Agricultural and Extension Education

(College of Agricultural Sciences and Natural Resources)

MAJOR

DEGREE

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

Roy R. Lessly, Head

Professors:
Dickson, Louis H. (Emeritus), Ed.D., Illinois
Lessly, Roy R. (Liaison), Ed.D.......... Oklahoma State
Todd, John D. (Emeritus), Ed.D............ Illinois

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

Assistant Professor:
Delerino, 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 Extension 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 related fields.

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

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

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

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

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

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

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

555 GIS and GPS Applications to Biosystems (3) (Same as Biosystems Engineering 555.)

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

5.A. Extension Program Planning (2) Methods of determining county extension programs; sources of capital and needs of people, function of lay people and various groups of extension workers. Use of committees, step-by-step planning procedures, coordinated county and state plans and characteristics of effective programs. Prereq: 411 or consent of instructor. Sp

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

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

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

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

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

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. Sp

528 Advanced Techniques for Teaching Agricultural Mechanics (3) Teaching techniques for teaching needed competencies, organizing and managing agricultural mechanics facilities. Prereq: 435, 436 or consent of instructor.

529 Selected Occupational Experiences in Agricultural Education (3) Historical and philosophical bases for supervised occupational experience 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 (3) Historical and philosophical foundation of adult education in American agriculture, key figures, issues, legislative movement, farmer organizations and programs. Cooperative Extension Service, origin, legislation and growth of present-day objectives and programs. Prereq: 411 or consent of instructor. Sp

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

593 Special Problems in Agricultural and Extension Education (1-4) 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, kinds and sources of agricultural credit, and financial intermediation. Prereq: Introductory 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 concepts and tools to analyze management decision problems in farm and nonfarm agribusiness settings. Case study work on managerial, accounting, and control issues related to change in agribusiness. 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 fore-

Rural Sociology

GRADUATE COURSES

480 Technological and Community Change (3) Analysis of communication processes whereby new technology spreads within a farm population and analysis of sociological 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 changing structure and function of rural life in the United States 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.) SNC only. F

509 Scientific Communication (1) Application of speaking, writing, and oral presentation skills in preparation of research proposals, slide presentations, abstracts, web sites, and proposals. (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 DEGREES

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

Kelly Robbins, Head

Professors:
Barth, K. M. (Emeritus), Ph.D. Rutgers
Bell, M. C. (Emeritus), Ph.D. ... Oklahoma State
Blethen, J. K. (Emeritus), Ph.D. ... Ohio State
Chamberlain, C. C. (Emeritus), Ph.D. ... Iowa State

Associate Professors:
Backus, W. R., Ph.D. Tennessee
Bell, B. R., Ph.D. ... North Carolina
Grizzle, J. M., Ph.D. ... Florida
Heitmann, R. N., Ph.D. ... Maine
Kattetsh, H. G., Ph.D. ... YPI
Mathew, A. G., Ph.D. ... Purdue
Mendis-Handagama, L. C., D.V.M., Ph.D. ... Neenah
Schrick, F. N., Ph.D. ... Monash
Smith, M. O., 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
Tilthof, 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 emphasis 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. For 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 506 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 insufficient undergraduate background. The student must choose five courses from the following:

420 Advanced Reproduction (3) Collection, evaluation, and preservation of ova, spermatozoa, and embryos; application of methods of natural breeding and artificial insemination. 1 hr and 1 lab.

430 Advanced Ration Formulation (2) Advanced ration formulation for beef and dairy cattle, sheep, hogs, 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. F

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

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

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

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

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

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester 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

507 Professional Development Seminar (1) Same as Agriculture and Natural Resources 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.) S/N/C only. F

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

511 Special Problems in Animal Science (1-4) Pre Req: Consent of instructor and department head. May be repeated for credit up to 9 hrs. E

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

523 Advanced Mammalian Reproduction (3) Current topics and "new frontiers" in reproductive biology. Pre Req: 522. Sp/A

530 Animal Nutrition and Metabolism (4) Comparative digestive physiology, digestion, absorption and metabolism of nutrients in ruminant and nonruminant species. Concepts and methodologies of animal growth and nutrient requirements; interrelationships, availability and deficiencies of nutrients. Pre Req: Animal Nutrition, Feeds, and Ration Formulation or consent of instructor. F

535 Ruminology (2) Anatomy, physiology, and microbiology of ruminant ecosystem: microbial fermentation and metabolism of polysaccharides, lipids and nitrogen. Pre Req: 530 or consent of instructor. Sp.

551 Mammalian Organology (3) Microscopic study of structure of organs and major organ systems. Pre Req: Embryology, histology and histopathology of insects, 3 hrs and 1 lab. (Same as Comparative and Experimental Medicine—Veterinary Medicine 551.) Sp.

552 Anatomy of Domestic Carnivores (4) Gross dissection by systems and regions of dog with comparison to cat. Pre Req: Consent of instructor. 1 hr and 3 labs. (Same as Comparative and Experimental Medicine—Veterinary Medicine 552.) F

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

572 Least Squares Analysis (3) Least squares estimation and hypothesis testing procedures for linear models; model selection methodology; full rank and non-full rank situations; correlation; structure of variance; and linear functions of least squares. Pre Req: 571, or equivalent. 2 hrs and 1 lab. F

596 Seminar (1) Advanced topics in animal science. Required of all first- and second-year graduate students. Letter grade available only to those who make presentation. May be repeated. Maximum 4 hrs. S/N/C or letter grade. F/Sp

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

621 Advanced Topics in Animal Physiology (1-4) Recent advances and concepts, research techniques and current problems. May be repeated. Maximum 8 hrs. E

631 Advanced Topics in Animal Nutrition (1-4) Recent advances and concepts, research techniques, current problems. May be repeated. Maximum 8 hrs. E

633 Advanced Mineral-Vitamin Nutrition (4) Chemical forms, digestion, absorption, intermediary metabolism, deficiencies, excesses and interactions of minerals and vitamins. Pre Req: 533 or 534, and Biochemistry 410 or Nutrition 511 or consent of instructor. Sp/A

651 Advanced Topics in Animal Anatomy (1-4) Current and future research methodology, laboratory situation, recent advances in quantitative techniques for gross and microscopic anatomy. Pre Req: Consent of instructor. May be repeated. Maximum 6 hrs. (Same as Comparative and Experimental Medicine—Veterinary Medicine 651.) E

652 Disorders of the Endocrine System (2) Pathological and physiological aspects of diseases; endocrine glands of various animal species. Pre Req: 521 or consent of instructor. (Same as Comparative and Experimental Medicine—Veterinary Medicine 652.) Sp/A

Animal Science—Veterinary Medicine

See College of Veterinary Medicine and Comparative and Experimental Medicine

Anthropology

(College of Arts and Sciences)

MAJOR

DEGREES

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

Jan F. Simek, Head

Professors:

Bass, William M. (Emeritus).

Ph.D. .................................. Pennsylvania State University.

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

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

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

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

Ph.D. .................................. Texas A&M University.

Kleith, Robert L., Ph.D. .................. Northern Illinois University.

Kleith, Robert L., Ph.D. .................. Northwestern University.

Ph.D. .................................. North Carolina State University.

Ph.D. .................................. Missouri State University.

Ph.D. .................................. Northwestern University.

Ph.D. .................................. Indiana University.

Ph.D. .................................. Texas A&M University.

Ph.D. .................................. University of California, Berkeley.

Assistant Professor:

Ferreira, Mariana, Ph.D. ................. California State University, Berkeley.

Research Associate Professor:

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

Research Assistant Professors:

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


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, 3.5 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) 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 same time. In addition, the department requires a letter of intent from the applicant indicating career goals and reasons for selecting the University of Tennessee, three letters of recommendation, and one sample of the prospective student's written work (a class paper or research report); these materials should be sent directly to the Graduate Secretary, Department of Anthropology, SSS 250, University of Tennessee, Knoxville, TN 37996-0720.

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

The program leading to the M.A. is a general curriculum that allows for concentration after completion of a core course sequence. Formal requirements include:
1. Selection of an M.A. advisor. This should be done as soon as possible in the student's program of study, but no later than the end of the first semester in residence. The department graduate secretary must be informed in writing of each student's advisor.
2. A minimum of 50 credit hours in graduate courses. Twenty-four hours must be in coursework graded A-F. Coursework must include three core classes taken in the first year:
   a. 510 Method and Theory in Cultural Anthropology
   b. 560 Theory in Archaeology
   c. 590 Method and Theory in Biological Anthropology

Additional coursework should be selected in consultation with the student's advisor and must include one additional course from two anthropological concentrations besides the student's primary concentration. At least 20 hours of coursework must be at the 500 level or higher.
3. During the first year, comprehensive Graduate Evaluation Examinations (GEEs) are required of all M.A. students and are based on the content of the core courses. These examinations are given during regularly-scheduled final periods in each core class and are graded by all faculty within the appropriate subdiscipline for each course. At the end of the first year, all M.A. students will be evaluated by the entire faculty and will either be retained or dropped from the program based on their first year's performance and GEE scores.
4. All M.A. students must attend the graduate section of the visiting lecturer program. To insure compliance with this requirement, each student is required to register for one credit hour of Anthropology 550 in the fall semester of each year and fulfill all requirements for the course as defined by the instructor. Materials covered by visiting lecturers may appear on the GEE.
5. A graduate-level introductory statistics course, usually Statistics 537.
6. In the second year of the program, students pursue their concentration area and undertake thesis research. Coursework will be determined through consultation with the student's advisor and committee (composed of the advisor and at least one other member of the Anthropology faculty along with other mutually-agreed-upon members).
7. Successful completion of the thesis and final oral examination. Normally, students will complete and defend their thesis during the Spring semester of their second year.
8. Two copies of the thesis are required by The Graduate School. In addition, bound copies of the thesis are to be provided to the department and to all members of the student's M.A. committee.

