at soil-plant-environment. Prereq: 413 or 411 or 412 or Crop Physiology. 3 hrs and 1 rec. F

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

501 Seminar Preparation (1) Application of speaking, writing, and organizational skills in preparation and presentation of scientific material to all scientific and general audiences. Prereq: Graduate Seminar in Scientific Communication. F,Sp

502 Preparation for Use of Facilities (3-15) Required for the student not registered in any semester when the student uses University facilities and/or takes course work beyond first degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Seminar (1) Presentations and discussion of current scientific material. May be repeated. Maximum 3 hrs. F,Sp

507 Professional Development Seminar (1) Same as Agriculture and Natural Resources 507. Animal Science 507, Biosystematics Engineering 507, Biosystematics Engineering Technology 507, Food Science and Technology 507, and Horticultural and Landscape Design 507. S/NC only. F

509 Scientific Communication (1) Same as Agriculture and Natural Resources 509. Animal Science 509, Food Science and Technology 509, and Horticultural and Landscape Design 509. F

511 Soil-Plant Relationships (3) Principles of mineral nutrition of higher plants; plant physiological characteristics that influence uptake of water and nutrients; functions of nutrient elements in plants; soil factors influencing nutrient availability to plants; important relationships at soil-plant-environment. Prereq: 511 or 413 or 411 or 412 or Crop Physiology. 3 hrs and 1 rec. F

512 Pedology (3) Physical and chemical weathering processes, factor analysis, soil forming processes. Prereq: 512 or consent of instructor. 2 hrs and 1 lab. Sp,A

513 Advanced Soil Chemistry (3) Chemical properties and processes that operate in soil environment: thermodynamics of soils, plants and surface chemistry of soils, soils, and surface properties; salinity, solubility, electrochemical equilibria; geochemical modeling of soil and sediment. Prereq: Soil Chemistry (3 hrs)

514 Advanced Soil Physics (3) Theory and mathematical relationships of soil and soil-water transport in saturated and unsaturated soil systems. Prereq: Geophysical Analysis of Soil and Land Use by Plants. Prereq: Soil Physics (3 hrs)

530 Integrated Pest Management (3) General and specific relations among environmental factors, pest organisms, and agricultural systems. Prereq: Crop Physiology and Ecology 530. 2 hrs and 1 2-hr lab. F

532 Environmental Crop Physiology and Ecology (3) General and specific relations among environmental factors, pest organisms, and agricultural systems. Prereq: Crop Physiology and Ecology 530. 2 hrs and 1 2-hr lab. F

536 Ecology of Grazing Land Systems (3) Multi-disciplinary, field-oriented course. Components and functions of grazing lands and how these vary in different ecosystems; research needs, objectives and techniques for soil-plant-animal research; forage live-stock ecology and systems; grazing lands (crops, pasture, rangeland, and forest); role of forages in conservation practices, wildlife habitats, and sustainable agriculture; and interactions involved with forages and livestock. Two-week field trip, inclusive of trip and transportation. Prereq: Consent of Instructor. Sp

551 Organismal Plant Genetics (3) Discovery of genetics, polyploidy, extrachromosomal inheritance, apomixis, incompatibility systems, mutation, controlling elements, quantitative inheritance and heritability. Prereq: General Genetics, 471 or equivalent. F,A

553 Plant Breeding Technologies (3) Principles and methodologies targeting genetic gain for crop improvement. Principles of qualitative and quantitative trait improvement. Prereq: General Genetics, 471 or equivalent. F,A

571 Design and Analysis of Biological Research (3) Same as Animal Science 571. F

593 Special Problems in Plant and Soil Science (1-3) May be repeated. Maximum 6 hrs. E

600 Research and Dissertation (3-15) May be repeated. Maximum 6 hrs. E
and germplasm in crop production, theory and application of quantitative methods in crop physiology and ecology research. May be repeated. Maximum 6 hrs.

605 Special Topics in Plant Breeding and Genetics (1-3) Genotype by environment interactions, estimation of quantitative parameters, mutations, chromosome dynamics, polyploidy, genetic engineering, interspecific hybridization, linkage, screening methods, genome organization. May be repeated. Maximum 6 hrs. E

613 Advanced Topics in Soil Chemistry and Fertility (2) Topics of current significance, scientific literature. Prereq: 513 or equivalent. Sp,A

614 Advanced Topics in Soil Biology and Biochemistry (2) Topics of current significance, scientific literature. Prereq: 516 or equivalent. F,A

615 Advanced Topics in Soil Physics, Genesis, and Morphology (2) Topics of current significance, scientific literature. Sp,A

633 Plant Metabolism (3) Metabolism of chemical compounds of economic importance in crop production: plant growth regulators, naturally occurring plant metabolites, and herbicides. Prereq: Botany 521 or 522 and organic chemistry or biochemistry. Sp,A

653 Plant Breeding (4) Development and utilization of concepts of quantitative parameters, introgressing heterosis, methods of selection, in vitro breeding, interspecific hybridization, stability parameters, genetic resistance and vulnerability to pests and environmental stresses. Prereq: 453 and 571 or equivalent or consent of instructor. 3 hrs and 1 lab. Sp,A

Political Science
(College of Arts and Sciences)

MAJORS

DEGREES

Political Science .................. M.A., Ph.D.
Public Administration ............. M.P.A., J.D.-M.P.A.

Patricia Freeland, Head

Professors:
Cunningham, Robert B., Ph.D. ....... Indiana
Fitzgerald, Michael R., Ph.D. ....... Oklahoma
Freeland, Patricia K. ............... Wisconsin (Milwaukee)
Gant, Michael M., Ph.D. ........... Michigan State
Gorman, Robert A., Ph.D. .......... New York
Lyons, William, Ph.D. ............. Oklahoma
Peters, John, Ph.D. ................. Illinois
Plaas, Hyram, Ph.D. ................... Utah
Scheb, John M., II, Ph.D. .......... Florida
Smith, T. Alexander, Ph.D. ....... Ohio State
Stephens, Otis H. (Distinguished Prof.), Ph.D. .......... Johns Hopkins
Urquino, Thomas D. (Emeritus), Ph.D. .......... Iowa
Weltin, David M. (Emeritus), Ph.D. .......... Texas

Associate Professors:
Folz, David H. (Liaison), Ph.D. .... Tennessee
Houston, David J., Ph.D. .......... SUNY (Binghamton)
Nowins, Anthony J., Ph.D. ......... Kansas
Peterson, Robert L., Ph.D. ........... Yale
Zhong, Yang (Liaison), Ph.D. ....... Kentucky

Assistant Professors:
Kelly, Janet, Ph.D. ................. Wayne State
Van Cott, Donna, Ph.D. ............ Georgetown

The Department of Political Science offers the M.A., M.P.A., and Ph.D. The department also offers a dual program with the College of Arts and Sciences.

of Law. Inquiries concerning all programs should be directed to the departmental office.

ADMISSION REQUIREMENTS

Three departmental recommendation forms must be submitted to The Graduate School, at least two of which must be completed by instructors at the institution most recently attended. In addition, scores on the general portion of the Graduate Record Examination must be submitted.

THE MASTER OF ARTS PROGRAM

A Bachelor's degree or its equivalent is required for admission. Normally an overall average of 3.0 is also required together with an average of 3.2 in the last two years of political science or social science. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Themes pursuing the Master of Arts degree may follow one of two options:

Thesis Option: (30 hours) Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512). Six hours may be earned through thesis credit.

Non-Thesis Option: (36 hours) Coursework, plus a written comprehensive examination on all coursework is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512), and 3 hours in the 600-level research seminar in the student's first field of interest.

THE MASTER OF PUBLIC ADMINISTRATION PROGRAM

The M.P.A. program is intended to prepare students for public service careers by acquainting them with management principles, analytical tools, and the ethical dilemmas they will face as public administrators. It consists of a total of 39 semester hours, including a core program, an elective specialization and a recommended internship.

Applicants for admission to the program must have a Bachelor's degree or its equivalent. Normally, an overall average of 3.0 and an average of 3.2 in the last two years of political science or social science courses is required. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students must demonstrate proficiency in the use of software applications for the personal computer. This requirement can be fulfilled by achieving a satisfactory grade in Political Science 596, Workshops in Computer Applications. Exceptions to this requirement will be considered on an individual basis.

The M.P.A. is a non-thesis program requiring 39 hours. Specific requirements include the following:

1. Core Curriculum (24 hours)
   a. General perspectives (9 hours) - 539 State and Local Government; 540 Public Administration; 541 Policy Analysis; Theory; and any one of the following: 539 State and Local Government; 540 Public Law; 546 Law and the Administrative Process; 548 Public Policy Process; 558 The

Politics of Administration; or 566 Ethics, Values, and Morality in Public Administration.

2. Analytical skills (6 hours) - 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.

3. Management skills (9 hours) - 560 Public Budgeting and Finance; and any two of the following: 562 Public Management; 564 Human Resources Management; 556 Policy Analysis.

4. Specialization (9 hours)
   A specialization is designed by the student in consultation with the coordinator of the M.P.A. degree program. Possible specializations include general government, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.

5. Recommended Internship (6 hours) Internships are arranged in consultation with the coordinator of the M.P.A. degree program.

6. Final Examination
   A written final examination, which may be followed by an oral examination, is required.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science in the College of Arts and Sciences offer a coordinated dual degree program leading to the conferment of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the M.P.A. and J.D. degrees in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must make separate applications 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 500 level) offered in the Department of Political Science. The M.P.A. program will award a maximum of 9 semester hours of credit toward the M.P.A. degree for successful completion of
Approved courses offered in the College of Law. All courses for which such cross-credit is awarded must be approved by the J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (Law 82) and are encouraged to take Local Government Law (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.

1. During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the M.P.A. program. During those first two years, students may not take courses in the opposite area, without the approval of the J.D.-M.P.A. coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the J.D. or the M.P.A. degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Awards of Grades

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student's GPA or class standing. The College of Law will award a grade of Satisfactory for an approved M.P.A. course in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of 2.3 or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade assigned by the instructor without conversion.

The Doctoral Program

The Ph.D. program prepares students for careers in college teaching, as well as careers in other occupations related to service in the public or private sectors. Applicants for admission to the program should normally have completed a master's degree in political science or a related field with a 3.5 GPA and have earned a composite score of at least 1100 on the verbal and quantitative parts of the Graduate Record Examination.

Doctoral students admitted to the program must complete 84 hours beyond the bachelor's degree. Of these 84 hours of coursework beyond the master's degree, graded A-F, must successfully pass written and oral comprehensive examinations in three broad subfields of political science, and must pass a final oral examination on the dissertation.

In addition, students must satisfy a research tool requirement. Usually, students meet this requirement by completing 12 hours of coursework numbered above 500 in empirical theory and research methodology. However, if a student's advisor and program committee certify that competency in a foreign language is more appropriate research tool, a foreign language can be used instead.

In addition to the total hours required for the degree, the following requirements must also be met:

1. At least 69 hours must be in political science courses.
2. At least 54 hours in political science courses must be in courses numbered above 500.
3. Completion of the Political Science 510, 511, and 512.
4. Completion of at least three courses or seminars in each of the three broad subfields in which the student takes examinations.
5. Completion of at least one course or seminar in each of six broad subfields available for graduate instruction in the department.
6. At least 8 hours must be earned in political science courses numbered above 500.
7. A total of 24 hours must be earned by writing the dissertation.

Minor in Environmental Policy

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

Graduate Courses

430 United States Constitutional Law: Sources of Power and Restraint (3) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights.

411 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.

45 Criminal Law and Procedure (3) Substantive and procedural law in criminal justice field, constitutional questions and public policy issues.

442 Administrative Law (3) Legal dimensions of administrative power and procedures, and constitutional controls over administrators.

452 Black African Politics (3) Recent evolution and current political environment of Black African nations. (Same as Afro-American Studies 452.)

454 Government and Politics of China and Japan (3) Examination of the political setting, structure and political processes in China and Japan.

459 Government and Politics of the Soviet Union (3) Origins and development of Soviet political system, and study of selected policy areas.

461 Policy Making in Democracies (3) Comparative approach to theory and process of making public policies.

463 Contemporary Middle East Politics (3) Government and politics in Middle East, their characteristics, bases, and interrelationships.

470 International Law (3) Nature and development of international law and compliance. Function of international law in context of international conflict.

475 Ancient and Medieval Political Thought (3) Survey of major western political thinkers from Socrates to Marsilio of Padua.
base systems, computer applications, and training for management information technology.

566 Policy Analysis (3) Strategies and techniques for identification and analysis of public problems and policy solutions. May be repeated with consent of department. Maximum 9 hrs.

558 The Politics of Administration (3) Examination of public administration in context of American political system, policy making and political roles of public administrators and agencies. May be repeated with consent of department. Maximum 9 hrs.

550 Public Budgeting and Finance (3) Technical and political aspects of planning, preparing and adopting government budgets. Management implications, including revenue collection, debt management, treasury functions, accounting, internal auditing, purchasing risk management, and post-auditing.

562 Public Management (3) Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies in public sector. May be repeated with consent of department. Maximum 9 hrs.


566 Ethics, Values, and Morality in Public Administration (3) Morality and ethical dilemmas confronting administrators in American political system.

568 Comparative Government and Politics (3) Selected topics in modern governments. May be repeated with consent of department. Maximum 9 hrs.

567 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.

572 Area Seminar in Comparative Government and Politics (3) Selected topics in area studies; African, Asian, 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.

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

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

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

594 College Teaching in Political Science (1) Instructional effectiveness, techniques, organization, materials for teaching political science at college level. Preprq: Consent of instructor. S/N only.

595 Readings and Special Problems in Political Science (1-3) Reading or study under the direction of instructor. May be repeated. Maximum 15 hrs.

596 Workshops in Computer Applications (1) Training in software applications to support research and decision making tasks in public service. Successful completion certifies proficiency of MPA students in use of software applications for personal computer. S/N only.

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

610 Special Topics in Empirical Methodology (3) Advanced methods and procedures of analysis in political science. May be repeated with consent of department. Maximum 9 hrs.

615 Formal Political Analysis (3) Assumptions, methods and applications of formal political models, including game theory, rational choice theory, and public choice theory, and mathematical modeling. May be repeated with consent of instructor. Maximum 9 hrs.