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

THE DOCTORAL PROGRAM

In addition to The 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 graduation 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 coordinate directly with the potential chairperson and two additional members of the anthropology faculty who will be asked to serve on the committee.

Applicants to the Ph.D. degree program must 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 delineation of the fields by the student, committee, the student's major professor, and other members of the committee, is presented to the department head and the student's major professor. As early as possible, but no later than one full semester after admission to candidacy, the student shall formally present a written dissertation proposal to the department head and advisor.

Residence and Coursework: Every potential Ph.D. candidate must complete two consecutive semesters of full-time residence prior to taking the comprehensive written examination. The student must complete the minimum coursework requirements of The Graduate School, including at least nine hours of 500- or 600-level courses outside of anthropology, in a language other than English. The comprehensive written examination will be held during the Spring semester of the student's second year of residence.

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 defend the dissertation on the nature and significance of his/her contribution to anthropological knowledge as set forth in the dissertation.

Language: Students must demonstrate knowledge of one foreign language. This language should normally be French, German, Russian or Spanish, but another language may be substituted at the committee's discretion. This requirement may be met by either:
1. Successful performance on a language examination administered by the appropriate language department. A student electing this alternative should consult with the advisor; or
2. Completion of the second semester of specialized reading courses for graduate students with a grade of B or better.

The department does not accept completion of the intermediate (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 comprehensive (200 level) examination, 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 defend the dissertation 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 at UT on an in-state tuition basis. The M.A. program in Anthropology is available to residents of the states of Louisiana, Virginia, or West Virginia. The Ph.D. program is available to residents of Alabama, Delaware, Louisiana, Mississippi, South Carolina, or West Virginia. Additional
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 archaeological, ethnohistoric, and contemporary cases. Prereq: 130.

414 Political Anthropology (3) Organization and dynamics of power and politics in both stateless and state-level societies. Role of symbols, rituals, and ideologies in production and reproduction of power relations. Relationship between individuals (social and cultural) and structures. Escapulation 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 procedures and methods of processing, identification, and interpretation of artifacts from historic 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: 125, 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 Zooarchaeology (3) Basic osteological studies of major vertebrate groups: aboriginal use of animals in subsistence and culture. Identification and interpretation of archaeologically derived molluscan 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 material. Prereq: 110 and consent of instructor. 3 hrs and 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.)

485 Oral Biology (4) Intensive examination of human dentition and oral skeletal structures; dento-facial embryology/growth; histology; gross tooth morphology and pathology. Prereq: Junior standing.


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) P/NP only. E

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

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

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

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

512 Urban Studies in Anthropology (3) Process of urbanization examined cross-culturally; theory and method in researching urban communities; urban problems and solutions. Prereq: 130.

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 8 hrs.

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

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

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

520 Seminar in Zooarchaeology (3) Approaches to analysis and interpretation of archaeological faunas. Intensive reading; evaluation and discussion of major faunal studies, guiding students in identification and interpretation of faunal data. Prereq: 480.

521 Laboratory Studies in Zooarchaeology (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 Archaeology (3) Theoretical and practical issues in contemporary archaeology: ethnoarchaeology, paleoethnobotany, taphonomy, ceramic analysis, agricultural origins, and regional archaeological cultures. May be repeated. Maximum 8 hrs.

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

550 Contemporary Issues in Anthropology (1-3) Review of recent directions in method and theory in anthropology. May be repeated. Maximum 6 hours.

560 Theory in Archaeology (3) Detailed consideration of theory in contemporary archaeology: models of scientific explanation, research design, chronological, stratigraphical, and functional processes, methods and practices of analysis and interpretation.

561 Archaeological Resource Management (3) Federal legislation and regulations affecting identification, protection, and management of cultural 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.


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

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

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) Critical methods of analysis in biological anthropology and of past and current history of theoretical perspectives. Palaeoanthropology, 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) P/ NP 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 evaluation of current issues in cultural anthropology, primarily for doctoral students in cultural anthropology.

669Advanced Seminar in Archaeology (3) Selected topics in prehistoric and historic archaeology. May be repeated. Maximum 6 hrs.
Architecture
(College of Architecture and Design)

MAJOR

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

Marleen K. Davis, Dean
Max A. Robinson, Director
Jon P. Coddington, Graduate Program Head

Professors:
Anderson, G. I., M.Arch. ............... Illinios
Conley, G. (Emeritus), B.Arch. ........... Harvard
Davis, Marleen, M.Arch. ............... Harvard
Kaplan, M. (Emeritus), M.Arch. ........... Harvard
Keole, R. M., M.S. .............. Tennessee
Kozy, S. A., Ph.D. .............. SUNY (Buffalo)
Lauer, W. J. (Emeritus).
M. S. Arch. Eng. ................. Iowa State
Lester, A. J. (Emeritus), M.Arch. .......... Virginia
Lizon, P., Ph.D. ................ Pennsylvania
Moffett, M. S., Ph.D. .............. MIT
Rabun, J. S., M.A. ............... Texas
Robinson, M. A., M.Arch. .......... Pennsylvania
Rudd, J. W. (Emeritus), M.A. .......... Northwestern
Shell, W. S., M.S. Arch. ........... Columbia
Watson, J. S., M.Arch. .......... Pennsylvania

Associate Professors:
Coddington, J., M.Arch. .............. Pennsylvania
Davis, T. K., M.Arch. .............. Cornell
Martin, W. E., B.Arch. .............. California
Schimmenti, M. M., M.Arch. ....... Florida

Assistant Professors:
Almy, D. J., III, M.Arch. .............. Texas
Fox, L. D., M.Arch. .............. Cranbrook
French, R. C., B.Arch. .............. Tennessee
Livingston, M., M.F.A. ............. Wisconsin
Moir-McClean, T. W., M.Arch. ......... Michigan
Ware, S. M., M.F.A. ............. Tennessee

MASTER OF ARCHITECTURE PROGRAM

The School of Architecture offers two tracks leading to the Master of Architecture degree. Track 1 is for students seeking the first-professional degree who already hold a Bachelor's degree or an advanced degree in another field. Track 2 is for students with an accredited first-professional degree who seek to develop an area of specialization. Due to budgetary constraints, there are no students currently being admitted to the track. Contact the Graduate Program Head for additional information.

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

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

For Track 2 applicants, a Bachelor of Architecture degree from an NAAB accredited program, or foreign equivalent is required. Candidates with a GPA less than 3.0 may be considered for conditional admission when evidence of exceptional promise is identified. Submission of a portfolio with a separate application to Architecture 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.

Graduate Program

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

For Track 2 applicants, a Bachelor of Architecture degree from an NAAB accredited program, or foreign equivalent is required. Candidates with a GPA less than 3.0 may be considered for conditional admission when evidence of exceptional promise is identified. Submission of a portfolio with a separate application to Architecture 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.

Degree Requirements
Track 1 requires a minimum of 48 semester hours of undergraduate preparation and 60 semester hours of graduate coursework, taking approximately 3 1/2 years of full-time study. A minimum 4 hours of architectural electives or approved electives from another discipline must be taken at the 500 level or above.

For 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 programs 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, or West Virginia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

GRADUATE COURSES

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

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

405 Descriptive Analysis of Historic Buildings (3) Identification and analysis of characteristic elements of buildings from various architectural periods. American architecture, survey techniques.

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

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

412 Non-Western & Indigenous Architecture (3) Building responsive to climate, material availability, and economic conditions, as designed by anonymous builders. Prehistoric times to present throughout the world. Case studies of the Valley of the Nile, Buddhist and Hindu temples, and Mughal architecture of India, China, and Japan.

413 Tennessee Architecture (3) History of settlement patterns and building in Tennessee. Reading assignments, lectures, discussion, and field trips. Historical change in the primary building traditions.

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

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

417 The International Style (3) Survey of architecture of early modern movement, mainly in Europe and America, 1890-1940.


420 American Architecture, 1840-1940 (3) Stylistic movements from Gothic Revival through the twentieth century.

421 History of Landscape Architecture (3) Intellectual, social, and geographical influences that provided the theoretical basis for design throughout history. Selected examples of landscape architecture analyzed in terms of design.

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

425 Special Topics in Architecture (1-6) Faculty initiated courses. Basic urban design issues and exemplary design approaches through lectures, readings, essays, and sketch studies. Historical change in urban form and design.