628 Topics in Political Theory (3) Selected issues and problems in normative political theory. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

639 Special Topics in American Government and Politics (3) Advanced study of selected topics. May be repeated with consent of instructor. Maximum 9 hrs.

640 Special Topics in U.S. Constitutional Law (3) Systematic analysis of published research and judicial decision; development of constitutional law as major component of public policy. May be repeated with consent of department. Maximum 9 hrs.

654 Contemporary Public Policies (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor. May be repeated with consent of department. Maximum 9 hrs.

660 Contemporary Perspectives on Public Administration (3) Development of theory in public administration: contemporary critiques and alternatives. May be repeated with consent of instructor. Maximum 9 hrs.

668 Special Topics in Public Administration (3) Analysis of selected issues and problems in public administration. May be repeated with consent of instructor. Maximum 9 hrs.

670 Special Topics in Comparative Government and Politics (3) Research into selected topics. May be repeated with consent of department. Maximum 9 hrs.

682 Theory and Analysis of U.S. Foreign Policy Processes (3) Theoretical approaches to decision making in foreign policy area and analysis of policy making process. May be repeated with consent of department. Maximum 9 hrs.

686 Special Topics in International Politics (3) Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

THE MASTERS’ PROGRAM

Graduate study leading to the M.A. degree in psychology is available with a concentration in experimental psychology. This program is appropriate for students who desire a master’s degree as part of their progress toward a doctorate or for those who wish to complement a degree in a different field.

Admission

Any student with a B.A. or B.S. may apply to the Department of Psychology for admission to the master’s program. All students must also submit scores from the Graduate Record Examination (general and subject).

Major Advisor and Committee

Initially, the Director of Experimental Psychology will advise the student. As soon as possible, the student must select an advisor and obtain his or her approval for registration. Subsequently, the advisor and student will select two additional faculty members to comprise the student’s committee. Final committee approval comes from the Graduate Dean, upon recommendation by the Department Head.

Program Requirements

All students must complete 30 semester hours of graduate level courses in psychology. These hours must include 504-05, or 531-32 or an equivalent sequence; 565 or 420; six semester hours of Thesis 500; and twelve hours of 500- or 600-level foundation courses. Students must earn a grade of B or better in all courses that are to count toward the 30-hour total. Students must also propose, conduct and successfully defend an original piece of research in the form of a master’s thesis.

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 experimental psychology or clinical psychology. The doctoral program with a concentration in ethology is offered through the Life Sciences program. Doctoral study in industrial and organizational psychology is offered through the Intercollege program in Industrial and Organizational Psychology, to which application is made through the Department of Management.
### Experimental Psychology

The Ph.D. program in Psychology with a concentration in experimental psychology is designed to allow students to select from a variety of specializations oriented toward careers in research, teaching, and application of psychology in academic, institutional, or industrial settings. The program is flexible, individualized, and emphasizes a professional apprenticeship model of training. A full description of the program is given in the "Handbook for Students in Experimental Psychology," available from the department.

The basic requirements are:

1. Twelve semester hours of statistics and research (504-05 or Statistics 531-32 or equivalent and 6 additional hours in research methods or design).
2. Fifteen semester hours in experimental psychology (565 or equivalent and 4 courses from the following: 510, 511 or 512, 513, 543, 546 or 547, 550, 560, and 570 or 571).
3. Six semester hours of research practicum (509).
4. Psychology 528 - preparation for graduate teaching.
5. Two 600-level graduate seminars.
6. Six semester hours of graduate level courses outside the Psychology Department.
7. Predissertation research project involving the collection of original data or the original analysis of existing data, reported in publishable form and accepted by the student's advisory committee.
8. Comprehensive examination, determined and evaluated by the student's doctoral committee. This examination is comprised of an integrative review of theoretical papers and an oral exam or additional questions.
9. Twenty-four hours of dissertation research (600).
10. An original piece of research in the form of a doctoral dissertation, proposed, conducted, and defended.

### Clinical Psychology

This program is designed to lay the groundwork for a career as a clinical psychologist capable of working in both academic and applied settings. The program emphasizes the theoretical foundations of psychology as well as supervised experience oriented toward the development of practical skills. The program embodies a model of clinical psychology in which practice and research are integrated.

Clinical program students must complete a predissertation research project by the end of the second year. After forming the doctoral committee, students must then pass a comprehensive examination administered and evaluated by the committee. This examination is comprised of two parts, one addressing a topic of the student’s choice, and the second addressing an understanding of one individual’s personality and cognitive functions. 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). Finally, students must complete an acceptable doctoral dissertation and conduct a satisfactory oral defense of the dissertation. Requirements are as follows.

### GRADUATE COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>Cognitive Psychology: Language and Symbolic Processes (3)</td>
</tr>
<tr>
<td>403</td>
<td>Psychology of Knowledge, Perception, Learning, Thinking, Motivation (513)</td>
</tr>
<tr>
<td>404</td>
<td>Experimental Psychology (504)</td>
</tr>
<tr>
<td>405</td>
<td>Research Design (505)</td>
</tr>
<tr>
<td>406</td>
<td>Research Questions and Designs (560)</td>
</tr>
<tr>
<td>407</td>
<td>Psychological Assessment I and II (594-95) and Laboratory (596)</td>
</tr>
<tr>
<td>408</td>
<td>Empirical Methods in Psychology (504) and Research Design (505)</td>
</tr>
<tr>
<td>409</td>
<td>Social Psychology (550)</td>
</tr>
<tr>
<td>410</td>
<td>Field Placement in Clinical Psychology (595) (18 hrs.)</td>
</tr>
<tr>
<td>411</td>
<td>Dynamics of Psychopathology (573) and Psychometrics (555) or Applied Psychological Measurement (567)</td>
</tr>
<tr>
<td>412</td>
<td>Ethical, Legal and Professional Issues in Psychology (528)</td>
</tr>
<tr>
<td>413</td>
<td>Psychology of Psychotherapy I and II (570-71) and Laboratory (572) (4 hrs.)</td>
</tr>
<tr>
<td>414</td>
<td>Doctoral Research and Dissertation (600) 24 hrs.</td>
</tr>
</tbody>
</table>

---

400 Cognitive Psychology: Language and Symbolic Processes (3) Survey of physiological and psychological theories of perception, attention and cognition. Prereq: General Psychology or consent of instructor. Statistics in Psychology or Psychological Reasoning or Introduction to Statistics or graduate standing.

403 Psychology of Religion (3) History of psychology of religion: various philosophical and empirical orientations. Prereq: General Psychology or consent of instructor.

404 Measurement and Testing (3) Theory of test construction and psychological measurement. Statistical methods in measurement. Survey of existing tests. Prereq: General Psychology or consent of instructor.


410 Sensory Processes & Perception (3) Survey of physiological and psychological theories of perception, attention and cognition. Prereq: General Psychology or consent of instructor. Statistics in Psychology or Psychological Reasoning or Introduction to Statistics or graduate standing.

415 Psychology of Religion (3) History of psychology of religion: various philosophical and empirical orientations. Psychological function of religion for individuals and society. Prereq: General Psychology or consent of instructor.

420 History and Systems of Psychology (3) History of psychological thought. Classical approaches and recent developments. Prereq: General Psychology or consent of instructor.

424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: General Psychology or consent of instructor.

430 Health Psychology (3) Survey of psychological factors related to health and illness: stress, personality, and environment. Applications of psychological treatments to physical illness. Prereq: General Psychology or consent of instructor.

434 Psychology of Gender (3) Biological, psychological, and social factors in gender: importance of gender roles and stereotypes for behavior and experience. Prereq: General Psychology or consent of instructor.

440 Organizational Psychology (3) Social-psychological analysis of organizations, role-theory and systems theory. Prereq: General Psychology and Social Psychology or consent of instructor.


450 Comparative Animal Behavior (3) (Same as Ecology and Evolutionary Biology 450.)

459 Comparative Animal Behavior Laboratory (3) Coreq: 450. (Same as Ecology and Evolutionary Biology 459.)

461 Physiological Psychology (3) Nervous system and physiological correlates of behavior. Biological basis of emotion, learning, memory, and stress. Prereq: General Psychology or consent of instructor.

470 Theories of Personality (3) Survey of major theories of human personality and their development. Prereq: General Psychology or consent of instructor.

475 Adolescent Development (3) Theoretical perspectives and empirical research findings pertinent to adolescent development. Prereq: General Psychology or consent of instructor.

480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: General Psychology or consent of instructor.

482 Topics in Psychology (3) Intensive analysis of special topics: Afro-American psychology or evaluation of programs in community. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hrs.

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

502 Registration for Use of Facilities (3-15) Required for all the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
504 Empirical Methods in Psychology (3)
Data management. Techniques for reducing and presenting data: charts and tables. Basic descriptive statistics. Prereq: Consent of instructor.

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. Sp

507 Foundations of Applied Psychology (3)
Fundamental methods for application of psychology principles and techniques in community, organizational, and industrial settings, and related empirical and theoretical issues. Prereq: 505 and consent of instructor.

508 Readings and Special Issues in Psychology (1-3)
Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

509 Research Practicum (1-3)
Required of first-year graduate students in psychology. May be repeated. Maximum 9 hrs. SNC only. E

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 development: physical, cognitive, and emotional development from conception through infancy, childhood, and adolescence. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F

512 Life-Span Development (3)
Theories and research concerning normal human development throughout life, adulthood, and old age. Prereq: Consent of instructor.

513 Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (3)
Intensive survey. Prereq: Consent of instructor. F

515 Colloquium in Experimental Psychology (1)
Research and practical issues in experimental psychology. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. SNC only. F,Sp

516 Colloquium in Ethology (1)
Current research and theory. May be repeated. Maximum 5 hrs. (Same as Ecology and Evolutionary Biology 516.) SNC only. E

525 General Vertebrate Neuroanatomy (3)
Lecture and laboratory. Structure and functioning of central and peripheral nervous system. Prereq: 461, 469, or equivalent and consent of instructor. Prereq: Consent of instructor.

527 Behavioral Neurology (3)
Disorders of nervous system, organic brain dysfunctions. Diagnosis and treatment. Prereq: Consent of instructor.

528 College Teaching in Psychology (3)
Concepts, techniques, and materials for teaching psychology at college and university level. Supervised practice. Prereq: Consent of instructor. SNC only.

543 Cognitive Science (3)
Theories and research. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

545 Advanced Animal Behavior (3)
(Same as Ecology and Evolutionary Biology 545.)

546 Ethological Psychology (3)
Basic ethology and comparative psychology. Implications for human behavior. Prereq: Consent of instructor. F

547 Conceptual Foundations of Evolution and Behavior (3)
Critical evaluation of seminal writings on theory and methods in comparative analysis of behavior. (Same as Ecology and Evolutionary Biology 547.)

550 Social Psychology (3)
Survey of theory and research concerning social interaction in both individual behavior in social context. Prereq: Consent of instructor. F

554 Laboratory in Psychometrics (3)
Further learning about psychometrics theories: item response theory (modern factor analysis), factorial study, and applications of those methods using computer programs to simulated or empirical data. Prereq: 555. May be repeated. Maximum 6 hrs.

555 Psychometrics (3)
Basic concepts: factor analysis, scaling, test theories, probability models and their applications, computerized adaptive testing and other topics. Prereq: Statistics 537-538 or equivalent. May be repeated. Maximum 6 hrs.

557 Applied Psychological Measurement (3)
Issues and techniques in applying psychological measurement in organizational, clinical, and research settings. Prereq: Statistics 537-538 or equivalent or consent of instructor. May be repeated. Maximum 6 hrs.

558 Interviewing and Observation (3)
Sensitizing students to own feelings and beliefs and to feelings of interviewees, and analysis of language content, style, and body language. Exploration of various important aspects of interviewee's life. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 529.

559 Laboratory in Interviewing and Observation (1)
Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 558.

560 Psychology of Learning (3)
Review of current evidence from research involving human and/or non-human animals. Prereq: 500 and consent of instructor. May be repeated. Maximum 6 hrs.

565 History and Systems of Psychology (3)
History of philosophy concerning psychology. Major systems of psychology which emerged during 20th century. Prereq: Graduate standing. Sp

570 Personality: Theory and Research I (3)
Advanced survey of psychodynamic and neo-Freudian approaches to personality. Prereq: Consent of instructor. Coreq: 529.

571 Personality: Theory and Research II (3)
Advanced survey of behavioral and humanistic approaches to personality: related research. Prereq: Admission to clinical program or consent of instructor. Sp

573 Descriptive and Theoretical Psychopathology (3)
Current psychiatric taxonomic system and theories of etiology for various diagnostic categories. Prereq: Consent of instructor. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. F

575 Psychopharmacology (3)
Connections between pharmacology and psychology. Prereq: Consent of instructor.

577 Object Relations (3)
European and American conceptions of normal and psychopathological development of object relations. Significance for psychotherapy, psychoanalysis, and psychoanalytic therapy. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

580 Research Questions and Designs (3)
Question-asking process in research and strategies or designs through which answers might be derived. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. F

583 Independent, Off-campus, or Foreign Study (1-15)
Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. SNC only.

594 Psychological Assessment I (3)
Basic concepts and techniques of adult assessment: intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Sp

596 Psychological Assessment II (3)
Basic concepts and techniques of adult assessment, intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. F

598 Laboratory in Psychological Assessment (1)
Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 554 or 558. May be repeated. Maximum 4 hrs. SNC only. Sp

600 Doctoral Research and Dissertation (3-15)
Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

601 Seminar in Psychology (3)
Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

610 Seminar in Applied Psychometrics (3)
May be repeated. Maximum 9 hrs. Prereq: 554, 557, and consent of instructor.

613 Seminar in Existential-Phenomenological Psychology (3)
Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

617 Seminar in Cognitive Science (3)
Prereq: 543 and consent of instructor. May be repeated. Maximum 12 hrs.

623 Seminar in Methods of Naturalistic Research (3)
Prereq: 548 or consent of instructor. May be repeated. Maximum 6 hrs.

635 Ethical, Legal, and Professional Issues in Psychology (3)
Research, human services, teaching and public policy. Prereq: Admission to doctoral program in psychology or consent of instructor. (Same as Counselor Education and Counseling Psychology 535 and Psychoeducational Studies 563.) SNC only.

670 Psychotherapy I (3)
Prereq: Admission to doctoral program in clinical psychology or consent of instructor. F

671 Psychotherapy II (3)
Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Sp

673 Laboratory in Psychotherapy (2)
Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 670 or 671. May be repeated. Maximum 6 hrs. SNC only.

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.

695 Field Placement in Clinical Psychology (3)
Prereq: Admission to doctoral program in clinical psychology and consent of instructor. May be repeated. Maximum 24 hrs. SNC only. E

696 Advanced Psychology Clinic Placement (1-3)
Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 695. May be repeated. Maximum 24 hrs. SNC only. E

697 Supervised Field Work in Applied Psychology (1-6)
Guided practice in applying psychological principles and techniques in industrial, organizational, and community settings. Prereq: 505, 507, 557, and consent of instructor. May be repeated. Maximum 12 hrs. SNC only.

Religious Studies

Religious Studies

(College of Arts and Sciences)

Charles H. Reynolds, Head

Professors:
Dungan, David L., Th.D. .................. Harvard
Hackett, Rosalind I. J., Ph.D. .......... Aberdeen
Humphreys, W. Lee, Ph.D. .............. Union
Linge, David E., Ph.D. .................. Vanderbilt
Norman, Ralph V., Jr., Ph.D. ........... Yale
Reynolds, Charles H., Ph.D. ........... Harvard
Schmidt, Gilya G., Ph.D. ............... Pittsburgh

Associate Professors:
Fitzgerald, James L., Ph.D. ............. Chicago
Gwynee, Rosalind W., Ph.D. .......... Washington
Hodges, John O., Ph.D. ............... Harvard
Husheiter, Mark, Ph.D. ............... Minnesota
Levering, Miriam L., Ph.D. ............. Harvard

A master's degree in Philosophy with a concentration in religious studies is available. Contact the department for details of this program. Graduate courses in religious...
studies provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

**GRADUATE COURSES**

405 Modern Jewish Thought (3) History, culture, and geography of the now Israeli portion of Levant from 1850 to present. Founding of modern state of Israel in 1948 and political complexities of Middle East. Israeli culture and literature. Writing emphasis course. (Same as Judaic Studies 405.)

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from Niccolos of Cusa to nineteenth-century German Idealists. (Same as Philosophy 411.)

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 consent of instructor.

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.

440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

480 Readings and Research in Religious Studies (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.


506 Historical and Comparative Studies of Religions (3) Description and analysis of religious traditions, phenomena, and themes. May be repeated. Maximum 6 hrs.

507 Religion, Power and Society (3) Studies of religions in relation to social structure and political institutions: issues of gender, race, class, ethnicity, caste, slavery, religion and the state, globalization and human rights. May be repeated. Maximum 6 hrs.

513 Religion, the Arts, and the Media (3) Material and expressive culture, religion and journalism, mass communication technologies, popular culture, issues of representation, cultural studies methodologies. May be repeated. Maximum 6 hrs.

514 Religion and Healing (3) Ecology of religion, nature, shamanism, healing of body and mind, spirituality, religious dimensions of medical ethics. May be repeated. Maximum 6 hrs.


520 Readings in the Study of Religion (1-6) May be repeated. Maximum 12 hrs.

532 Topics in the History of Religions (3) Prereq: Consent of instructor.

533 Topics in Religious Thought (3) Prereq: Consent of Instructor.

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

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

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

**Russian**

See Modern Foreign Languages and Literatures

**Small Animal Clinical Sciences**

See College of Veterinary Medicine and Comparative and Experimental Medicine

**Social Work**

*(College of Social Work)*

<table>
<thead>
<tr>
<th>DEGREES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Work</td>
</tr>
</tbody>
</table>

**Majors**

**Social Work**

Professors:

Bloom, Martha H. (Emeritus), M.S. .... Ohio State
Celingok, Musamer, Ph.D. .............. Washington (St. Louis)
Fauer, Catherine, Ph.D. ................. Michigan
Fyer, Gideon W. (Emeritus), Ed.D. .... Columbia
Glisson, Charles A., Ph.D. ............. Washington (St. Louis)
Granger, Ben P. (Emeritus), Ph.D. ..... Brandeis
Lamerton, Georgiana (Emeritus), M.S.S.W. ...... Tennessee
Millins, Mrs. Kate (Emeritus), Ph.D. .... Chicago
Nooch, Roger M., Ph.D. ................. Tulane
Orten, James D. (Emeritus), D.S.W. .... Alabama
Rubenstein, Hila (Emeritus), Ph.D. ...... Chicago
Shatz, Eunice (Emeritus), Ph.D. ........ Brandeis
Sowers, Karen, Ph.D. ............... Florida State

**Associate Professors:**

Bell, William J., Ph.D. ............... Alabama
Campbell, Paul M., D.S.W. ............ Alabama
Combs-Orme, Terri, Ph.D. ............. Washington (St. Louis)
Cruthirds, C. Thomas, Ph.D. .......... Tulane
Dupre, David R., Ph.D. .............. Florida State
Egan, Marcia, Ph.D. ................. Maryland
Fiene, Judith (Liaison), Ph.D. ....... Tennessee
Galambos, Coleen M., D.S.W. .... Catholic University of America
Naff, James A., Ph.D. ................. Florida State
Negent, William, Ph.D. ............. Florida State
Orme, John, Ph.D. ........... Washington (St. Louis)
Patterson, David, Ph.D. ............ Utah
Rocha, Cynthia, Ph.D. .............. Washington (St. Louis)
Spicuzza, Frank, M.S.S.W. ....... Tennessee
Vaughn, Hugh H., Ed.D. ............ Memphis State

Assistant Professors:

Bowie, Stan L., Ph.D. ................. Barry
Collier, Jenny C., M.S.W. ............ Tulane
Cunningham, Sherry, Ph.D. .......... Georgia
Davey, Timothy L., Ph.D. ........... Florida State
DeCoste, Vaughn, Ph.D. .......... LSU
Dulmur, Catherine, Ph.D. ............. SUNY (Buffalo)
Evans, Theo, A., Ph.D. ............ Minnesota
MacMaster, Samuel A., M.S.S.A. ...... Case Western Reserve
Page, Timothy F., Ph.D. .......... Western Michigan
Rogge, Mary, Ph.D. ............... Washington (St. Louis)
Staudt, Marlys, Ph.D. .......... Washington (St. Louis)

**Clinical Associates/Field Practice Coordinators:**

Allen, Sandra (Memphis), M.S.S.W. ........ Tennessee
Bailes, Melinda (Nashville), M.S.S.W. ....... Texas (Arlington)
Betz, Phyllis (Knoxville), 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) clinical social work practice and 2) social work management and community practice. These programs' objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either clinical social work practice or social welfare management and community practice. The M.S.S.W. program is accredited by the Council on Social Work Education.

**Admission Requirements**

Admission to the master's program is based on the following requirements:

1. A Bachelor's degree from an accredited college or university with appropriate preparation in the social sciences. At least three-fourths of the applicant's undergraduate work should be in the social sciences, humanities, physical sciences, and other Arts and Sciences subjects. Applicants must have a course in human biology and demonstrate a liberal arts preparation through coursework in at least four of the following five areas: economics or mathematics; government, political science or history; sociology or anthropology; psychology; philosophy, literature, or the arts.

2. Personal qualifications acceptable for entrance into the professional practice of social work.

3. All applicants must submit up-to-date scores from the Graduate Record Examination (generally).

Preference is given to applicants with a GPA of 3.0 or above in their undergraduate work with substantial preparation in the social sciences.
Advanced Standing
The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires: (1) a B.S.W. from an accredited program, (2) an overall undergraduate GPA of 3.0 or greater, and (3) personal qualifications acceptable for entrance into the professional practice of social work. Students admitted into advanced standing are required to complete a minimum of 36 hours of study in either of the college's concentrations - clinical social work practice or social work management and community practice. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.

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 locations of the college. Admission requirements are the same as for full-time study. Coursework can be completed over a three-year period.

Financial Aid
Students may apply directly to the University's Financial Aid Office for assistance such as the National Direct Student Loan or the Work-Study Program. Information regarding scholarships administered by the College is made available after admission.

General Requirements
1. The program requires successful completion of a minimum total of 60 semester hours including completion of the foundation curriculum (30 hours) and 30 hours in one of the two concentrations (clinical social work practice or social work management and community practice).
2. Students may select a thesis or non-thesis option. Students pursuing the thesis option receive six credits for successful completion.
3. Successful completion of a comprehensive exam or thesis defense.
4. An overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

The Professional Foundation Curriculum
All students must complete 30 semester hours in the foundation curriculum consisting of 24 hours in foundation classroom courses and 6 hours in field practice. The foundation is the initial phase of the master's program and contributes to the process of professional identification. It provides a comprehensive, broad base of theory, knowledge and skills from which to practice. The foundation classroom courses include:
- Foundations of Social Work Practice I, II and III
- Human Behavior in the Social Environment I and II
- Social Welfare Policy and Services
- Social Work Research
- Social Work and Oppression
Students also complete a two-semester field placement, Field Practice (6 hours). Upon successful completion of the foundation curriculum, all students must complete a minimum of 30 hours in the concentration curriculum including field practice (12 hours). Students select a concentration in clinical social work practice or social work management and community practice.

Clinical Social Work Practice: The clinical social work practice concentration focuses on students developing expertise in clinical social work practice with client systems including individuals and small groups, particularly with clients from high-risk and vulnerable groups. The concentration emphasizes theoretical and empirical knowledge and practice skills in differential assessment, clinical interventions and practice evaluation. The concentration also emphasizes knowledge and skills directed toward (1) an understanding of complex psycho-social, interpersonal problems; (2) ethically sound and culturally sensitive practice; and (3) influencing the development of services and programs that are responsive to the needs of vulnerable, high-risk clients and groups.

Required courses:
- 521 Clinical Social Work Practice with Individuals (3 hours)
- 525 Clinical Social Work Practice with Groups (3 hours)
- 526 Evaluating Clinical Practice (3 hours)
- 582-83 Field Practice (12 hours)

Minimum of three (total of 9 hours) advanced course electives as follows:
- One course in advanced policy (3 hours)
- One course in advanced general courses.

Social Welfare Management and Community Practice: The social welfare management and community practice concentration focuses on students developing skills directed toward the management and analysis of complex service delivery needs within organizations and communities, knowledge and skills in the development of service intervention strategies to address such and related needs, and the organizational and management skills that enable practitioners to work in a variety of challenging and turbulent environments. The concentration emphasizes theory and skills related to leadership and administration, and permits flexibility in tailoring a program to fit the student's individual interests, capabilities, and career goals.

Required courses:
- 541 Leadership and Management in Human Services (3 hours)
- 543 Financial Management and Resource Development (3 hours)
- 547 Evaluation Research (3 hours)
- 582-83 Field Practice (12 hours)

Minimum of three (total of 6 hours) advanced course electives as follows:
- One course in advanced policy (3 hours)
- Two courses from a pool of advanced general courses (6 hours).

Field Practice
Field instruction is a critical component of the student's first-and-second-year programs. Through cooperation with a wide range of social agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to 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 practice experiences related to the foundation curriculum content. Within the placement, each student's experiences are planned and designed according to educational objectives.

Second-year placements are selected according to the student's area of concentration, individual career interests, and educational needs. The student actively participates with the field practice coordinator and the educational committee in selection of the second-year placement. The second-year field placement experience focuses on the integration of social work knowledge and values, and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of their placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled University breaks and may result in variations in holidays and office hours for the student.

Students receiving a grade of NC in field practice may not repeat the field practice.

Transfer Credits
Coursework equivalent to the first year of the master's program, completed in another accredited graduate social work program, is usually accepted toward degree requirements. Applicants must meet the admission requirements of The Graduate School and the College of Social Work. Transfer courses must be approved as equivalent to required and/or elective courses taken for graduate credit and passed with a grade of B or better. An S earned on an SGPA 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 university's academic committee must approve the request and the transfer credit must meet Graduate School requirements.

Proficiency Examination
Students in the master's program may earn a maximum of nine hours by proficiency examination, with the exception of field practice courses. Students interested in proficiency examinations are referred to The Graduate School statement describing the procedure for applying for examination.

THE DOCTORAL PROGRAM
The College of Social Work offers the Doctor of Philosophy with a major in Social Work.

The focus of social work education at the doctoral level is to foster the development of an attitude of scientific inquiry, knowledge of the scientific method, ability to extend the
knowledge base of social work practice, and
effective participation in leadership roles in
social work education, research, and
practice.

The emphasis of the doctoral program is
upon:

--The analysis of direct intervention and
social administration and of the interrelation-
ships among each of them and their social
policy, organizational, and community
contexts.
--Research-based knowledge to inform and
guide social work practice, social policy,
and social welfare program development.

The program consists of foundation
courses, elective courses, and dissertation
research. The courses are available only in
Knoxville. Students and their committees can
develop a plan for completing their research in
Nashville and Memphis based on the
availability of dissertation resources.

Students have the opportunity to work in
the Children's Mental Health Services
Research Center as part of their training. The
Center focuses on services to children who
have experienced mental health problems
associated with abuse, neglect, violence and
a variety of psychosocial problems.

Admission Requirements
The Ph.D. program is designed for
students who have completed a master's
degree in an accredited school of social
work and have post-master's social work/
social welfare experience. Applicants who
do not meet these requirements, but believe
they have equivalent credentials should
contact the Chair of Ph.D. program for further
information regarding admissions criteria.

General Requirements
1. A minimum of 66 hours beyond the
master's degree including: a) completion of
27 hours of required coursework, b)
completion of 15 credits of advanced
electives, at least 12 of which are taken
outside the department, and c) completion of
at least 24 credit hours of dissertation
research.
2. Successful completion of qualifying
and comprehensive examinations.
3. Completion and defense of the
dissertation.

Curriculum
The curriculum of the Ph.D. program
consists of foundation coursework,
electives, and dissertation research. The
foundation curriculum consists of 27 hours
of coursework in the history and philosophy
of social work, issues in direct service
and administration and planning, areas of
practice, and research methodology and
statistics. Upon this foundation, students and
their academic committees develop a plan of
study consisting of coursework in Social
Work and other departments of the
University.