432 Computer Applications in Design II (3) Advanced computer aided design using three-dimensional modeling software. Design analysis using computer animation, rendering techniques, visualization, and video. Prereq: Computer Applications in Design I or consent of instructor.

433 Computer Applications in Design III (3) Integration of three-dimensional modeling and technical analysis using computer-aided design and computer-aided design. Independent studies under faculty direction. Prereq: Consent of instructor.

443 Building Energy Analysis (3) Balancing heat flow through external skin of building. Large and small scale climatic analysis. Site planning, building size and orientation, window area, wall treatment, infiltration control, and other design elements. Energy use quantification methods, and economic analysis of energy efficient design features. Architectural program analysis of external and internal load dominated buildings. Prereq: 341.

444 Advanced Environmental Control Systems (3) In-depth analysis and innovative concepts in design of heating, ventilating, and air conditioning. Prereq: 341.
445 Advanced Lighting (3) In-depth analysis and innovative concepts in design of lighting. Prereq: 342.

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

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


507 Seminar in Contemporary Architectural Theory (3) Readings, discussions, lectures in contemporary architectural thought. Principles underlying cultural 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 expression 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 profession's ethos.

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 of 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 theories of application related to generation of architectural form and space in response to both cultural and environmental focus.

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

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.

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

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


591 Foreign Study (1-9)

592 Off-Campus Study (1-9)

593 Independent Study (1-9)

Art (College of Arts and Sciences)

MAJOR

Art ................................................. M.F.A.

Norman Magden, Head

Professors:
Blair, Sandra J., M.F.A. ................. Wisconsin
Brakke, P. M., M.F.A. .................. Yale
Clark, P. (Emeritus), M.S. ............. Wisconsin
Cleaver, Dale G. (Emeritus), Ph.D. ....... Chicago
Daher, R. H. (Emeritus), M.F.A. ... Wisconsin
Falsfitt, Joseph S. (Emeritus), M.S. Ohio State
Franklin, M.B., M.F.A. .............. Nebraska
Kennedy, William C., M.F.A. ........ Wisconsin
Lee, B., M.F.A. ......................... Yale
Leland, W. E., M.F.A. ............... Tennessee
Livingston, P. R., M.F.A. ............ Wisconsin
Lyons, B. (Laison), M.F.A. .......... Arizona State
Norman, Ph.D. ....................... Case Western Reserve
Martinson, Fred (Emeritus), Ph.D. ......... Chicago
Metros, Susan E., M.F.A. ........ Michigan State
Moffatt, F., Ph.D. ..................... Chicago
Peacock, D. (Emeritus), M.F.A. ...... Iowa
Riesing, T. J., M.F.A. .............. Nebraska
Stewart, F.C., M.F.A. ............... Claremont
Wilson, D., M.F.A. ................. California (San Diego)
Yates, S., M.F.A. ..................... North Carolina (Greensboro)

Associate Professors:
Haney, Dorothy, Ph.D. ............... Michigan
Hines, Timothy, Ph.D. ............. Penn State
Naff, A., Ph.D. ....................... Pennsylvania
Staples, Carolyn, M.F.A. .......... Michigan State

Assistant Professors:
Brogden, Sally B., M.F.A. .......... NY College of Ceramics (Alfred)
Everson, Kevin, M.F.A. ................ Ohio State
Jung, A., M.F.A. ....................... Wisconsin
Smith, Peter, M.F.A. ................. Fordham
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. 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 present a portfolio for evaluation by the faculty and receive permission to continue in the program.

2. Second-year evaluation: With completion of all coursework, the student must present work for evaluation by the faculty and receive permission to register for Projects in Lieu of Thesis.

3. If, in a review by the student's major area faculty, the student's progress is deemed insufficient, the faculty may recommend a work period without advancement toward the degree, probation with specific goals set for a specific time, or dismissal.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT 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 undergraduate Art History minor, or its equivalent, and reading knowledge of French, German, or Italian, unless waived by the Art History faculty.

Art

GRADUATE COURSES

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

482 Museology II: Exhibition Planning and Installation (3) Exhibition concept, development and implementation. Exhibition design and installation techniques. Publicity, production, matting and framing, shipping and storage. Prereq: 481 and 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. (Same as Anthropology 484.)

498 Special Topics (3) Student- or instructor-initiated course offered at convenience of department. Prereq: 481 and consent of instructor. May be repeated. Maximum 12 hrs.

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

507 Professional Practices: Teaching Internship (1) Individual study in development of skills and methodology in teaching studio courses. For students who are not GTAs. 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 (1) 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


424 Ceramics: Clays and Glazes (3) Clay chemistry, clay bodies, glaze theory and calculation. Formulating, mixing and testing of clay bodies and glaze formulas. Prereq: Ceramics: Portfolio Review.

425 Ceramics: History Seminar (3) History of ceramists 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 modern refractories, construction methods, and kiln operation. Prereq: Ceramics: Portfolio Review.

429 Ceramics: Special Topics (3)Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

521 Graduate Ceramics I (2-5) May be repeated. Maximum 10 hrs.

525 Graduate Ceramics 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. E

Art Design/Graphic

GRADUATE COURSES

405 Computer Enhanced Graphic Design I (3) Exploration of new technologies and their significance to graphic design. Prereq: Intermediate Graphic Design I. Graphic Design Production with a grade of C or better, and consent of instructor. May be repeated. Maximum 6 hrs.

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

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

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

454 Editorial Illustration (3) Media and techniques as applied to editorial illustration for books, magazines, and newspapers. Prereq: 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 prearrangement with department. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

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

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

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

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

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

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

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

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 Drawing

GRADUATE COURSES

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

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. E

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

415 Chinese Art (3) Survey from pre-Shang Dynasty to contemporary movements in China, Taiwan, and Hong Kong. New discoveries. Writing-emphasis course.

419 Japanese Art (3) Survey from ancient Joman art in clay to Nihonga painting styles of today. Variety of media. Writing-emphasis course.

425 Early Christian and Byzantine Art to 1350 (3) Art in Italy and the Eastern Empire from the beginnings of Christian art to 1350. Mosaic and painting, sculpture and architecture. Writing-emphasis course. (Same as Judaic Studies 425.)

431 Medieval Art of the West, 800-1400 (3) Western European art of the “Dark Ages.” Romanesque, and Gothic periods. Writing-emphasis course. (Same as Judaic Studies 431.)

441 Northern European Painting, 1350-1600 (3) Concentrated study of Van Eyck, Rubens, Rembrandt, Georges de la Tour, Vermeer, Poussin, and Hals. Writing-emphasis course.

442 Art of Northern Europe, 1600-1875 (3) Concentrated study of Bruegel, Rubens, Rembrandt, Georges de la Tour, Vermeer, Poussin, and Hals. Writing-emphasis course.


453 Art of Southern Europe, 1575-1700 (3) Concentrated study of Caravaggio, Bellini, and Italian Baroque development in all media. Spanish Baroque painting and sculpture: Velazquez. Writing-emphasis course.

471 History of North American Art (3) Landmarks in painting, architecture, sculpture, and design from prehistory to 1900.

472 History of 20th-Century American Art (3) Development in architecture, painting, and design from 1900.

473 19th-Century American Painting (5) From West and Copley to emergence of “The Eight.”

474 History of 20th-Century Art in Europe and America (3) Theoretical basis for modern movement. Analysis and discussion of individual works of art in light of contemporary writings by artists and theorists. Prereq: Western Art I and II, or consent of instructor.


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

483 History of American Sculpture (3) American sculpture from prehistory to 1960’s.

485 History of Printmaking (3) Prints from 15th century to present. 20th century in Europe and U.S. Prereq: 172 and 173.

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

489 Studies in Art History (3) Concentration in individually selected area. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

491 Art of Medieval Art (3) Art and architecture of Middle Ages: major monuments from Byzantium or western Europe. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

492 Studies in Italian Renaissance Art (3) Art and architecture of 14th, 15th, and/or 16th centuries in Italy. Early or High Renaissance or Mannerist periods. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

493 Studies in Baroque Art (3) 17th-century art and architecture: major artists and works from southern or northern Europe. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

494 Studies in Modern Western Art (3) Selected topics in 19th- and 20th-century western art. Prereq: M.F.A. candidate or consent of instructor. May be repeated with consent of department. Maximum 6 hrs.

495 Art of Indian Asia (3) History of Indian art: Central Asia and Southeast Asia. Writing-emphasis course. (Same as Judaic Studies 495.)

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

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

499 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 Media Arts

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 and transition to 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 and transition to 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 (1-2) 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. May be used toward art history requirement. May be repeated. Maximum 12 hrs.

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

Art Painting

GRADUATE COURSES

413 Painting IV (6) Advanced painting, individual concepts of different visiting artists. Prereq: Painting III. May be repeated. Maximum 12 hrs.


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

514 Graduate Painting II (2-6) May be repeated. Maximum 12 hrs.

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

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

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.

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 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 printing methods and combinations with other print media. Prereq: Intermediate Intaglio or consent of instructor. May be repeated. Maximum 12 hrs.

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

464 Screen Printing I (2-6) 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.

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

GRADUATE COURSES

441 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.

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

452 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.

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. E

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

Arrowmont

GRADUATE COURSES

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

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

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

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

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

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

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

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

470 Fabric (2-4) Intermediate to advanced. May be repeated.

480 Enameling (2-4) Intermediate to advanced. May be repeated.

490 Wood (2-4) Intermediate to advanced. May be repeated.

Astronomy

See Physics and Astronomy

Audiology and Speech Pathology

(College of Arts and Sciences)

MAJORS

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

Patrick J. Carney, Head

Professors:

Asp, Carl W., Ph.D. ......................... Ohio State
Carney, Patrick J., 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
Gordon, Charles J., M.A. .......... Tennessee
Hedrick, Mark, Ph.D. .................. Vanderbilt
McCullough, Gary ....................... Vanderbilt

Assistant Professor:

Ericson, Mary E., Ph.D. ................. Southern Cal
Harkrider, Ashley, Ph.D. ............. Texas
Thelin, J. W., Ph.D. ......................... Iowa

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 524, and at least two seminars from the following courses: 522, 523, 531, 626, or 571 A 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:
Audiology and Speech Pathology

511 Introduction to Research in Speech and Hearing
(3) Analysis of research in speech and hearing techniques, methods, and statistics. Application of statistical techniques to completion of a proposal and hypothetical pilot research project.

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 (5) Principles of instrumentation in audiology and speech pathology. Laboratory assignments for familiarization with instruments for measuring hearing and speech processes.

520 Aphasia (3) Historical review of aphasia literature, theories of brain function, dysphasia classification and terminology, test rationale, use of language therapy, 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.


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

526 Dysphagia (3) Clinical diagnosis, evaluation, and treatment of adult swallowing disorders and critical interpretation of research literature in dysphagia.

531 Seminar on Stuttering (3) Current issues in stuttering. Prereq: 473 or consent of instructor.

532-33-34 Advanced Clinical Practice in Speech-Language Pathology (1-4, 1-4, 1-4) Prereq: 473 or equivalent or consent of instructor. 534 may be repeated. Maximum 6 hrs. Enrollment for less than 2 hrs must have prior departmental approval.

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

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

539 Motor Speech Disorders (3) Neuromotor organization for speech production; types of motor speech disorders and associated neuromotor syndromes in the diagnosis and management of motor speech disorders.

540 Structural Speech Disorders (3) Etiology, diagnosis and clinical management of craniofacial speech disorders and laryngeal anomaly.

541 Pediatric Oromotor Disorders (3) Evaluation, diagnosis, and treatment of pediatric oromotor disabilities that affect normal acquisition of feeding and preschool skills. Prereq: 506 or consent of instructor.

542 Hearing Disorders (3) Effects of heredity, development, aging, disease, 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. Electroacoustical and real-ear analysis of hearing aids. Coupler material and geometry effects. Practical experience in troubleshooting, repair and construction of hearing aids. Prereq: 473 and 507 or equivalents or consent of instructor.


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

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

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

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

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

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

552 Seminar in Speech Pathology (1-3) Current research in speech pathology. Topic vary. Prereq: 5hrs in speech pathology. May be repeated with consent of department. Prereq: 5hrs in speech pathology. May be repeated 10 hrs.

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

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

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

563 Language Disorders: Birth to Three (3) Overview of family focused, multidisciplinary intervention process. Evaluation and treatment of infants, toddlers, and preschoolers. Description of disabilities and resulting communication disorders. Prereq: 461 or equivalent or consent of instructor.

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

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

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

577 Vestibular Disorders (3) Anatomy, physiology, and pathophysiology of vestibular system and other systems that contribute to balance. Prereq: 461 or consent of instructor.

579 Psycholinguistic Concepts in Speech Pathology (3) Psycholinguistic concepts and information theory in 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, speechreading, school-based programs, programs for adults and the elderly; student research reports/case studies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

600 Doctoral Research and Dissertation (3-15) P/NP only: 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 psychological 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 Neurologically-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 6 hrs.

652 Advanced Seminar in Speech and Language (2) Topics vary: aberrations of voice, articulation, speaking time and rhythm, language development or use, and language symbolism. Prereq: Consent of Instructor. May be repeated. Maximum 6 hrs.

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

656 Directed Research (1-4) Participation in on-going 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 Speech Science (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

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

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

### Aviation Systems

**Aviation Systems** (UT Space Institute)

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<tr>
<th>MAJOR</th>
<th>DEGREE</th>
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<tr>
<td>Aviation Systems</td>
<td>M.S.</td>
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Frank G. Collins, Co-Chair
Ralph D. Kimberlin, Co-Chair

Professors:
Collins, F. G., Ph.D. California Kimbrell, R. D. (Liaison), Ph.D. RWTH (Germany)
Mason, A. A. (Emeritus), Ph.D. Denver Paludan, C. T. (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 an area pertinent to aviation. Current emphases include flight testing, aircraft design, aviation meteorology, air traffic control, and airport management.

To qualify for admission to this program, the applicant must possess a Bachelor's degree in engineering or science from an accredited institution, show evidence of ability to pursue and benefit from the program, and fulfill The University of Tennessee Graduate School admission procedures and grade-point standards. It is expected that the student will have a basic knowledge of computer utilization and statistics; an understanding of 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 electives in the major field, mathematics or engineering.
3. Three hours of an assigned project under Aviation Systems 550.
4. 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.
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
Churchich, Jorge 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. ................................ New York
Kennedy, J. R., Ph.D. ........................................ Iowa
Liles, J. N. (Emeritus), Ph.D. .................................... Ohio State
MacCabe, J. A., Ph.D. ....................................... California (Davis)
McKee, B. D., Ph.D. ......................................... Michigan State
Monty, Kenneth J., Ph.D. .................................... Rochester
Rich, L. Evans (Emeritus), Ph.D. ................................. Chicago
Salo, T. P. (Emeritus), Ph.D. .................................. Michigan
Shippee, 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. ............................. Kentucky
Peterson, Cynthia B., Ph.D. ................................... LSU
Prosser, R. A., Ph. D. ....................................... Michigan State
Roberts, Daniel M., Ph.D. .................................... California (Davis)
Serpers, 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:
Mazur, 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. No survey courses will be accepted.

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 five 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 the state of Kentucky to enroll in 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 metabolism, mechanisms of catalysis, and enzyme 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, genome structure and genetics, and mechanisms of biological regulation. Prereq: Biology 240 General Genetics, Chemistry 350-360-369 Organic Chemistry and Lab.


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 biochemical genetics; regulation of biological processes. May not be counted if credit received for 401. Prereq: Chemistry 350-360-369 Organic Chemistry and Lab. Biology 140 Organ Culture of the Cell. Biology 240 General Genetics. 3 hrs and 1 discussion. Sp.


421 Cell and Tissue Structure and Function (4)
Study of animal cells and tissues at light and electron microfcope 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 technology modules: techniques used in cell isolation, purification, culturing, fluorescence microscopy, receptor binding and signal transduction, apoptosis, cellular and nuclear analysis, protein and steroid secretion, computer modeling, and state-of-the-art electron microscopy. Experiment design, execution, data analysis, and peer evaluation. Prereq: or coreq: 419 or 410. F, Sp.


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

501 Advanced Protein Chemistry and Cellular Biology (3) Cellular and molecular level in progression: protein structure and function; membrane structure and function; bioenergetics and membrane proteins. Prereq: Prior knowledge of cell biology and biochemistry and/or consent of instructor.

512 Advanced Molecular Biology (3) Regulation of nucleic acid expression activity; nucleic acid structure and function; replication and repair of nucleic acids; gene expression; protein synthesis; post-translational protein modification; mitosis and meiosis; cyclic AMP and cell growth. Prereq: 511 or consent of instructor. F.

513 Advanced Protein Biochemistry and Cell Biology II (3) Advanced topics of cellular function and regulation of cell division and growth, and structure and function of supramolecular structures: cytoskeleton and cell junctions and adhesions. Prereq: 511. F.

515 Experimental Techniques 1 (4) Modern experimental methodology and instrumentation lab: cell growth; spectrophotometry; microscopy; nucleic acid purification and analysis; protein assays; enzyme purification; electrophysiology; computer analysis of nucleic acid and protein sequences. Lectures on theory of laboratory to accompany two lab periods per week. Primarily for departmental graduate students. Prereq: Consent of instructor. F.

516 Experimental Techniques II (3) Laboratory rotations. Students work in laboratory of faculty member on clearly defined project. Written proposal and oral report. Primarily for graduate students. Prereq: 515. S/NC only. F.

517 Physical Biochemistry (3) Physics and chemistry of biological systems and molecules. Thermodynamics, equilibria, electronic and magnetic properties of macromolecules; enzyme kinetics, binding reactions; spectroscopy, electrophysiology. Prereq: 511 or consent of instructor.

520 Special Topics (1-2) Selected directed readings or special course in topics of current interest. Contact the department for offerings. May be repeated with consent of instructor. Maximum 6 hrs. S/NC only. Sp.