Typically, the 24 hours of foundation
curriculum are completed and electives
workshop begun during the first year of
study. Social Work 670 and the elective
requirement are completed and dissertation
research begun in the second year of study,
and dissertation research is continued in the
third year of study. While it is generally
expected that the coursework will be
completed on a full-time basis, dissertation
research can be completed on a planned
part-time basis.

Examinations
All doctoral students are required to pass
a qualifying examination and a compre-
sensive examination. The qualifying examination
covers the foundation curriculum. The
comprehensive examination is administered
by members of the doctoral and committee
and is designed for the student to demonstrate
comprehensive knowledge of the major and
cognate areas and the dissertation topic. In
the case of failure of either examination, the
student may request a retake. The result of
the second examination is final.

Financial Aid
Financial aid is available to qualified
students in the form of fellowships, scholar-
ships, and teaching and research assis-
tants. Graduate assistantships and other forms of assistance are awarded on the
basis of merit and interest to applicants who
are accepted into the Ph.D. program.

MINOR IN GERONTOLOGY
Graduate students in the College of Social
Work, at the Knoxville location, may pursue
a specialized minor in gerontology. This
interdepartmental/interdisciplinary minor gives
the student an opportunity for combining the
knowledge about aging in American society
with his/her major concentration. Please refer
to Human Ecology for specific require-
ments.

POST-MASTER'S CERTIFICATE IN
MANAGEMENT AND COMMUNITY
PRACTICE
The College of Social Work offers a 15-
credit hour post-master's certificate program
designed for social workers desiring supervisory, management, administration and
community practice training and education to
enhance career advancement or career
 redirection. Required for admission is a
master's degree in social work or closely
related field.

Course requirements are 541, 543, 547,
and two courses selected from 550, 551,
552, 555.

ACADEMIC 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.S.W. and Ph.D. programs in Social
Work are available to residents of the State
of Arkansas; the Ph.D. to residents of
Delaware, Oklahoma or West Virginia.
Additional information may be obtained from
the Admissions Specialist in the Office of
Graduate Admissions and Records.

GRADUATE COURSES

NOTE: Graduate students majoring in fields other
than social work are admitted to certain social work
courses with the approval of the College of Social
Work and the student's major professor.

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

501 Foundations of Social Work Practice I (3)
Survey of history, mission, and identity of the school.

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

503 Foundations of Social Work Practice II (3)
Generalist practice with family and small group systems.

504 Foundations of Social Work Practice III (3)
Basic theory, methods, problems, and techniques in implementing planned change within and among larger social systems, task groups, human service organizations, and community systems. Various practice roles: planner, program developer, supervisor, administrator, advocate and task group leader.

506 Social Work Research (3) Research methodologies with respect to evolution and application to social work theory and practice. History and philosophies of science; problem formulation; research design; ethics; instrument use and construction; data collection; analysis and reporting; and evaluation and utilization of research.

508 Practicum in Social Work Research (3-6) Supervised practice in application of research methods to social work. May be repeated. Maximum 6 hrs. S/N only.

509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 509, Nutrition 509, and Nursing 509.)

514-15 Human Behavior in the Social Environment I, II (3,3) Major social science theories that inform social work practice and profession. History and philosophies of science; problem formulation; research design; ethics; instrument use and construction; data collection; analysis and reporting; and evaluation and utilization of research.

516 Social Work Policy and Services (3) Development of contemporary social policy at local, state, national, and international levels. Contribution of social work professionals to formal policy-making processes through which macrolevel change is affected and through which aggregate social welfare services are proposed, authorized, financed, and programmed. Theories of complex organizations applied to social welfare service delivery settings.

518 Social Work and Oppression (3) Sources, dynamics, and impact of oppression in U.S. society as manifested in both social/educational/economic systems and personal experience. Emphasis on various forms of oppression: racism, sexism, classism, and heterosexism, and forces that perpetuate such conditions.

521 Clinical Social Work Practice with Individuals (3) Theories, knowledge, and skills for clinical practice with individuals from ecological perspective. Therapeutic process and intervention strategies, incorporating concepts from psychoanalytic and cognitive practice models, and specific client problems.

523 Clinical Social Work Practice with Families (3) Concepts related to understanding and analyzing family dynamics and interactional patterns from perspective of major family therapy models. Techniques of intervention in terms of application to families with varied system and individual problems and to families from varied social and cultural backgrounds.

525 Clinical Social Work Practice with Groups (3) Theoretical and historical approaches to social work
with groups and clinical principles supporting specific types of group work used in clinical practice and associated leader interventions.

526 Evaluating Clinical Practice (3) History and philosophies, conceptual approaches, techniques and methods in evaluating and use of practice research as applied to implementation and evaluation of direct services to clients.

530 Seminar in Clinical Social Work (2-3) Topics in theory and practice of clinical social work with individu-

532 Short-Term Interventions (3) Theory and practice of planned short term, emergency, and crisis interventions.

533 Social Work Interventions with Couples (3) Topics in theory and practice of clinical social work with individuals, couples, families and groups. May be repeated. Maximum 6 hrs.

534 Social Work Interventions with Children and Adolescents (3) Various practice modalities for as-

535 School Social Work (3) Place of school as community institution and resource. Methods, pro-

541 Leadership and Management in Human Services (3) Management practices and leadership skills required in planning and management of human service delivery settings. Focuses on performance of human resources management, resource allocation, strategic planning, and organizational dynamics.

543 Financial Management and Resource Development (3) Administrative decision-making related to financial planning and resource allocation in human service organizations. Knowledge and skills in budgeting, accounting, budgeting, expenditure control, fundraising, grant writing, marketing, and evaluation.

547 Evaluation Research (3) History and philosophies, conceptual approaches, techniques and meth-


552 Community Organization (3) Local development, social planning and social action as practice models for development of resources to meet human needs.

555 Current Issues in Management and Community Practice (3) Major problems affecting delivery of human services and requisite knowledge and problem solving skills needed to address them: board/leadership development, coalition building, conflict management, and team development.

561 Supervision and Consultation in Social Work (3) Roles, techniques, and practices of social work supervision and consultation.

564 Substance Abuse (3) Survey and analysis of social, cultural, medical and psychological factors underlying alcoholism and drug abuse and addiction; recent research and practice innovations.

566 Social Gerontology (3) Physical, psychological and social aspects of aging, and major social policies and programs.

580 Field Practice (3) Instruction and supervision in clinical social work practice. S/NC only.

581 Field Practice (3) Instruction and supervision in clinical social work practice. S/NC only.

582 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. S/NC only.

583 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. S/NC only.

584 Field Practice (2-6) Instruction and supervision in social work practice. May be repeated. S/NC only: E

585 Seminar in Gerontology (1) (Same as Human Ecology 555, Counselor Education and Counseling Psychology 555, Exercise Science 555, Nursing 555, Public Health 555, Psych/educational Studies 555, and Sociology 555.)

593 Independent Study (1-6) Individualized study, student selects, designs, and completes examination of special issue or problem. May be repeated. Maximum 6 hrs.

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

601 Research for Social Work Practice I (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. F

602 Research for Social Work Practice II (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. F

604 Research in Social Service Settings (3) Advanced research, under faculty supervision, of practice issues in community agency, Prereq: First year required Ph.D. courses or equivalent. Instructor. May be repeated. Maximum 9 hrs. F.Sp

606 Evaluative Research for Social Work Practice, Programs and Policy (3) Techniques and strategies for quantitative and qualitative research for social policy's impact on individuals and groups. For evaluating policies and outcomes of social work practice. F


640 History of American Social Work (3) Social, cultural, economic and political contexts for development of social work profession, development of education for profession, and modern welfare system. F

650 Programs and Legislation for Children and Families (3) Background, purposes, and current issues surrounding major federal and state programs serving disadvantaged children and their families: Social Security Act (Title IV, Child Welfare and AFDC); Title XIX, Medicaid; Title XX; Head Start, WIC and other nutrition programs, and Healthy Start. Current issues and controversy: legislative changes.

660 Issues in Social Work Knowledge Building (3) Advanced seminar in theory and model building in direct intervention, administration and planning. Prereq: First year required Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F.Sp

670 Critical Literature Reviews (3) Techniques and methods for conducting critical reviews of literature: conceptual and methodological critiques of existing research.

693 Directed Study in Social Work Research (3) Advanced individual study, under faculty guidance, of social work practice issues. Prereq: First year required Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F.Sp

Sociology

(College of Arts and Sciences)

MAJOR

Sociology

DEGREES

M.A., Ph.D.

Suzanne B. Kurt, Head

Sociology

Professors:

Betz, D. Michael, Ph.D. Michigan State
Black, James A., Ph.D. Iowa
Hartmann, Donald W., Ph.D. Massachusetts
Hood, Thomas C., Ph.D. Duke
Perrin, Robert G. (Liaison), Ph.D. British Columbia
Shover, Neal, Ph.D. Illinois
Wallace, Samuel E., Ph.D. Minnesota

Associate Professors:

Benson, Michael L., Ph.D. Illinois
Cable, Sherry, Ph.D. Penn State
Jalata, Asafa, Ph.D. SUNY (Binghamton)
Kurth, Suzanne B., Ph.D. Illinois (Chicago)

Assistant Professor:

Jones, Robert E., Ph.D. Washington State

The Sociology Department offers graduate study leading to the Master of Arts and the Doctor of Philosophy. The M.A. program includes a thesis and non-thesis option. The graduate program has concentrations in criminology, energy, environment, and resource policy; and political economy. The criminology concentration includes 505, 551, 552, and 555. The energy, environment and resource policy concentration includes 560, 563, 565, and 565. The political economy concentration includes 540, 541, 544, and 545. Both the master's and the doctoral program allow for the construction of individualized programs of study. Detailed information may be obtained from the Director of Graduate Studies in Sociology. All incoming students will be advised by the Director of Graduate Studies. New students are admitted in fall semester only and applications must be received by the Graduate Admissions and Records Office by February 1.

ADMISSION REQUIREMENTS

1. Acceptable scores on the general Graduate Record Examination (verbal, quantitative, and analytical) are required. GRE scores in the subject area (Sociology) are requested but not required.

2. Three letters of recommendation (forms may be obtained from the department).

3. Completion of the appropriate previous degree (baccalaureate, preferably with a major in one of the social sciences, for the M.A. program; master's degree in one of the social sciences for the doctoral program).

THE MASTER'S PROGRAM

Thesis Option

A minimum of 30 hours beyond the baccalaureate degree, including 24 hours of coursework and 6 hours of Thesis 500, is required. Students must complete Sociology 521, 531, Statistics 531, and one foundation course (504, 505, or 560). At or near the end of all coursework, the student must take an oral examination on course material and thesis. The examination will be administered by the student's committee.

Non-Thesis Option

A minimum of 30 hours of coursework is required, including Sociology 521, 531, Statistics 531, and one of the following: 504,
505, or 560. Sociology 534, 622, and Statistics 532 are recommended. Sociology courses at the 400 level may be taken with the approval of the student's committee. A student's plan of study should follow one of the following approaches: Plan 1, 6 hours in one of the department's concentrations and 6 hours in a second area, including areas outside the department, subject to the approval of the student's committee; Plan 2, 12 hours in a special area of study approved by the student's committee and the Graduate Program Committee. Students are encouraged to prepare a paper synthesizing their knowledge of the concentration(s). Students who incorporate supervised field experience in their programs are encouraged to prepare a report based on those experiences that demonstrates their understanding of research, theory, and report writing. All students must take final written and oral examinations that include questions on their general coursework in theory and methods and on their special areas of study. Subject to approval by the student's committee, up to 12 hours may be taken in courses outside the department for either program.

THE DOCTORAL PROGRAM

Coursework
Twenty-four hours of coursework beyond the master's degree are required (exclusive of S/NC credits). Twelve hours of course credit in Sociology at the 600 level are required. Students who enter the program without the courses required for the major in Sociology may construct an individualized course of study subject to the approval of the student's doctoral committee and the Graduate Program Committee. Sociology courses at the 400 level may not be taken unless the consent of the student's advisor and the Graduate Program Committee. Six hours may be taken in related fields without petitioning the Graduate Program Committee for approval. The student's program may include a minor or cognate field.

Comprehensive Examinations
Written examinations in four areas are required (sociological theory, research methodology, and two substantive areas). Doctoral students are eligible to take the theory and methodology examinations whenever offered. Substantive examinations may be taken upon completion of theory and methodology examinations. Detailed information on examinations and examination options (generalist, specialist, and collateralist) may be obtained from the department.