525 Graduate Research Participation (3-12) Tutorial laboratory experience. May be repeated. Maximum 12 hrs. E.

530 Experimental Design and Analysis (3) Development of skills in strategies of experimental design and interpretation of experimental results. Critical discussion of research articles. Illustration of experimental design. Preparation of grant proposal in standard format to be read and discussed by class and by panel of faculty expert in area of proposal. Prereq: 511-512. F.

550 Advanced Concepts in Neurobiology/Physiology (3) Concepts related to neurobiology and physiology with information taken from current literature. Preemminently lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.

560 Advanced Concepts in Structural Biology/Biochemistry (3) Concepts related to structural biology/biochemistry with information taken from current literature. Preemminently lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.

561 Environmental Toxicology (3) (Same as Ecology and Evolutionary Biology 561.)

562 Introduction to Electron Microscopy - Transmission Electron Microscope (4) Practical application to techniques for preparation of biological samples for viewing in transmission electron microscopy. Use of microtome and ancillary equipment, darkroom techniques, preparation of materials for publication, and special project. Admission limited to departmentally approved graduate students. (Same as Botany 510.) 2 hrs and 1 lab. Sp.

564 Introduction to Electron Microscopy-Scanning Electron Microscope (3) Practical introduction to techniques of electron microscopy and to scanning electron microscopy. Use of microscope, introduction to darkroom techniques and digital image processing, preparation of samples for observation, and special project. Prereq: Consent of instructor. May be repeated.

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

580 Advanced Concepts in Genetics/Developmental Biology (3) Concepts related to genetics/developmental biology with information taken from current literature. Predominantly lecture format with student participation. Specific subject area to be announced. Prereq: Consent of instructor. May be repeated.

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

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

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

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


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

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

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

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

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


610 Current Topics in Biochemistry, Cellular, and Molecular Biology (1-2) Critical reviews of research problems and methods in biochemistry, cellular biology, and/or molecular biology. Oral presentations, written
Botany

(College of Arts and Sciences)

**MAJOR DEGREES**

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

**Edward E. Schilling, Head**

**Professors:**

Caponetti, J. D., Ph.D. .......... Harvard 
Clebsch, E. E. C. (Emeritus), Ph.D. ..... Duke 
DeSelm, H. R. (Emeritus), Ph.D. ..... Ohio State 
Evans, A. M. (Emeritus), Ph.D. ......... Michigan 
Hullman, A. S. (Emeritus), Ph.D. ..... Ohio State 
Harrill, W. R. (Emeritus), Ph.D. ...... Yale 
Hickok, L. G. Ph.D. .............. Massachusetts 
Holton, R. W. (Emeritus), Ph.D. ..... Michigan 
Hughes, K. W., Ph.D. .............. Utah 
Mullin, B. C., Ph.D. ............... North Carolina State 
Petersen, R. H. (Distinguished Professor), Ph.D. .......... Columbia 
Schilling, E. E. (Lissian), Ph.D. .... Indiana 
Schwarz, O. J., Ph.D. ............ North Carolina State 
Smith, D. K., Ph.D. .............. Tennessee 
Wolfford, B. E. (Curator), Ph.D. ...... Tennessee 

**Associate Professors:**

Amundsen, C. C., Ph.D. .......... Colorado 
Pigliucci, M., Ph.D. ............... Connecticut 
Smith, D. K., Ph.D. .............. Tennessee 
Wolfford, B. E. (Curator), Ph.D. ...... Tennessee 

**Assistant Professors:**

Cruzan, M. B. C., Ph.D. SUNY (Stony Brook) 
Small, R. L., Ph.D. .......... Iowa State 
von Armin, A. G., Ph.D. ......... East Anglia (UK)

**Lecturer:**

McFarland, K. D., Ph.D. .......... Tennessee

**Edward E. Schilling, Head**

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, photobiology, physiology, plant pathology, and taxonomy.

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

**ADMISSION REQUIREMENTS**

The Botany Department requires scores of 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.

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.
2. Successful completion of 30 hours of graduate credit, at least two-thirds of which must be at the 600 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, phycology, aquatic vascular plants, mycology, woody plants, and botanical photography. May be repeated under different topic. Maximum 9 hrs.

**403 Plant Evolution** (3) Evolutionary biology from plant perspective. Speciation, hybridization, polyploidy, origin of mating systems, phenotypic plasticity; comparison of characteristics of animal and plant systems. Lectures; paper discussions on primary literature; current research in evolutionary ecology and genetics. Prereq: General Botany or Biodiversity; Organization and Function of the Cell. (Same as Ecological and Evolutionary Biology 403.)

**404 Plant Molecular Biology** (4) Current research in plant molecular biology: techniques and procedures.
Genome structure, gene expression and regulation, transformation, transposable elements, plant development. Labs: isolation of DNA and RNA, molecular hybridization, isolation and preparation of plasmids, PCR amplification of specific sequences, DNA sequencing and transformation. Prereq: Biodiversity; Organization and Function of the Cell and Genetics with grade of B or better and consent of instructor. 2 hrs lecture, 2 hrs lab.

412 Plant Anatomy (3) Cells, tissues and organs; development in vegetative and reproductive structures of vascular plants—seed plants. Prereq: General Botany or Biodiversity; Organization and Function of the Cell or equivalent.

431 Plant Ecology (4) Interactions between individuals, species, communities and their environments. Circulation of energy and matter in ecosystems. Weekly field trips or laboratory periods, and at least two 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: General Botany or Biodiversity; Organization and Function of the Cell or equivalent and General Chemistry or equivalent. Recommended prereq: Botany 412. Prereq: General Botany or Biodiversity; Organization and Function of the Cell or equivalent and General Chemistry or equivalent. Recommended prereq: Botany 412.

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

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

503 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 Physiology (4) Comparative study of major asexual phyla, both freshwater and marine: morphological, developmental, ecological, taxonomic and phylegetic 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) photographic and preparatory techniques. Film and video for recording and presentation for research and publication of data in pictorial and graphic form.

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

521-22 Advanced Plant Physiology I, II (3, 3) 521- Plant biochemistry and metabolism: respiration, photosynthesis, carbon partitioning, and biosynthesis of specialized plant products: terpenoids, alkaloids, phytates and plant growth regulators. 522-Growth and differentiation of plants at molecular, cellular and organismic levels. Hormonal regulation of development, macromolecular interpretation of differentiation, dormancy, germination, flowering and senescence. Prereq: Introduction to Biochemistry or Biochemistry and Cellular and Molecular Biology 510, or consent of instructor. Prereq: 310 or consent 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. S/NC only.

544 Seminar in Botany (1) Readings and discussions of current literature and/or selected topics in botanical research. May be repeated. Maximum 4 hrs. S/NC only.

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

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


635 Environmental Assessment and Sustainable Development (3) Prereq: Botany 412 and 1 semester Introductory Plant Physiology or Cell Biology. (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 civilizations to modern periods. May be repeated. Maximum 4 hrs.

## Broadcasting

### MAJOR

<table>
<thead>
<tr>
<th>DEGREES</th>
<th>Communications</th>
<th>M.S., Ph.D.</th>
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<tbody>
<tr>
<td>Barbara A. Moore, Head</td>
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</table>

### Professors:

- Holt, Darrel W. (Emeritus), Ph.D. ........................................... Northwestern University
- Howard, Herbert H. (Emeritus), Ph.D. .................. Ohio University
- Moore, Barbara A., Ph.D. ......................... Ohio State University
- Swan, Norman R., Ph.D. ............................... Missouri State University

### Associate Professors:

- Bates, Benjamin J., Ph.D. ......................... Michigan State University
- Wilkinson, Jeffrey, Ph.D. ...................... Georgia Tech University

### Assistant Professors:

- Harmon, Mark, Ph.D. ............................... Ohio State University
- Luther, Catherine, Ph.D. .............................. 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: 430 or consent of instructor.
- 460 Broadcast News Operations (3) Production of news programs for broadcast on television stations. Electronic news gathering, editing and writing news packages and studio production. Prereq: 410 or consent of instructor.
- 470 Cable Television and Emerging Technologies (3) History and structure of cable television industry. Cable regulations and programming. Entry of telephone companies in distribution video. Analysis of all relevant technologies: direct broadcast satellite, fiber optics cable, high definition television, and others. Prereq: Introduction to Radio and Television or consent of instructor.

### BUSINESS ADMINISTRATION

### (College of Business Administration)

### MAJOR

| DEGREES | Business Administration | J.D.-MBA, M.S.-MBA, Ph.D. |

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

The full-time MBA is for students seeking a full-time, weekend 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.-MBA with the College of Law and the M.S.-MBA 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 University that offer the MBA in a part-time format.
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) 974-1600.

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 applicant recommendation forms, and the Graduate Management Admission Test (GMAT) score report. The first items should reach The Graduate School one month before the MBA application deadline to allow for processing. Additional information is required by The Graduate School for international students.

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

Prerequisites

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: 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 in nature with self discovery within a team setting is an important element of the learning process. Individualized support is provided for developing both written and oral communication skills.