Dissertation and Final Examination
A dissertation based on original research must be completed (24 hours). The candidate must pass an oral defense of the dissertation, including the theory and methodology related to the research, in accordance with the deadlines specified by The Graduate School.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

MINOR IN GERONTOLOGY

Graduate students in the Department of Sociology may pursue a specialized minor in gerontology. This interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.A. program in Sociology is available to residents of the state of Virginia (concentrations in criminology only), the Ph.D. to residents of Florida (concentration in criminology only), or West Virginia. Additional information may be obtained from the Admission Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

405 Sociology of Sport (3) Social meaning, organization, and process of sport. Prereq: 291 or consent of instructor.
414 Sociology of Health Care (3) Organization of health care facilities, staff-patient relationships, demographic characteristics, and prevalence of disease.
415 Sociology of Aging (3) How roles and statuses change with age in relation to major social institutions; impact that rapidly increasing number of older people has on society, effect of society on older people.
446 The Modern World System (3) Critical examination of capitalist world-system as social system, its coherence, boundaries, regions, member groups, cleavages, and patterns of conflict. Analysis of who gets what, why, and how in global political economy.
453 Sociology of Religion (3) How religious and political ideologies affect social change, social impact of legal sanctions, relations between law and social justice.
459 Organizational and Corporate Crime (3) Analysis of crime and deviance committed by organizations. Case studies of corporate and organizational crime, organizational dynamics of crime, theories of corporate crime, and organized responses to this type of crime by governmental regulatory agencies.
462 Population (3) Demographic factors and social structure; trends in fertility, morality, population growth, migration, distribution, and composition; population policy.
464 Urban Ecology (3) Relation of humans to their urban environment: conservation and use of appropriate technology. (Same as Urban Studies 464.)
465 Social Values and the Environment (3) Human dimensions of ecosystem management and public policy. Applied focus on social values activated within specific biophysical and social settings. Prereq: 110 Social Problems and Social Change or 120 General Sociology or consent of instructor.
471 Sociolinguistics (3) (Same as English 471 and Linguistics 471.)
480 Diffusion of Agricultural Technology (3) (Same as Rural Sociology 480.)
500 Thesis (1-15) P/NP only: E
502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
504 Sociological Foundations of Political Economy (3) Survey of contemporary sociological theories of political economy, sources of political and economic power and conflict.
505 Foundations of Criminology (3) Critical overview of contemporary developments in criminology, theories of crime causation and theories of responses to crime. Prereq: 350 or equivalent.
507 Foundations of Social Psychology (3) Current and classical theoretical perspectives in social psychology.
510 Teaching Sociology (3) Art and craft of teaching sociology from curricular considerations through teaching techniques. May be repeated. Maximum 6 hrs.
521 Sociological Theory I (3) Assessment of what sociological theory is; its major figures and their approaches to understanding society.
531 Research Methods in Sociology (3) Research design, measurement, sampling, quantitative and qualitative data collection techniques, data reduction, and analysis.
534 Advanced Sociological Analysis (3) Underlying assumptions and logical procedures used by sociologists in formulating explanations; foundations of sociological research strategies and techniques.
540 Occupations (3) Occupations in relation to individuals and society, technology, economic stratification, and social organizations.
541 Collective Behavior, Social Movements, Social Change (3) Basic theory and research on conditions of social unrest in human collectivities and efforts of collectives to change existing society.
543 Sociology of Development (3) Sociological theories and studies of development: modernization, colonialism, dependency; comparative impact of various development paths upon selected aspects of structural change and society.
551 Delinquency and the Social Structure (3) How study of delinquency and juvenile justice is affected by changes in social structure of society, changing demographic and institutional influences, and changing views about responsibility and punishment.
560 Environmental Sociology (3) Systematic treatment of current research in environmental sociology. Social impact analysis and conflicts over environmental issues.
563 Demographic Techniques (3) Standard rates and measures of demographic variables, life table analysis, increment-decrement model, and survey techniques of population analysis.
580 Advanced Rural Sociology (3) (Same as Rural Sociology 580.)
585 Seminar in Gerontology (1) (Same as Human Ecology 585, Committee on Education and Counseling Psychological 585, Experiences in Science 585, Nursing 585, Public Health 585, Psychological Studies 585, and Social Work 585.)
591 Foreign Study (1-15) See College of Arts and Sciences.
592 Off-Campus Study (1-15) See College of Arts and Sciences.
599 Readings (3) Selected topics. May be repeated. Maximum 6 hrs.
600 Doctoral Research and Dissertation (3-15) P/NP only. E
622 Sociological Theory II (3) Distinct schools of sociological theory and contributions of their principal
   exponents. Prereq: 521 or consent of instructor.
629 Supplementary Readings in Sociological Theory (4) Individual guidance. Preparation for comprehensive
   examination. Prereq: Consent of instructor. S/N only.
633 Survey Design and Analysis (3) Systematic
   exploration of survey problems through student participation
   in design and analysis of survey. Prereq: 531 or consent of instructor. (Same as Child and Family
   Studies 533.)
638 Field Research (3) Research experience in selected field sites using techniques of interviewing,
   participant observation, and other methods of field research. Prereq: 531 or consent of instructor.
639 Supplementary Readings in Methodology (3) Individual guidance. Preparation for comprehensive
   examination. Prereq: Consent of department. S/N only.
644 Political Sociology (3) Critical examination of
to states and political processes.
645 Advanced Studies in Political Economy (3) Topical seminar. Prereq: 504 or consent of instructor.
   May be repeated. Maximum 6 hrs.
646 Supplementary Readings (3) Prereq: Consent of department. May be repeated. Maximum 6 hrs. S/N only
653 Sociology of Law (3) Intensive examination of selected topics in sociology of law. Prereq: 505 or
   consent of instructor.
655 Advanced Studies in Criminology (3) Intensive examination of selected topics in criminology. Recom-
   mended prereq: 505. May be repeated. Maximum 6 hrs.
661 Theory and Methods of Human Ecology (3) Historical and contemporary studies of interaction
   between humans and their environment. Prereq: Consent of instructor.
662 Urban and Regional Sociology (3) Historical and contemporary studies of urban and regional
   societies.
665 Advanced Studies in Energy, Environment and Natural Resources Policy (3) Topical seminar cover-
   ing particular lines of research and theory within area. Prereq: Consent of instructor. May be repeated.
   Maximum 6 hrs.
675 Advanced Studies in Social Psychology (3) Selected contemporary research issues related to
   social psychological theories. Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hrs.
695 Advanced Special Topics (3) Topic of special interest or study. Prereq: Consent of department. May be
   repeated. Maximum 6 hrs.
699 Tutorials in Advanced Topics (3) Individual instruction. Prereq: Consent of department. May be
   repeated. Maximum 6 hrs.

Speech Communication

(College of Communications)

MAJORS

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

Professors:

John W. Haas, Head

Associate Professors:

Julian, Faye D. (Liaison), Ph.D. ....Tennessee

Lester, Lorayne W., Ed.D. ............ Tennessee

Yoemans, G. Allan (Emeritus).

Ph.D. ...................................... Louisiana State

Assistant Professors:

Ambrester, M. L., Ph.D. ................. Ohio

Cook, N. C., M.A. .................. Alabama

Glenn, Robert W., Ph.D. ........... Northwestern

Haas, John W., Ph.D. ............. Kentucky

Assistant Professors:

Arthur, R. S., Ph.D. .................. Ohio State

Grant, Charles H., Ph.D. ........... South Florida

Violanti, Michelle T., Ph.D. ........ Kansas

The Department of Speech Communication offers a concentration area for the master's degree with a major in Communications and participation in the interdisciplinary doctoral program. See Communications for additional information.

Graduate courses in Speech Communications and Communication provide opportunities for students in a variety of disciplines to investigate how oral language can affect change in the knowledge, the understanding, the ideas, the attitudes, or the behavior of other human beings.

GRADUATE COURSES

420 Communication and Conflict (3) Communication as significant factor in development, management, and resolution of conflict at interpersonal, small group, organizational, or societal levels.

425 Interpersonal Health Communication (3) Interpersonal communication in health care settings: provider-client interactions, social support groups, stigma and disease, and contemporary models explaining use of health-related information.

440 Organizational Communication (3) Organizational setting and variables affecting quality of human interaction both within and outside organization.

Spanish

See Modern Foreign Languages and Literature

Special Programs

(College of Arts and Sciences)

GRADUATE COURSES

510 Humanities Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in humanities.

Emphasis on nature and special forms of human experience and its interpretation through study of formal texts and critical figures.

520 Natural Science Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in physical and biological sciences drawing on history of science, critical figures in shaping of scientific thought, and methodology for observation and experimentation in natural sciences.

530 Social Science Perspectives in the Arts and Sciences (2) Seminar on nature of inquiry in social sciences. Emphasis on methodology for observation and research in study of human beings, their social environments and their behavior.

1830's through 1920's. (Same as Women's Studies 486.)

476 Rhetoric of the Contemporary Feminist Movement (3) Historical and critical study of rhetoric in campaign for women's rights in United States from 1940's to present. (Same as Women's Studies 476.)

505 Research Methods (3) Understanding of wide array of data collection and analysis procedures used in speech communication research. Development of project/thesis proposal.

510 Orientation to Teaching Assistantship (1) Curriculum, classroom management, and other issues associated with teaching at college level. For departmental GTAs.

526 Seminar in Interpersonal Health Communication (3) Seminar in health communication: support groups, medical ethics, medical narratives, doctor-patient communication, or interpersonal communication in medicine.

550 Organizational Culture (3) Clarity of complex nature of organizational culture to communicate meaning and its usefulness to organizational effectiveness: challenges created by today's changing organizations and workforces.

560 Special Topics in Speech Communication (3) Contemporary topics. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

580 Contemporary Rhetorical Theory (3) Current theoretical contributions to rhetoric. Burke, Perelman, Weaver, feminist and critical scholars.

590 Directed Reading and Research (3) May be repeated. Maximum 6 hrs.

591 Foreign Study (1-15) Independent study outside U.S. Prereq: Departure dates and credit requirements must be approved by department head and supervising faculty member. Credit given only upon fulfilling all requirements set by department. May be repeated. Maximum 15 hrs.

592 Off-Campus Study/Internship (1-6) Independent study outside traditional classroom setting: community involvement and/or work experiences. Credit given only upon fulfilling all requirements set by department. May be repeated. Maximum 6 hrs.

593 Independent Study (1-6) Independent study under direction of faculty member. Must obtain approval of faculty member and department prior to study.

Statistics

(College of Business Administration and Intercollegiate Program)

MAJORS

DEGREES

Statistics................................................. M.S., Ph.D.

Robert W. Mee, Head

Professors:

Bozdogan, Harmansah, Ph.D. .......... Illinois

Guess, Frank M., Ph.D. ................. Florida State

McLean, Robert A. (Emeritus), Ph.D. . Purdue

Mee, Robert W., Ph.D. .................. Iowa State

Perr, William C., Ph.D. ............... Southern Methodist

Philpot, John W. (Emeritus), Ph.D. .... VPI

Sanders, Richard D. (Emeritus), Ph.D. .. Texas

Sylwester, David L., Ph.D. ............ Stanford

Thigpen, Charles C. (Emeritus), Ph.D. .... VPI

Associate Professors:

Lethaker, Mary G., Ph.D. ............... Kentucky

Ldon, Ramon V., Ph.D. ............... Florida State

Walker, Esteban, Ph.D. ............... VPI

Younger, M. S. (Liaison), Ph.D. ......... VPI
Additional Intercollegiate Program Faculty:

Aikens, Charles, Engineering; Bates, Ben, Communications; Bunting, Dewey, Arts and Sciences; Chang, Hui, Business Administration; Dessart, Don, Education; Dyer, Carl, Human Ecology; Eastwood, David, Agricultural Sciences and Natural Resources; Fitzpatrick, Ben, Arts and Sciences; Fribourg, Henry, Agricultural Sciences and Natural Resources; Glasson, Charles, Social Work; Gross, Louis, Arts and Sciences; Huck, Schuyler, Education; James, Lawrence, Business Administration; Ladd, R. T., Business Administration; Lounsbury, John, Arts and Sciences; Lyons, William, Arts and Sciences; McHale, Dan, Agricultural Sciences and Natural Resources; Miller, Mark, Communications; Orne, John, Social Work; Raijul, Balram, Arts and Sciences; Rosinski, Jay, Arts and Sciences; Samejima, Funiko, Arts and Sciences; Sexton, Arnold, Agricultural Sciences and Natural Resources; Singletary, Michael, Communications; Smith, Julius, Arts and Sciences; Wagner, Carl, Arts and Sciences; Xiong, Jie, Arts and Sciences.

THE MASTER'S PROGRAM

The M.S. program in Statistics provides students with the foundations in theory and practice required for careers in applied statistics. In addition to the education traditionally offered in such a program, the department offers a concentration in industrial statistics, which provides unique opportunities for experiences in practical applications of statistics. Through involvement in the University of Tennessee Practical Strategies for Process Improvement Institute and related programs, department faculty participate in a variety of consulting and research projects in industry. Students may supplement their classroom study with an industrial internship and participation in research projects dealing with industrial problems. Department faculty also collaborate with researchers from many academic disciplines. Statistics graduate students may gain consulting experience by working with faculty involved in these consulting activities. All students are encouraged to participate in supervised internship or consulting activities as part of their graduate program.

Individuals with undergraduate or graduate degrees in other disciplines are encouraged to enter the program. The candidate's mathematics background should include differential and integral calculus of several variables. Individuals with limited mathematics background should seek departmental guidance regarding specific ways in which they may prepare themselves for the program by taking coursework as non-degree students. Requests for application forms and further information may be sent to the Director of Graduate Studies, Department of Statistics, Stokely Management Center, University of Tennessee, Knoxville, TN 37996-0532 or ewalker@utk.edu or http://www.pembre.utk.edu/igsp.

Admission Requirements

General admission requirements for The Graduate School are stated beginning on page 12. Applicants for Statistics must submit results of the Graduate Record Examination (GRE) general portion, although GMAT exam scores may be substituted. Applicants for the statistics program must have completed at least two years of college-level mathematics, including the calculus of several variables and matrix algebra, and be proficient in a foreign language. Applicants whose native language is other than English must submit results of the Test of English as a Foreign Language (TOEFL).

Curriculum

A minimum of 33 credit hours must be completed for the master's degree. Required of all students are 6 hours in statistical methods, 6 hours in statistical theory and 1 hour in statistical computing. Students must complete a minimum of 21 hours in approved statistics courses, exclusive of consulting, internship, independent study, or thesis.

Thesis or Independent Study

The thesis option for the master's degree requires the student to complete 6 hours for the thesis. Alternatively, the non-thesis option requires a minimum of 3 hours for an independent study project.

Comprehensive Examination

Students must pass a two-part written comprehensive examination covering 1) theory and 2) methods. Upon failing either part of the examination, the student may retake it. The result of the second examination is final. For students writing a thesis, this examination must be passed before the thesis is defended.

INTERCOLLEGIATE GRADUATE STATISTICS PROGRAM

The Intercollegiate Graduate Statistics Program (IGSP) is a formal University of Tennessee academic program established to enable students to earn either a minor or an M.S. in Statistics simultaneously with a master's or doctoral degree in another department. Approved coursework taken to meet doctoral requirements in the student's home department may also be credited toward the M.S. in Statistics. Similarly, approved coursework in statistics taken to meet the requirements for a master's or doctoral degree in another department may also count toward the minor in Statistics. The program is open to graduate students in all departments which have an approved minor and/or M.S. joint major curriculum offered through the program. The program is administered by an Executive Committee, consisting of college representatives from all colleges with approved programs, with advisory input from the program faculty.

Degree Program

<table>
<thead>
<tr>
<th>Hours in Approved IGSP Courses</th>
<th>Master's in home department, minor in Statistics</th>
<th>Master's in home department, M.S. in Statistics</th>
<th>Doctorate in home department, minor in Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>24</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Doctorate in home department, M.S. in Statistics

Course requirements consist of courses in statistics, offered either by the Department of Statistics or by other departments, which have been reviewed and approved by the IGSP Executive Committee. Students taking an M.S. in Statistics must pass the two-part comprehensive examination covering statistical theory and methods. Students taking a minor in Statistics in conjunction with a doctorate in another field must pass a written comprehensive examination in Statistics, constructed and evaluated by the student's Examining Committee. No formal comprehensive examination is required of students earning a Statistics minor along with a master's in another field beyond questions which the home department wishes to include as part of the comprehensive examination for the master's degree.

General Admissions and Degree Requirements

1. The student's home department must have approved a program of courses with the Executive Committee. That program will specify the sequence of statistics courses, chosen from the IGSP approved list, that are considered appropriate by the home department. Students who wish to participate in this program should consult their college representative or the Chair of IGSP in the Department of Statistics.

2. The student's graduate committee must include a member of the IGSP faculty. For students seeking the major in Statistics, the committee member must be a faculty member in the Statistics Department.

3. The student's Admission to Candidacy form must contain all courses required for the chosen degree program as set off in a group and labeled "Statistics Courses Required for the Minor or M.S. in Statistics." Students who do not wish to pursue the M.S. in Statistics can seek approval for a minor in Statistics and receive academic credit for the statistics courses they have successfully completed.

BUSINESS ADMINISTRATION CONCENTRATION

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

MBA Concentration: Statistics

Minimum course requirements are 571, 566, 572 with 561 or 562.

Ph.D. Concentration: Statistics

This degree provides students with a broad knowledge of the field of statistics, the ability to apply statistics in practical situations to problems of business and industry and the ability to develop new statistical methods; all of which takes place while students are
exposed to coursework in the basic functional areas of business.
Minimum course requirements are: 673, 666, 691, and 592.

CERTIFICATE IN APPLIED STATISTICAL STRATEGIES

The Department of Statistics offers a certificate program in applied statistical strategies. The program is designed for the part-time student and several of the course requirements are offered through distance education.

The 12-credit certificate is available by completing two required courses, 571-72, and two electives selected from the following: 573, 575, 579, and 585 or 566 or other graduate statistics courses as approved by the Statistics Graduate Program Committee chair.

ACADEMIC STANDARDS

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

GRADUATE COURSES


500 Thesis (1-15) S/NC only. E

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


531 Survey of Statistical Methods (3) Univariate and bivariate data collection and organization, statistical estimation and hypothesis testing; analysis of real-life situations from categorical and numerical data, including Chi-square tests and simple and linear and quadratic regression. Use of computing facilities required. Not offered for both 531 and 537. Prereq: 1 yr. college mathematics.

532 Survey of Statistical Methods II (3) Multiple linear regression, including use of dummy variables; single and multiple factor analysis of variance and covariance; issues in experimental design and analysis. Use of computing facilities required. Prereq: 531.

537 Statistics for Research I (3) Principles and application of statistical methodology, integrated with considerable use of modern statistical computing systems. Probability and proportion distributions, forming and testing hypotheses using parametric and nonparametric inference methods. Multiple linear regression and correlation. Credit not given for both 531 and 537. Prereq: 1 yr undergraduate mathematics and 1 undergraduate statistics course.

538 Statistics for Research II (3) General linear model as applied to multiple regression and analysis of variance. Diagnostic and influence techniques. One-way, factorial, blocking, and nested designs, preplanned versus posthoc contrasts. Random factors and repeated measures. Prereq: 537 or 532, Sp.

561 Introduction to Computing for Data Management and Analysis (1) UT computing environment for beginning statistics graduate students. Use of operating system commands, system editor, utility programs and eye SAS statistical package for data entry and editing, file management and statistical analysis. Use of UTCC computing facilities required. Coreq: 531, 537 or 5371, or consent of instructor.


564 Theory of Statistical Inference (3) Linear regression and analysis of variance, multiple range tests, equal and unequal variances, transformations; factorial experiments, completely randomized designs, repeated experiments. Robust regression, M-estimators, iteratively reweighted least squares. Nonparametric regression, kernel, splines, testing lack of fit. Prereq: 571 or equivalent.


573 Design of Experiments (3) One-way ANOVA, multiple range tests, equal and unequal variances, transformations; factorial experiments, completely randomized designs, analysis of covariance, split-plot and nested designs, fractional factorial, sequential designs. Prereq: 571.


579 Applied Multivariate Methods (3) Multivariate statistical models: predictive, likelihood; Bayesian and information-based model selection and evaluation. Application of techniques in various types of models for both continuous and discrete data modeling problems. Interactive computational tools. Prereq: 554 and 572 or 583, consent of instructor.

583 Special Topics in Statistics (1-3) May be repeated. Maximum 6 hrs.

585 Principles of Statistical Process Management (3) Principles and statistical techniques to manage organizational processes. Prereq: Consent of department head.

587 Graduate Seminar (1) Directed readings and active participation in colloquium program of Department of Statistics and of student's minor program. Prereq: Consent of department director of graduate studies. May be repeated. Maximum 2 hrs. S/NC only.

592 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, or government. Written and oral report. Prereq: courses in graduate-level statistics or consent of statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC only.

593 Independent Study (2-6) Faculty directed readings and investigation of specialized topics in statistics. Written report and oral presentation. Prereq: 2 courses in statistics and consent of the statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC only.

595 Statistical Consulting Practicum (1-6) Supervised experiences helping on-campus researchers plan, manage data, and develop and perform analyses specific to designs and hypotheses. Discussion of activities in regular seminar meetings. Final written reports and/or detailed diaries. Prereq: 572 or 583. May be repeated. Maximum 6 hrs.

602 Computational Methods in Statistics (3) Up-to-date computational methods and statistics open architecture interactive computational language implemented with other statistical packages with graphical capabilities; statistical computing; numerical methods for linear models and general linear models, nonparametric linear statistical methods, matrix computations and special matrices, essentials of Monte Carlo simulation, and resampling techniques. Use of knowledge of programming language and 572 or consent of instructor.


673 Advanced Topics in Design of Experiments and Linear Models (3) Experimentation for product and process improvement: response surface methodology, mixture design methods; mixture experiments, optimal design topics; distribution-free and inference for linear models. Prereq: 570 or consent of instructor.

675 Categorical Data Analysis (3) Log-linear analysis of multidimensional contingency tables. Logistic regression. Theory and applications, and use of statistical software. Prereq: 1 yr graduate-level statistics, regression analysis and analysis of variance and familiarity with UNIX, or consent of instructor.

677 Statistical Modeling (3) Modern techniques of statistical modeling: predictive, likelihood; Bayesian and information-based model selection and evaluation; two paradigms. Application of techniques in various types of models for both continuous and discrete data modeling problems. Interactive computational tools. Prereq: 554 and 572 or 583, or consent of instructor.

679 Multivariate Statistical Modeling (3) Modern information based techniques and model selection in multivariate analysis; inferential tests of significance with multivariate data; analysis of variance, multivariate regression and variable selection, multivariate cluster analysis, common principal component model, factor analysis. Computer-interactive structural models with latent variables, mixture-model cluster analysis. Prereq: Matrix algebra and 564, or matrix and linear model theory and inference in interactive computing, or consent of instructor.

683 Special Topics in Statistics (1-3) Presentation of specialized topics in statistics. May be repeated. Maximum 6 hrs.
Theatre

(College of Arts and Sciences)

MAJOR

THEATER

DEGREE

M.F.A.

Bill Black, Acting Head

Professors:

Black, W., M.F.A. .................................. Illinois
Custer, M., M.F.A. .................................... Wisconsin
Lester, L. W., Ed.D. .................................. Tennessee

Associate Professors:

Craven, E. H., M.A. ................................. Tennessee
DeCuir, L. J. (Liaison), M.F.A. ............... Tulane
Gould, B. K., M.F.A. ................................. Catholic

Assistant Professors:

Coleman, R., M.F.A. ................................... Yale
Van den Berg, Klaus, Ph.D. .................. Indiana
Weber, T., M.F.A. ....................................... Alabama

The Department of Theatre offers the Master of Fine Arts degree with a major in Theatre, concentrations in costume design, international performance studies in acting, international performance studies in directing, lighting design, scene design, and theatre technology. Not all areas of concentration accept applicants every year.

Applicants must have completed undergraduate degrees approximately equivalent to those specified for degrees conferred by The University of Tennessee.

Three letters of recommendation and interviews with appropriate faculty are required of all applicants. Applicants for admission to the M.F.A. design/technical theatre programs must submit samples of their work. Auditions are required of M.F.A. degree acting applicants.

For detailed information about the graduate program, contact the Director of Graduate Studies, Department of Theatre.

THE MASTER OF FINE ARTS PROGRAM

At least 60 semester hours, 40 of which must be at the 500 level or above, are required for the degree of Master of Fine Arts with a major in Theatre, which is normally to be completed in three consecutive years of full-time residence. Theatre 501 is required for the first year of residence. Three additional hours at the 500 level are required from history, literature, or dramaturgy. Students in the M.F.A. degree program are evaluated annually by juried performance or portfolio submission. Continuation in the program is with the approval of the faculty committee for the M.F.A. degree program. Theatre 599, Projects in Lieu of Thesis, and an oral defense of the project must be completed satisfactorily before the degree is conferred.

In addition to the core requirements listed above, each area of concentration has specific requirements:

**Design/Technical Production**

Required courses are at least 12 hours of Theatre 560, Design and Technical Production Seminar, and at least 6 hours in the projects courses. Theatre 401, Principles of Design is required in the first year of residence.

**International Performance Studies in Acting**

Theatre 520-21-22-23-24-25 Master Class are required, along with one course in directing and two hours each in voice and dance.

**International Performance Studies in Directing**

Theatre 530-31-32-33-34-35 Master Class are required along with Theatre 401 Principles of Design. Directing candidates are also expected to take art and music survey courses and language courses as advised.

**REQUIREMENTS FOR SECOND MASTER’S DEGREE**

Students admitted to the MFA program who have already earned a master's or a doctoral degree may apply up to 12 credit hours from the previous graduate program to the MFA degree with approval of the student's committee, the Dean of the College of Arts and Sciences, and the Dean of The Graduate School.

Any such credits applied from a previous graduate program would be from courses that are directly relevant to the student's MFA curriculum and must have been earned within the time limit (6 years) established for completion of the MFA degree.

**GRADUATE COURSES**

401 Principles of Theatrical Design (3) Fundamental principles of design, visual and structural relationships. Projects assigned to develop understanding and perception.

409 Stage Make-up (3) Study and problems in make-up design and application: character analysis. Prerequisite: Introduction to Theatre.

420 Special Studies in Acting (3) Content varies. Exercises in selected concentrated areas such as styles, techniques, approaches, e.g., Shakespeare, movement, humor. Prerequisite: Advanced Acting and consent of instructor. May be repeated. Maximum 9 hrs.

423 Period Movement and Dance (2) Movement styles and dances from Renaissance to 20th century. Prerequisite: Stage Movement or consent of instructor.

424 Theatre Dance II (2) Advanced dance technique incorporating elements of musical theatre. Prerequisite: Theatre Dance or consent of instructor. May be repeated. Maximum 6 hrs.

425 Selected Musical Theatre Techniques (2) Study and practice of musical theatre dance: and vocal work. Prerequisite: Theatre Dance or consent of instructor. May be repeated. Maximum 4 hrs.

426 Applied Phonetics (3) Development of skills in transcription and reproduction of principal varieties of English Language in North America and Great Britain and selected foreign dialects in North America. Prerequisite: Consent of Instructor.

430-31 Principles of Play Directing (3,3) Problems in composition, picturization, rhythm, movement. Prerequisite: Acting. Must be taken in sequence.

444-41 Advanced Theatre Costume Design (3,3) Costume as expressive element in dramatic production. Prerequisite: 340.

445 Advanced Costume Construction I (3) Advanced studies in construction technique: tailoring, vacuum forming, plastic molding, and cobbling. Prerequisite: 345 or consent of instructor.

450 Advanced Scenery Technology I (3) Study and practice of theatre woodwork: production participation required. Prerequisite: 250. Graduate credit to theatre M.F.A. students only.

451 Advanced Scenery Technology II (3) Study and practice of metalworking and plastics for theatrical productions: production participation required. Prerequisite: 250. Graduate credit to theatre M.F.A. students only.

452 Advanced Scenery Technology III (3) Study and practice of stage rigging for theatrical productions: production participation required. Prerequisite: 250. Graduate credit to theatre M.F.A. students only.

454 Scenery Painting (2) Introduction to materials, techniques, and principles of craft. Gaining skill and understanding through studio experience. Prerequisite: Consent of instructor.

455 Intermediate Scene Design (3) Materials, techniques and processes of scenic design. Development of skills. Prerequisite: 355 and consent of instructor.

462 Advanced Lighting Design (3) Advanced problems in lighting design and theory, lighting musical theatre, opera, and dance. Prerequisite: 362 or consent of instructor.

464 Computer Assisted Design for Theatre (3) Advanced techniques in computer assisted design for theatre. Work with CAD, Computer Drawing, Graphics, and/or 3D Modeling software for preparation of theatrical designs. Specific content varies with semester. Admission by consent of instructor only. May be repeated. Maximum 9 hrs.

472-71 Playwriting (3,3) Advanced instruction in writing of plays. Prerequisite: Consent of instructor.

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

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

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

501 Introduction to Graduate Research in Theatre (3) Research tools and methods for theatre artist and scholar.

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

510 Studies in Theatre History (3) Intensive study of selected topics in theatre history. May be repeated. Maximum 9 hrs.

512 Dramatic Literature Analysis (3) Dramaturgical strategies of major playwrights, using variety of analytical approaches from Aristotelian to deconstruction.

520-21-22-23-24-25 Master Classes in Acting (6,6,6,6,6,6) Master classes in acting techniques, voice, and movement. Theatre MFA students only.

530-31-32-33-34-35 Master Class in Directing (6,6,6,6,6,6) Master classes in directing techniques. Prerequisite: Admission to MFA program.