Concentration and Electives

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

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 electives 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.


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 encouraged to pursue an internationally 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 aims at building a strong academic foundation for both entrepreneurial and intrapreneurial activities. The new venture analysis and entrepreneurship concentration is offered in recognition of the growing trend in American business today towards new product/venture development. The new venture analysis 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 555. 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 projects applied 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.

Admissions Criteria: 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 also submit the 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 study and professional experience should demonstrate ability with both qualitative and quantitative work.

Transfer Credits: Because of the nature of the executive track curricula, 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 leading-edge 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 11-day residence periods in alternate months starting in January and ending in May. The May residency period, however, is a global business seminar of two weeks and is held in South America, Asia or Europe. On-campus work includes synchronous computer classes and requires substantial and regular contact with faculty and other participants. The project work in the executive MBA is a large-scale management project running throughout the year. Students work with managers in their own organizations to choose a project of significant scale and scope. Each student project has a faculty advisor.

Applications are accepted for January entry only. The early application deadline is June 1, and the final application deadline is September 15. Students will receive materials for study in mid-November preceding the January start date.

Physician Executive MBA

The physician executive MBA is provided for a national audience of physicians. The students for whom this program is designed have an M.D. or D.O. degree with five or more years of work experience. The curriculum objectives are the same as those for the executive MBA, but in the physician executive MBA many of the functional skills are taught in the context of the health care industry, and there is a specialized content related to the health care environment. The physician executive MBA is the right choice for physicians who want to have a voice in the health care industry and in their own careers and are seeking a program that allows them to continue their practice while earning their MBA degree.

The physician 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. All 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. The final application deadline is April 15. Students will receive materials for study in mid-November preceding the January start date.

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 at least 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 to develop skills in 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 three semesters completed in 19 months. Teams of UT faculty travel to Taipei for five 8-day residence periods occurring 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. The 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 years must take and pass it with a score of 213 or higher on the computer-based version. Students who have been accepted to the program will be taken after enrolling 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 conferment 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 conduct of business and business-related law practice, the complementary nature of many aspects of the graduate programs of the College of Law and the College of Business Administration, and the intellectual benefits inherent in the concurrent study of both business and business-related law. The program is designed to accommodate the interests of students who (a) contemplate a career in public service and want to acquire the skills and perspective of the lawyer and the business-oriented manager, (b) contemplate a career in business management and want to acquire the skills and perspective of a lawyer, or (c) contemplate a career as a lawyer specializing in business-related law and want to acquire the skills and perspective of the business-oriented manager.

Admission Requirements

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

Students who have been accepted by both colleges may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both colleges. Such approval will be granted, provided that dual program studies be started prior to entry into the last 28 semester hours of J.D. coursework and prior to entry into the second year of the MBA program. Students interested in pursuing 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 and may 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. Students may register through 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. The College of Business Administration will award a grade of Satisfactory for a law course in which the student has earned a 2.5 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 conferment of the Master of Business Administration degree (concentration in manufacturing management) and the Master of Science degree with a major in Industrial Engineering (concentration in manufacturing systems engineering). The dual program saves the student one or two semesters over the time that would be required to earn both degrees independently.

The establishment of the dual program addresses the critical need for 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 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). 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.

Admission Requirements
Students seeking a Ph.D. degree must be recommended by the College of Business Administration to The Graduate School. Application is required on the overall standing compared with other applicants and with the number of vacancies in each department. The College of Business Administration requires the Graduate School Application, transcripts from all previous college work, and additional information from international students. The college requires the Ph.D. application, scores from the GMAT, and four written recommendations. All materials should be received by the College of Business Administration not later than March 1. Late applications are considered only if space is available.

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

Program of Study
The Ph.D. normally requires 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 a doctoral program, each student is required to serve as a teaching assistant to an undergraduate business course 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 webpage.

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 of 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 may be taken only once.

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 fulfillment 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 is available 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, (3) 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 management. Functional fundamentals (accounting, finance, marketing, operations, human resource management) through year-long case in which knowledge is applied to real or simulated real-world enterprises. Continuous systems improvement and delivery of customer value: role of firm in society (with attention to social, economic, and the ethical and legal environment of firm). Professional leadership skills: teamwork, written and oral communication, and assessment of students' leadership abilities. Prereq: Admission to MBA program or consent of Dean of the MBA Program.

505 Core II (15) Continuation of 504. Functional fundamentals through year-long case. Case-study work on organizational reality, global competition, managing 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 internetworks. Design of structured system 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. Mass customization, interactive marketing, capacity management economics, and relationship management for industries: healthcare, consulting, temporary services, professional services, repair services, truckload transportation, emergency response organizations.
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, totaling approximately 24 semester hours, subject to approval by the student's faculty committee.
2. Supporting courses in related scientific and engineering fields totaling approximately 24 semester hours.
3. The comprehensive examination, consisting of a written and oral part.
4. Active participation in graduate seminars conducted by the department.

Resident students must register for ChE 501 every semester offered.

GRADUATE COURSES

403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical engineering problems; unconstrained and constrained optimization methods, linear programming methods, and geometric programming. Prereq: Math 241.

415 Computer Applications in Chemical Engineering (3) Computer solution of chemical engineering problems. Application of existing computer programs to chemical engineering problems; use of computer terminals, spreadsheets, and graphical process modeling software. Prereq: Math 241.


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

477 Honors: Applied Process Automation Laboratory (3) Interfacing flexible batch continuous processes to automation systems. Top-down analysis with bottom-up implementation, hierarchical structures and object oriented controls. Prereq: Process Automation Laboratory (3).


485 Hydrocarbon Processing (3) Chemical and physical properties of selected petroleum and other engineering systems.

Non-Thesis Option: Under certain conditions, a candidate may apply for a non-thesis program. To be eligible, a candidate must show evidence of significant professional experience after the baccalaureate degree; at least five years of industrial experience or research publications would be examples of such evidence. The departmental faculty will consider each application individually. Upon 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 reviewing the paper and related areas.
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 studies, analysis of alternative waste minimization/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.

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

631 Advanced Topics in Statistical Thermodynamics and Kinetics I (3) Basic concepts of statistical thermodynamics, equilibrium and nonequilibrium thermodynamics, statistical mechanics, molecular-based computer simulations, Monte Carlo and molecular dynamics calculations; applications to supercritical fluids, macromolecules and biological systems. Prereq: 592.


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

643 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 models. Structuring of important mechanistic processes, interactions, and regulation at several systems levels (reactor or reactor, ecological, cellularphysiological, and molecular). Experimental methods for data gathering, signal resolution and processing, mathematical signal analysis, model development (deterministic, stochastic, phenomenological), and utility and limitations of approach. Prereq: 576 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. W., Ph.D. ............ Texas
Alexandrov, S. D. (Hoechst-Celanese Prof. of Polymer Science), Ph.D. California
Baker, D. C. (Paul and Wilma Ziegler Prof.). Ph.D. Ohio State
Bartmess, J. E., Ph.D. .......... Northwestern
Bloor, J. E. (Emeritus), Ph.D. .... Manchester
Compton, 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
Felger, C. S. , Ph.D. ........ Colorado

Fletcher, W. H. (Emeritus), Ph.D. .... Minnesota
Griffin, F. A. (Emeritus), Ph.D. ......... Cornell
Guichon, G. (Distinguished Scientist), Ph.D. Ecole Polytechnic of Paris VI
Kabalka, G. W. (Robert H. Cole Prof., Distinguished Prof.), Ph.D. Purdue
Kleinfeinler, D. C. (Emeritus), Ph.D. ....... Princeton
Kovac, J. D., Ph.D. ............... Tennessee
Lietzke, M. H. (Emeritus), Ph.D. ........ Wisconsin
Magid, L. J., Ph.D. ............ Tennessee
Pagni, R. M., Ph.D. .......... Wisconsin
Patterson, J. R. (Emeritus), Ph.D. ........ California
Schweitzer, G. K. (Distinguished Prof.), Ph.D. Illinois
Sevanian, M. J., Ph.D. ........ Iowa State
VanHooke, J. A. (Paul and Wilma Ziegler Prof.), Ph.D. Johns Hopkins
Wang, E. L. (Emeritus), Ph.D. ........ Purdue
Williams, T. F. (Distinguished Prof.), Ph.D. California

Associate Professors:
Barnes, C. E., Ph.D. ............... Stanford
Schell, F. M., Ph.D. .......... Indiana
Zue, Z. B., Ph.D. ............... California

Assistant Professor:
Dadmun, M. D., Ph.D. ........ Massachusetts
Gilman, S. C., Ph.D. .......... Pennsylvania
Hinds, Robert, J., Ph.D. ....... Chicago
Turner, J. D., 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 a prerequisite one year each of general, analytical, organic, and physical chemistry with a satisfactory record. At least one-half year 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 a prerequisite one year each of general, analytical, organic, and physical chemistry. 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.

THE MASTER'S PROGRAM

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

The requirements for the M.S. in Chemistry consist of the satisfactory completion of:

1. Research and a thesis to give 6 to 12 hours of graduate credit in Chemistry 500.

2. Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar.

3. Prescribed remedial courses based on performance on entrance examinations.

4. Sufficient grade in inorganic chemistry (at the 400 level or above) and/or a related field to make an overall total of 30 hours, including one of the following sequences: 530-31-32, 550-51-52, 570-72-73, 590-94-95, or three courses from 510-11-12. At least 14 hours of this graduate coursework must be at the 500 level or above.

5. A final oral examination.

THE DOCTORAL PROGRAM

The department offers concentrations in eight areas for the Ph.D.: analytical chemistry, chemical physics (in cooperation with the Department of Physics), environmental chemistry, inorganic chemistry, organic chemistry, physical chemistry, polymer chemistry, and theoretical chemistry.

The requirements for the Ph.D. in Chemistry (except for the chemical physics concentration) consist of the satisfactory completion of:

1. Research and a dissertation to give at least 24 hours of graduate credit in Chemistry 600. Registration must be continuous from the beginning of research.

2. Participation in seminar (Chemistry 501) during the entire period of graduate study, including the presentation of at least one seminar.

3. Prescribed remedial courses based on performance on entrance examinations.

4. Completion of the comprehensive examination series and defense of an original research proposal to give 2 hours of credit in Chemistry 601.

5. Eighteen additional hours in courses at the 500 level or above including at least one course above 601 and one of the following sequences: 510-11-12, 550-31-32, 550-51-52-53-54, 570-71-72-73, and 590-94-95.

6. A final oral examination.

The Ph.D. program with concentration in chemical physics is conducted jointly with the Department of Physics. Requirements depend on the choice of the major department. Chemistry departmental requirements include passing the above degree requirements in chemistry with concentration in physical chemistry plus 6 additional hours in physics at the 500 level or above. Three of the additional physics hours can be used to satisfy the 18 hours requirement in item 5.

GRADUATE COURSES

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 Biotechnology and Molecular Biology 471-81.)

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

479-89 Physical Chemistry Laboratory (2,2) Experiments on topics discussed in 471-81 or 473-83.
C550 Advanced Physical Chemistry (3) Chemical dynamics, statistical thermodynamics, quantum mechanics of atoms and molecules, systems of crystal structure and solid state. Prerequisite: 478 or 483. Sp

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

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

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

505 Special Problems (3) Specially assigned theoretical or experimental work on problems not covered in other courses. Prerequisite: 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 electrochemical phenomena. Required background: Two semesters of physical chemistry.

512 Electroanalytical Chemistry (3) Fundamentals of electroanalytical techniques in quantitative chemical analysis and application to study 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. Prerequisite: Consent of instructor.

530 Chemical Bonding (3) Wave mechanical atom, group theory, quantum approach 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, equilibrium, and spectra of coordination, organometallic, bioinorganic compounds. Required background: One semester of inorganic chemistry.

532 Experimental Methods of Inorganic Chemistry (3) Electronic, infrared, Raman, microwave, NMR, ESR, nuclear magnetic, 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, nucleic structure and models, nuclear reactions, radiation and matter, 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, spectroscopy, conformational analysis, and molecular mechanics; substituent effects on addition and reaction; introduction to reaction mechanisms. Required background: Two semesters of organic chemistry.

551 Organic Reactions (3) Organic transformations of use in synthesis; carboxylic chemistry and carbon-carbon bond formation; stereochemistry and reactivity of synthetic processes. Prerequisite: 550. Sp

552 Organic Reaction Mechanisms (3) Techniques and principles in study of organic reaction mechanisms; applications and interpretations in polar, radical, and pericyclic reactions; radioactive and non-radioactive. Prerequisite: 550. Sp


554 Organic Spectroscopy Laboratory (1) Use of IR, UV, MS and multinuclear FTNMR spectrometers. Development of problem-solving ability in areas of spectroscopic characterization of organic molecules. Prerequisite: 553 or equivalent. Corequisite: 555. 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) Prerequisite: 570 or consent of instructor. Sp

572 Thermodynamics and Statistical Mechanics (3) Macrocscopic and microscopic description of equilibrium 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.

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

594 Organic Chemistry of Polymers (3) Synthesis of monomers, mechanism, stereochemistry, polymerization, formation of block, graft, and network polymers. Reactions on polymers. Prerequisite: 590 or equivalent.

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

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

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

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

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

670 Selected Topics in Physical Chemistry (3) Topics of current significance. Prerequisite: Consent of instructor. May be repeated. Maximum 12 hrs.

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

Child and Family Studies
(College of Human Ecology)

MAJORS

Child and Family Studies ...................... M.S.

Human Ecology ............................... Ph.D.

Ernest W. Brewer, Head

Professors:
Blanton, Priscilla, Ed.D. .................... Tennessee
Buehler, Cheryl, Ph.D. ...................... Minnesota
Cunningham, Jo Lynn, Ph.D. .......... Michigan State
Fox, Greer Litton, Ph.D. .................. Michigan
Moran, James D., Ph.D. .................. Oklahoma State
Nordquist, V. M., 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
Tegano, Deborah, Ph.D. .............. Virginia Tech

Assistant Professors:
Catron, Carol, Ph.D. ...................... Groves, Melissa, Ph.D. .............. Michigan 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 study is carefully planned in conjunction with a faculty committee to establish a program consistent with program requirements and a student's individual goals. All programs are characterized by a broad array of coursework, varied research experiences, and opportunities for experiences in applied settings.

ADMISSION REQUIREMENTS

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

Admission to the program is contingent upon faculty evaluation of GRE scores, undergraduate/graduate GPA, rating forms, work experience, and the match between student's goals and department's foci. 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 appropriate substitutions), 3 hours of computationally-based, graduate-level statistics, 3 hours of 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 coursework. 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 include 6 credits of specified relevant coursework and a maximum of 6 credits of supervised internship (563 and 565). Specific coursework within each specialization is on file in the Department of Child and Family Studies. Interested students should contact the Graduate Coordinator in Child and Family Studies.

The early childhood education concentration is designed for students seeking initial teacher licensure in early childhood education (Pre-K through Grade 3). This program is based on an undergraduate degree in child development or equivalent coursework. A non-thesis option only is available. All students in the early childhood education licensure program must enroll in Human Ecology 574, 575, 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, 530, 540, 550; 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).

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 a selected area of study. A doctoral program that is concurrently specialized and integrative in nature reflects the complexity of the disciplinary subject matter, provides a broader context to formulate theoretical questions, and broadens the empirical literature for addressing those questions.

Requirements include:
2. Completion of the doctoral core: 640, 654, 651 or 652.
5. Three credits of advanced statistics.
6. Minimum 3 credits in specialized research methods.
7. Selection of one of the following specializations: teaching in higher education (requires UT GTA seminar, 3 credits of college teaching methods, and one semester of supervised teaching experience); administration in community services (requires 566 or 563, 521 or HRD 512 or SW 541, and one semester of an administrative apprenticeship); research emphasis (requires 6 additional credits in research methods or statistics).
8. Minimum of 6 credits in a cognate area.
10. Minimum of 66 credits beyond the bachelor's degree.

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 and/or after the term in which the facility, and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
505 Development of Interpersonal and Supervision Skills (3) Refinement of interpersonal skills needed to work with families and other professionals. Supervisory training in children's skill development, active listening, self-disclosure, relationship building, and negotiation. Skills adapted for use among family members.
510 Theory in Human Development (3) Theoretical models of human development: cognitive, social learning, and ecological frameworks, analysis, synthesis, and discussion of historical and contemporary relevance of models, application of theory to research, prevention, intervention, and education; critical reading and evaluation of theory-based research on human developmental processes.
511 Survey of Research in Child Development (3) Survey of current research development research from conception through adolescence. Classic and contemporary empirical literature in domains of physical, cognitive, linguistic, social, emotional, and moral development; biological basis of development of cross-cultural perspectives.
512 Survey of Research in Early Childhood Education (3) Current literature and issues in early childhood education. Prereq: 510 or equivalent or consent of instructor.
515 Children in Contemporary Society (3) Theory and research on environmental and developmental issues in contemporary family situations and educational environments for children from infancy through middle childhood. Implications for programs and policy.
521 Organizational Management in Early Childhood Education (3) Designing, implementing, and evaluating physical and human resources in educational environments. Emphasizes environmental organization, interpersonal leadership, budgeting and supervision of staff. Required background: 6 hrs graduate-level coursework in early childhood education or child development.
522 Naturalistic Interventions for Parents and Teachers of Young Children (3) Common problems faced by parents and teachers; methods available to modify problem behavior.
525 Seminar on Play (3) Comparison and contrast of theoretical frameworks and research methodologies on play. Developmental perspective on play.
530 Families of Children with Disabilities (3) Developmental nature of families' experiences in caring for handicapped children, especially during infancy and early childhood.
535 Child and Family Policy (3) Key policy issues related to children and families:custody disputes, family poverty and welfare reform, parental kidnapping, abuse and neglect, child care, employment and practices and policies, basic elements of family impact analysis. Required background: 6 hrs master's core.
550 Theory and Research in Family Studies (3) Research and application of theoretical models to understanding research.
555 Children, Divorce and Remarriage (3) Children's and adolescents' adjustment to transitions involved in parental divorce, single-parenthood, and remarriage.
564 Practicum in Human Development or Family Studies I (3) School and community programs. Education for human development and family living. Committee approved of resource management written project. S/NC only. E
565 Practicum in Human Development or Family Studies II (3) School and community programs concerned with education for human development and family living. Committee approved of supervised written project. S/NC only. E
566 Approaches to Family Intervention and Counseling (3) Various theoretical approaches for family intervention and counseling: Structural, strategic, experiential, and social learning and practice. Effects of intervention from perspective of their impact on family functioning and communication. Prereq: 562. (Same as Counseling Education and Counseling Psychology 566.)
567 Family Violence (3) Theory and research on initiation, maintenance and cessation of violent behaviors in intimate family contexts, and assessment of responsibility to violent family members, victims, and family systems. Prereq: 550.
571 Research Seminar (1) Presentation and critique of research projects. Prereq: Departmental major or consent of Instructor. May be repeated. S/NC only. E
Civil and Environmental Engineering