536 Projects in Play Directing (3) Practical work in play direction involving various lengths and kinds of scripts. May be repeated. Maximum 9 hrs.
Theory and Practice in Teacher Education

(Majors in College of Education)

DEGREES

MAJORS

Education ......................... M.S., Ed.S., Ed.D., Ph.D.

L. Knight, Leader

Professors:

Alexander, J. Estill. (Emeritus), Ed.D. ............... Kentucky
Benner, Susan M., Ed.D. ......................... Columbia
Brozo, William G., Ph.D. ...................... South Carolina
Christensen, Mark A. (Emeritus), Ph.D. ................. Kansas
Cole, Laurence J., Ph.D. ...................... Kent State
Davis, A. R., Ph.D. ............................... Ohio State
Davis-Wiley, Patricia E.D. ............... Houston
Hargis, Charles H. (Liaison), Ed.D. ..................... Colorado State
Harris, G. A., Jr., Ph.D............................ Michigan
Hatch, J. Amos, Ph.D. ............................. Florida
Huff, P. (Emeritus), Ph.D. ..................... Ohio State
Hull, Howard N. (Emeritus), Ed.D. ........... Peabody
Jost, Karl J., Ed.D. ............................... Oklahoma
Knight, Lester N., Ph.D. ...................... Texas
Lindsey, LaVerne B., Ed.D. ............... Mississippi State
Long, Vena M., Ph.D. ......................... Missouri (Columbia)
Rowell, C. Glennon, Ed.D. ............. George Peabody
Schindler, W. Jean, Ph.D. ..................... Kent State
Turner, T. N., Ed.D. ............................. Pennsylvania
Watkins, J. Paul (Emeritus), M.S. ................... Tennessee

Associate Professors:

Cagle, Lynn C., Ed.D. ............................ Georgia
Chance, Charles A., Ph.D. ...................... Ohio State
Hannum, Michael C., Ed.D. .................... Northern Colorado
Hodge, R. E., Ph.D. ............................. Texas
Judge, Sharon L. ................................. Santa Barbara
Melear, Claudia T., Ph.D. ..................... Ohio State
Puckett, Kathleen S., Ph.D. .................... Tennessee

Assistant Professors:

Bell, Sherry M., Ph.D. ......................... Tennessee
Gilrane, Colleen P., Ph.D. ..................... Illinois
Hendriks, D. A., Ph.D. ......................... Alabama
Molianen, Mark B., Ph.D. ..................... Wisconsin
Rearden, Kristin T., Ph.D. ..................... Texas A&M

The Department of Theory and Practice in Teacher Education offers graduate programs leading to degrees, majors, and concentrations in:

Master of Science

Education

Track 1-art education
Track 1-elementary education
Track 1-English education
Track 1-foreign language/ESL education
Track 1-mathematics education
Track 1-modified and comprehensive special education
Track 1-reading education
Track 1-science education

Track 1-social science education
Track 1-special education: early childhood
Track 2-art education
Track 2-elementary teaching
Track 2-modified and comprehensive special education
Track 2-secondary teaching
Track 2-special education: early childhood

Specialty Area:

Education

Elementary education
English education
Foreign language/ESL education
Mathematics education
Reading education
Science education
Social science education

Doctor of Education

Education

Early childhood education
Literacy, language education, and ESL education
Teacher education

Doctor of Philosophy

Education

Early childhood education
Literacy, language education, and ESL education
Teacher education

See Education Under Fields of Instruction for full description of all degree requirements.

The department also houses programs for students seeking licensure in early childhood, primary, and middle school education (grades K-8 and 1-8), reading endorsement, special education licensure, and secondary education programs. Early childhood licensure and degree programs are also available through the College of Human Ecology.

The department houses three areas of interest: holistic teaching/learning, early childhood education, and secondary content teaching.

The holistic teaching/learning area’s central emphasis is on holistic, integrative, and interdisciplinary teaching/learning as opposed to teaching disciplinary subject content (e.g., science, mathematics, language arts) as separate entities. The focus on integration is similar to how children learn and how language is central to the teaching/learning process. The faculty believe that students should be prepared as teachers who can facilitate learning rather than merely dispense content. Central to the philosophy of holistic teaching and learning is knowing each individual child’s learning style, abilities, and interests.

The early childhood education area is focused on preparing teachers for the education of all young children with and without disabilities in inclusive settings. Young children are defined as children from birth to age eight, including children of poverty, those of color, with disabilities, with advanced development and “mainstreamed” children.

The secondary content teaching area’s mission is the preparation of teachers for instruction in art, ESL, English, foreign language, mathematics, social science, and science. The emphasis is on how these disciplines are taught in contexts of different cultures.
Art Education

GRADUATE COURSES

510 History and Philosophy of Art Education (3) United States from 1800's to present. Prereq: Consent of instructor.

520 Studies in Art Education (3) Issues and topics current to the field of art education. Prereq: Consent of instructor.

530 Production and Critical Analysis of Art (3) Relationship of production and critical analysis of works of art to discipline-based art education.

540 Instructional Materials and Production Related to the Teaching of Art (3) Development and use of instructional aids concerned with all aspects of teaching art: videotapes, audiotapes, slides, charts, and learning packs.

Early Childhood Education

GRADUATE COURSES

446 Early Childhood Education: Program Development and Teaching in Kindergarten (3) Curriculum planning, classroom organization and management, practices for teaching young children, relationship of kindergarten to elementary school. Prereq: Admission to teacher education. E

515 Seminar in Early Childhood Education (6) Assessment, curriculum planning and development and teaching approaches used in early childhood education. Prereq: Admission to teacher education. F

545 Assessment in Early Childhood Special Education (3) Development of knowledge and skills in appropriate formal and informal assessments of handicapped infants and young children: screening, identification, diagnosis, placement and programming assessment issues. Prereq: 553 or consent of instructor.

566 Curriculum for Early Childhood Education (K-3) (3) Theoretical foundations and current research in content and skill areas of curriculum for kindergarten-grade 3; application to local school setting. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. E

567 Application of Theory in Early Childhood Education (K-3) (3) Principles and practices from selected theoretical orientations. Prereq: Course in early childhood education or consent of instructor. May be repeated. Maximum 6 hrs. F, Su

568 Early Childhood Special Education: Theories and Interventions (3) Theoretical perspectives of early childhood education: emphasis on programmatic, family-focused concepts and curriculum development.

584 Seminar in Early Childhood Education (3) Analysis of research and theory in early childhood education; educative process of young children. Prereq: Course in early childhood education. May be repeated. Maximum 6 hrs. F, Su

650 Advanced Studies in Early Childhood Education (3) Prereq: 2 graduate courses in early childhood education and consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. E

547 Reading Instruction in Early Childhood Education (2) Techniques for teaching reading and study skills in content areas of school program. Extensive assessment of text books, middle school and high school. E

English Education

GRADUATE COURSES


460 Teaching Reading and Literature in the Secondary School (3) Techniques for teaching reading and study skills in content areas of school program. Extensive examination of textbooks, middle school and high school. E

507 Teaching Poetry Grades 7-12 (3) Research and theory in application to teaching of poetry. Design of strategies and materials for teaching and writing and reading of poetry. Review of texts and materials. E

508 Teaching Composition in the Secondary School (3) Teaching narrative, description, exposition, and argumentation; writing process and marking of student papers. Sp

509 Teaching Fiction in the Secondary School (3) Teaching novels and short stories. F

521 Interdisciplinary Aesthetics (3) Discussions, visual and audio presentations concerned with aesthetic considerations of areas of study in literature, history, physics, literature, languages, music, visual arts and drama.

533 Reading in Community College: Research and Theory (3) Analysis of components of effective community college reading program. Attention to research and theoretical bases. Prereq: Course in reading education or consent of instructor. Su

590 Seminar in Teaching English in Secondary Schools (3) Content varies. Theoretical and practical approaches to teaching English in secondary school. May be repeated. Su

592 Linguistics and the Teaching of English (3) Grammar, usage, semantics, dialectology, history of language, and lexicography. Su

597 Teaching Drama Grades 7-12 (3) Strategies and materials for teaching creative dramatics, enacting and writing of plays, reading of scripts. Sp

596 Developing Speaking and Listening Skills, Grades 7-12 (3) Approaches to nonverbal communication, interpersonal and group communication, public address and listening. Review of tests and materials. Sp

601 Studies in English Education (3) Issues and research in teaching of English. Su

605 Organizing and Administering Reading Programs (3) Analyzing and synthesizing instructional, learning, and materials components into classroom of school and system programs. Prereq: 2 500-level courses in reading education or consent of instructor. Su

Foreign Language/ESL Education

GRADUATE COURSES

455 Teaching of Foreign Languages, Grades 7-12 (3) Instructional methods, lesson planning, peer-teaching, materials for teaching foreign language and culture, evaluation techniques. Prereq: Certification in modern foreign languages and Latin. Prereq: Completion or near completion of foreign language hours for certification and Admission to teacher education.

555 Foreign Language in the Elementary Schools Practicum (3) Experiences designing, implementing and assessing second language instruction in elementary school setting. Prereq: 587 or consent of instructor.

556 English as a Second Language Practicum (3) Experiences designing, implementing and assessing English instruction to non-native English speakers. Required course for ESL certification. Prereq: 578 or consent of instructor.

578 Teaching English as a Second Language (3) Instructional methods, lesson planning, peer-teaching, materials for teaching foreign language and culture, evaluation techniques. Required for Tennessee ESL (K-12) licensure. Prereq: 587 or consent of instructor. Sp


678 Advanced Studies in English as a Second Language (3) Research, curriculum assessment, trends
Mathematics Education

GRADUATE COURSES

485 Teaching Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials, for teaching mathematics; reading and observation in schools. Prereq: Admission to teacher education.

522 Programs and Materials in Elementary School Mathematics (3) Examination, development, and use of materials for creating an active learning environment for learning mathematics in elementary and middle schools. Prereq: 530, 543, or equivalent. Sp.

530 Teaching Mathematics to Young Children: K-4 (3) Unit planning, daily planning, grouping, and other strategies of teaching mathematics. For those with little preparation in teaching elementary school mathematics. Prereq: 530, 543, or equivalent. Sp.

543 Teaching Mathematics in Middle School: 5-8 (3) Unit planning, daily planning, grouping, and other strategies of teaching mathematics. For those with little preparation in teaching middle school mathematics. Sp.

581 Seminar in Mathematics Education (3) Current issues influencing instruction in mathematics in schools, elementary through college. Related teaching methodologies. Opportunities for work on special problems. Prereq: 485 or equivalent. F.

582 Teaching Enrichment Mathematics in Middle and Junior High Schools (3) Topics to enrich middle and junior high mathematics. Geometrical, laboratory, and problem solving activities. Special attention to metric system. Opportunities for individual projects. Prereq: 485 or equivalent.

583 Teaching Mathematics in Senior High Schools and Community Colleges (3) Topics appropriate for high school and community/junior college mathematics curriculum. Special problems related to enrichment, problem solving, and use of microcomputers. Opportunities for special projects. Prereq: 485 or equivalent.

586 Teaching Probability and Statistics (3) Teaching of probability and statistics in schools, elementary through college. Probabilities and statistical experiments, demonstrations, and applications. Prereq: 485 or equivalent.

683 Advanced Studies in Mathematics Education (3) Analysis of current research in mathematics education and implications of research for classroom practice. Prereq: Two graduate courses in mathematics education.

Reading Education

GRADUATE COURSES

430 Elementary and Middle School Developmental Reading Instruction (3) Word recognition (including phonics), comprehension, evaluation, and materials. Not open to students with recent course in reading methods. Prereq: Admission to teacher education. F, Sp.

434 Topics in Reading Education (1-6) Prereq: Admission to teacher education, and course in reading education. May be repeated. Maximum 6 hrs. E

530 Teaching Reading in Elementary and Middle Schools (3) Trends in methods, materials, basic approaches, skill development and assessment procedures for teaching reading at elementary and middle school level. Prereq: Course in teaching of reading or consent of instructor. F, Sp.

534 Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E

536 Psychology of Reading (3) Reading act, relationship between learning theory and reading, role or reading in child's overall intellectual development. Affactive and cultural factors. Prereq: 500-level course in reading education or consent of instructor. F

537 Diagnosis and Correction of Classroom Reading Problems (3) Procedures, methodologies, and materials for diagnosing and correcting classroom reading problems. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor. Sp, Su

538 Practicum in Diagnosis of Reading Problems (3) Theoretical and practical applications of specific reading diagnostic instruments; testing of elementary and secondary school students, preparing case study reports, and conducting parent conferences. Prereq: Course in diagnosis and correction of classroom reading problems or consent of instructor. Sp.

539 Practicum in Remediation of Reading Problems (3) Application of learning and teaching methodology in working with elementary and secondary school students on one-to-one or small group basis. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. Sp.

554 Developmental Reading Practicum (2) Diagnosing and teaching children having developmental and corrective reading needs. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. May be repeated. Maximum 4 hrs. Su

602 Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E

603 Advanced Studies and Theoretical Models of Reading Research (3) Research on reading processes. Current theoretical models related to how learners process print. Prereq: 500-level courses in reading education or consent of instructor. Sp.

Science Education

GRADUATE COURSES

496 Teaching Science Grades 7-12 (3) Methods, materials, recent trends in science and environmental education programs for secondary schools. Prereq: Admission to teacher education program. F.

531 Teaching Science in Elementary and Middle Schools (3) Recent trends in methods, materials, and content in elementary science education. Prereq: Course in teaching elementary school science or consent of instructor. F.

565 Instructional Trends and Issues in Science Education (3) Analysis of current trends in science education, instructional issues facing elementary, secondary, and community college science teachers, and application of learning theory to teaching biological, physical, and environmental sciences. Prereq: 496, teaching methods, or equivalent.

572 Nature of Mathematics and Science Education (1) Teaching and assessment of mathematics and science based upon student conceptions of nature of mathematics and science. Su


696 Research Trends in Science Education (3) Analysis of current research trends in science education and relationship of such trends within broader educational community. Prereq: 528.

Social Science Education

GRADUATE COURSES

454 Teaching and Issues in Social Studies Education (3) Goals, objectives, materials, and assessment; directed observation in public schools, preparation of teaching plans and materials; simulated teaching experiences. Prereq: Admission to teacher education program.

521 Teaching Social Studies in Elementary and Middle Schools (3) Planning and techniques, Trends in curriculum, development of concepts and generalizations, integration of social sciences. Prereq: Course in teaching of social studies or consent of instructor. Sp.

525 Strategies, Programs, and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative social studies program materials and techniques. Exploration of current trends in social studies education. Prereq: Previous course in teaching of social studies or consent of instructor. F.


599 Seminar in Social Studies Education (3) Research, trends, and issues in secondary social studies. Su.

621 Seminar in Social Studies Research and Theory (3) Status of research and theory. Needed research, related research from other fields, and application of research. Prereq: Recent course in teaching of social studies or consent of instructor. May be repeated. Maximum 4 hrs. E

Special Education

GRADUATE COURSES

419 Psychology and Education of Students with Mild Disabilities (6) Nature and characteristics of persons with mild handicaps; educational strategies appropriate for these persons. Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq: 420. F.

420 Field Experience in Modified Programs (2) Practicum in teaching in modified programs; planning, developing, implementing and evaluating instruction. Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq: 420. S/NC only. F.

431 Field Experience in Comprehensive Programs (3) Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq: 430. S/NC only.

432 Psychology and Education of Students with Moderate/Severe Disabilities (6) Nature and characteristics of persons with moderate/severe disabilities and educational strategies appropriate for these persons. Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq: 430. S/NC only.


456 Speech and Language Basis of Learning Disabilities in the Classroom (3) Normal communication development; understanding of speech and language impairments in school-age students; integration of oral/reading and writing into existing curriculum, especially for high incidence special education students.

470 Psychology of the Exceptional Child (3) Varieties of exceptional children; general characteristics and educational needs. Implications of developmental.
Transportation
See Marketing, Logistics and Transportation

Veterinary Medicine

(College of Veterinary Medicine)

MAJOR DEGREE
Veterinary Medicine.......................... D.V.M.
Comparative and Experimental Medicine .......... M.S., Ph.D.

THE PROFESSIONAL PROGRAM

Admission Requirements
To qualify for admission to the professional program of the College of Veterinary Medicine, a candidate must have completed at least the minimum preprofessional course requirements listed below. These may be completed at any accredited college or university that offers courses equivalent to those at The University of Tennessee. Preprofessional course requirements must be completed by the end of spring term of the year in which the student intends to enroll. Biochemistry requirements must have been satisfactorily completed within five years of the time the applicant wishes to enter the program.

Subject Area Semester Hours
English 6
Humanities and Social Sciences* 18
Physical Sciences 8
General Chemistry 8
Organic Chemistry 8
Biochemistry** 4
General Biology 8
Genetics 8
Cellular Biology*** 3
TOTAL 66

*May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology and geography.

**Exclusive of laboratory.

***It is expected that this requirement will be fulfilled by a course in cellular or molecular biology.

Admission Procedures
Admission of new students is for the fall semester, with first priority given to students of Tennessee. The College of Veterinary Medicine utilizes the Veterinary Medical College Application Service (VMCAS) for all applicants. Forms and instructions for making application for admission may be obtained beginning June 1, 2000 from the Office of the Associate Dean, The University of Tennessee, College of Veterinary Medicine, P.O. Box 1071, Knoxville, TN 37901-1071.

Note: The deadline for receipt of the completed application materials by VMCAS is November 1. NON-TENNESSEE APPLICANTS MUST HAVE A MINIMUM CUMULATIVE GRADE-POINT AVERAGE OF 3.2 ON A 4.0 SCALE FOR APPLICATION TO BE CONSIDERED.

Applications are accepted only from U.S. citizens or permanent residents of the U.S.
D.V.M. Curriculum

The curriculum of the College of Veterinary Medicine is a nine-semester, four-year program. Each class begins in August and graduates four years later in May. The first three years generally follow the traditional fall and spring semester with the summer break following years one and two. The final year of the professional curriculum begins immediately following semester six and is a continuous clinical rotation experience extending over 54 weeks.

Development of a strong basic science foundation is emphasized in the first year. Courses consist mostly of preclinical subjects of anatomy (gross and microscopic), physiology, immunology, bacteriology, virology and parasitology. Also included in the first year are clinical subjects of physical diagnosis and epidemiology. Considerable integration of subject matter is incorporated during this year.

The second and third years include the study of diseases, their causes, diagnosis, treatment and prevention, and courses are team-taught on an organ system basis.

The final year (three semesters) is devoted to intensive education in solving animal disease problems involving extensive clinical experience in the Veterinary Teaching Hospital. Each student will participate exclusively in clinical management in the Veterinary Teaching Hospital and in required externships (preferably off-campus).

Innovative features of this curriculum include: eight weeks of student centered, small group, applied learning exercises in semesters one through six; three weeks of dedicated clinical rotations in the Veterinary Teaching Hospital in semesters three through five; and elective course opportunities in semesters four, five and six which allow students to focus on individual educational/career goals. Students enrolled in the D.V.M. program are required to complete at least 14 credit hours in the sixth semester and may register for up to 10 credit hours of graduate courses without enrolling in The Graduate School and these hours will be counted toward the D.V.M. degree.

Elective study offers a unique educational alternative for students interested in graduate studies and the Doctor of Philosophy degrees. Because of the interdisciplinary departmental administration of the College of Veterinary Medicine, the faculty have opportunities in the graduate programs of other instructional units, including Animal Science (nutrition, physiology, genetics and animal management), Microbiology (bacteriology, virology and immunology), Ecology and Evolutionary Biology (environmental toxicology), Public Health, and Comparative and Experimental Medicine. (Refer to other sections of this catalog for a full description of these programs.) The majority of the graduate and graduate faculty of the College of Veterinary Medicine are involved in the Comparative and Experimental Medicine programs, so the program provides a wide spectrum of interdisciplinary training that prepares graduates for teaching and/or research careers in the health sciences.

PROFESSIONAL COURSES

801-02-03 Application Based Learning Exercise (ABLE), I, II, III (2.2.1) Small group, student-centered learning environment with faculty facilitator for self discovery of new information.ing. One week of clinical experience at participation in specific clinical rotations in Veterinary Teaching Hospital.

811 Infection and Immunity I—Bacteriology and Mycology (3) Fundamental aspects of microbiology and cell biology relative to pathogens of bacterial and fungal diseases of animals: antimicrobial actions and mechanisms of bacterial resistance. General approaches to diagnosis, treatment and prevention.

813 Infection and Immunity II—Immunology (2) Basic biology and practical aspects of immunology: cells of immune system, immune function and dysfunction, immunodiagnosis, testing and specific diseases involving immune system.

814-16 Clinical Correlations and Ethics I, I, II (1.2) Correlations between basic science material from concurrent courses and practice of veterinary medicine. Thoughts on written spectrum of current veterinary ethical issues. 816—Student-led discussions follow faculty presentations.


821-22 Veterinary Anatomy I, I, II (6.6) Integrated approach to study of developmental, macroscopic (gross), and microscopic anatomy of common domestic animals. Dissections of entire specimens of common domestic species for comparative purposes. Microscopy relates structure with function. Study of developmental anatomy related to normal anomalies.

823-24 Physiology I, I, II (4.4) Introduction to concepts and problems in physiology which form basis for clinical applications and for formal training in pharmacology, medicine, pathology, and surgery. Cellular, neural, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive physiology.

827 Special Problems in Animal Science (1-8) Extramural and specially designed study for students interested in select topics in anatomy, histology, and physiology.

831 Physical Diagnosis (1) Basic care, feeding, restraint, and handling of domestic animals. Introduction to physical examination and diagnostic techniques used by veterinarians.

832 Anesthesiology (2) Principles of anesthesiology: pharmacology of anesthetic agents, and introduction to anesthetic techniques in veterinary medicine.

833 Epidemiology and Evidence Based Medicine (2) Study of distribution and determinants of disease in animal populations. Use of knowledge (evidence) gained from management of clinical patients in past to improve future clinical decision making processes.

834 Hematopoietic System (2) Pathophysiology and diagnosis of diseases involving bone marrow and blood cells, platelets, and blood coagulation in domestic animals; interpretation of laboratory test results using illustrative clinical cases.

835 Principles and Practice of Surgery (2) Principles of veterinary surgery: aseptic technique, patient and surgeon preparation, control of surgical hemorrhage and infection, and general operating room procedures. Proper techniques of tissue handling, surgical instrumentation, and selection of sutures and suturing patterns. Pathophysiology of surgical and accidental wounds: wound healing and management.

836 Toxicology (2) Principles of toxicology, molecular mechanisms, pathologic processes and clinical features of animal diseases caused by common toxic agents.

837 Food Hygiene and Zoonoses (2) Host-agent relationships, public health aspects of veterinary medicine and role of veterinarians in ecology and food hygiene.

840 Integumentary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of integumentary system. Laboratory examination, pathology, diagnosis and treatment.

841 Reproductive System (4) Pathophysiology, special pathology, medicine and surgery of diseases of male and female reproductive systems and mammary glands.

842 Alimentary System (4) Pathophysiology, special pathology, medicine and surgery of diseases of alimentary systems.

843 Musculoskeletal System (I) Pathophysiology, clinical description and basic treatment modalities of common diseases and conditions of skeletal system of small animals; development of basic diagnostic and treatment skills.

844 Musculoskeletal System (II) Pathophysiology, special pathology, medicine and surgery of diseases of muscular and skeletal systems. Advanced principles, radiographic interpretation and surgical procedures.

845 Veterinary Nutrition (2) Principles of nutrition, and nutrition of animals in health and disease. Applied nutrition relating to individual small or large animal patient or to herd situations.

846 Multispecies Medicine (4) Anatomy, pathophysiology, medicine, and surgery of avian species, laboratory and zoa animals and reptiles. Species and diseases seen by practicing veterinarian. Current topics on foreign animal diseases.

851 Urinary System (3) Pathophysiology, special pathology, medicine and diseases of urinary system. Urinary system in health and disease.

852 Cardiovascular System (2) Pathophysiology, special pathology, medicine and surgery of diseases of cardiovascular system. Anatomic, physiologic and pharmacologic principles which provide basis for treatment.


854 Respiratory System (3) Pathophysiology, special pathology, medicine and surgery of diseases of respiratory system. Upper and lower respiratory systems: infectious and noninfectious diseases.

855 Radiology (3) Basic, advanced and special techniques in radiology with interpretation and use of radiologic and related techniques in diagnosis and treatment of animal diseases.

856 Special Senses (2) Pathophysiology, special pathology, medicine and surgery of diseases of visual and auditory systems.

857 Nervous System (3) Pathophysiology, special pathology, medicine and surgery of diseases of nervous system: clinical neurology and neuropathology.

859 Neurology/Ophthalmology (4) Diagnosis of multiple diseases of ocular and neurological problems. Direct responsibility for diagnosis, patient care, and treatment of patients in both Large Animal and Small Animal Clinical Sciences.
861 Pharmacology I (2) Principles of pharmacokinetics and pharmacodynamic properties of veterinary drugs; mode of action and pharmacologic effects including important medicinal aspects, chemical and physical properties, side effects (toxicities) and clinical application.

862 Pharmacology II (2) Continuation of 861: modes of action, pharmacologic effects, and clinical application of drugs to control specific disease conditions.

864 Infectious Diseases (2) Pathogenesis and clinical findings of major viral, bacterial, and fungal infectious diseases of domestic animals: cattle, horses, swine, sheep, goats, dogs and cats; relevant case-based presentations.

865 Clinical Rotation in Comparative Medicine (2) Clinical training in avian medicine, laboratory animal and zoo animal medicine, epidemiology, public health, and other related disciplines.

866 Introduction to Animal Behavior (2) Basic principles of normal and abnormal animal behavior in domestic animals; clinical case discussions to illustrate common behavioral problems and current approaches to therapy.

868 Anesthesiology (4) Clinical training in sedation and anesthesia of companion animals, food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

870 General Pathology (3) Principles of pathology: causes of disease, disturbances of cell growth and inflammation.

873 Infection and Immunity IV—Parasitology (3) Principles of parasitology: protozoology, helminthology, and entomology and relationship to diseases in animals.

874 Oncology (2) Fundamental aspects of cell biology and pathology relative to ontogeny and natural behavior of various neoplasms of animals; general approaches to diagnosis, treatment and prevention of neoplasia.

877 Special Problems in Comparative Medicine (1-8) Extramural and specially designed study for students interested in select topics in avian medicine, laboratory animal medicine, epidemiology, public health, and other related disciplines.

878-79 Elective Clinical Rotation I, II (2,2) Special rotations in applied clinical education in Small Animal Clinical Sciences, Large Animal Clinical Sciences, Comparative Medicine and Pathology. Novel experience not associated with required clinical rotations may be arranged.

880 Clinical Rotations in Small Animal Clinical Sciences 1(4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

882 Clinical Rotations in Small Animal Clinical Sciences II (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

883 Clinical Rotations in Small Animal Clinical Sciences III (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

886-89 Clinical Rotation in Radiology and Pathology 1, II (2, 4) Two weeks in each discipline. Clinical training in radiographic techniques and interpretation, including ultrasonography. Post-mortem examination and laboratory diagnostics: clinical pathology and introductory histopathology of biopsy specimens.

887 Special Problems in Small Animal Clinical Sciences I-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, anesthesiology, radiology and medical specialties of small (companion) animals.

890 Transition and Accreditation Seminars (2) Discussion of USDA, state, and local animal laws and regulations; preparation of animal movement forms, veterinary ethics, jurisprudence, basic practice management, and other topics involved in practice of veterinary medicine.

891 Clinical Rotations in Large Animal Clinical Sciences 1(4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

892 Clinical Rotations in Large Animal Clinical Sciences II (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

893 Clinical Rotations in Large Animal Clinical Sciences III (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

897 Special Problems in Large Animal Clinical Sciences (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, herd health, reproduction, radiology and medical specialties of large animals.

898-99 Externship I, II (2,2) Educational experiences in private practice, research facilities, zoological preserve, aquarium, or other veterinarian-related facilities outside Veterinary Teaching Hospital; to provide experiences not frequently available in large referral veterinary teaching hospitals.