(College of Engineering)

MAJORS

Civil Engineering .................................. M.S., Ph.D.
Environmental Engineering ........................ M.S.
(Ph.D. through Civil Engineering)

DEGREES

Gregory D. Reed, Head

Professors:
Bennett, R. M., PE, Ph.D. ....................... Illinois
Burdeau, E. G. (Fred N. Pfeebles Prof.), PE,
Ph.D. ........................................... Illinois
Chatterjee, A., PE, Ph.D. ....................... NC State
Davis, W. J., 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. .... Illinois
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, Ph.D. . So.D. 
Walker, C. R. (Emeritus), M.S. ............... MT
Wegmann, F. J., Ph.D. .......................... Northwestern

Associate Professors:
Chou, K. G., Ph.D. .............................. Northwestern
Cox, C. D., Ph.D. ................................ Penn State
Han, L. D., Ph.D. ................................ California
Mauldon, M., 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 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 course work is 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 390, 395, 396; Mathematics 141, 142, 231, 241; Chemistry 120, 130. In general, these must be completed with a B average before courses for graduate credit can be taken.

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

Thesis Option: The student must present a minimum of 30 semester hours of approved graduate courses. The 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 18 semester hours of approved environmental engineering coursework. A minor may be selected but is not necessarily required.

Either option must be approved by the student's major professor. A student's program must include a minimum of 9 semester hours of 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
Civil and Environmental Engineering

Graduate Courses

421 Portland Cement Concrete Mix Design and Analysis (3) Aggregate and admixture tests of portland cement and concrete, mix design methods, admixtures, and nondestructive testing. Prereq: 321, 2 hrs and 1 lab.

451 Highway Engineering (3) Design, construction, operation, and maintenance of highway facilities; application of various engineering principles and techniques to process of planning, locating design of highway facilities; both geometric and pavement design. Prereq: 210, 251, 352.

452 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their interrelationship; traffic studies; basic considerations of traffic circulation and control; lighting; capacity analysis; roadway safety analysis and design. Prereq: 210, 251, 352.

453 Airport/Railroad Planning and Design (3) Airport master planning and railroad engineering. Runway configuration, airfield capacity, geometrics and terminal layout and design. Railroad capacity, geometrics and system layout and design. Prereq: 210, 251, 352.

461 An. of Framed Structures (3) Determination of dead, live, wind and earthquake loads for buildings: vertical and lateral load resisting systems: analysis of building frames. Prereq: Structural Analysis II.

472 Steel Design (3) Design of plate girders and composite beams; consideration of member subjected to combined stresses; design of typical framed building connections. Prereq: 471.

474 Reinforced Concrete Design (3) Design of continuous beams, columns and slabs with combined axial loads and bending, foiling; and design for torsion. Prereq: Introduction to Structural Design.

485 Principles of Hydrogeology (3) (Same as Geological Sciences 485).
design and response of structures. Prereq: Introduction to Structural Design.

571 Behavior of Steel Structures (3) Behavior of structural steel members due to static and fatigue loading; relation between research results and current specifications for design. Prereq: 471.

572 Fracture Analysis (3) (Same as Geology 572.)

573 Prestressed Concrete (3) Properties of prestressing materials; methods of prestressing and posttensioning; 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; flexural analysis; 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, geotechnological, 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 nonthesis programs. May be repeated. Maximum 6 hrs. S/NC only.

595 Special Topics (1-4) Problems and topics related to current design or analysis 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 (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 558.

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 ACI 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: 560. 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

508 Seminar (1) Reports on current research in environmental engineering at UT. Prereq: Graduate standing.

510 Environmental Protection (3) Managing water resources, wastewater, air quality, solid waste, and hazardous materials to promote efficiency and comfort and to safeguard biological systems 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; hydraulic design; flow measurement; non-linear alignment; computer applications, featuring HEC-2. 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: structural and non-structural; institutional responses: policies, programs, organizations, regulations, and legal aspects; floodplain hydraulics and hydrologies; HEC-1, HEC-2; floodway enrochment; flood and land use zone and damage potential determinations; case studies. Prereq: Hydraulics or consent of instructor for non-environmental engineering students. E

524 Sediment Transport (3) Sediment properties and measurements; principles of dynamics of suspended and bed sediment transport in erodible channels; erosion, deposition, and transportation of sediment by flowing water; estuarial channel design; channel regimen theory; common computer models. Prereq: Hydraulics.

525 Soil Erosion and Sediment Yield (3) Theory of soil erosion and sediment yield processes from disturbed land; problems and methods for estimating sediment yield. Erosion and sediment control; theory and management practices. Local and state regulations. Prereq: Civil Engineering 390. (Same as Biosystems Engineering 525.)

530 Urban Hydrology and Stormwater Engineering (3) Planning, design, modeling, management, and maintenance of urban stormwater systems. Atmospheric and hydrological processes associated with impervious surfaces; stormwater management systems; design of urban stormwater systems; design of stormwater management systems; design of stormwater management systems; design of stormwater management systems; design of stormwater management systems; design of Stormwater Management Systems. Prereq: 651. (Same as Biosystems Engineering 530.)

535 Ground Water Hydrology (3) Dynamics of ground and contaminant transport in porous media: hydrodynamics, dispersion, anisotropy, layered soils, unsaturated flow and groundwater contaminant transport phenomena. Analytical and numerical solution of moving boundary problems. Prereq: Hydraulics and Hydrology or Civil Engineering 485 (Geology majors). (Same as Geology 535.)

540 Remote Sensing for Transportation and Facilities Siting (3) Principles of remote sensing: sources of data and data acquisition systems; photo interpretation, analog 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 Physiochemical 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 application of biological processes to treatment of wastewater and solid waste. Prereq: Water and Waste Treatment. 2 hrs and 1 lab. (Same as Biosystems Engineering 552.)

553 Aquatic Chemistry (3) Theoretical, applied, and analytical chemistry related to generation, measurement and treatment of water pollutants. 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 chemistry and consent of instructor.

555 Solid Waste Management (3) Magnitude and characterization 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: Consent of instructor.

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 and monitoring for particulate and gaseous air pollutant emissions from industrial processes; ambient air monitoring instrumentation and 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 nonthesis 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.


651 Industrial Waste Unit Operations and Processes (3) Theoretical design and laboratory modeling of industrial waste treatment processes and operations. Prereq: 551, 553, Prereq or coreq: 552. 2 hrs and 1 lab.

653 Pollutant Fate Modeling and Risk Assessment (3) Application of scientific principles concerning movement and fate of chemicals at interfaces between water, and earthen solids in environment. Methods of assessing risk posed by presence of those chemicals. Prereq: 551.

691 Special Topics in Environmental Engineering (3) Selected advanced problems of current interest. Prereq: Consent of instructor. May be repeated.

Classics

(College of Arts and Sciences)

Susan D. Martin, Head

Professors:

Gosnell, G. C. (Lindsay Young Prof.), Ph.D. .................. North Carolina
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 application information 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 require-
ments of The Graduate School. In addition,
they must complete the Graduate Record
Examination, rating forms, and application
forms as required by the College of
Communications. Minimum requirements
for admission to full potential candidate status
normally include a 3.0 (4.0 system) grade-
point average in undergraduate studies and
scores at or above the fifteenth percentile in
verbal, quantitative and analytical aptitude on
the Graduate Record Examination. All
application materials are screened by an
admissions committee authorized by the
faculty of the College of Communications.

New students normally are admitted to the
programs only at the beginning of fall
semester. However, under special circum-
stances, a student may be admitted at the
beginning of spring semester in a temporary
non-degree status. Applications for fall
admission must be received by May 1.

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 no courses in
their major area of concentration may expect
to spend four or more full-time semesters in
the program, including a media internship.

THE MASTER'S PROGRAM

The Master of Science with a major in
Communications is intended for students
who desire a career in the mass media and
communications industry, with an emphasis
on communications management and a
deeper understanding of the communication
process and social role of media. The
program follows a broad-based multi-media
approach while allowing the student to
concentrate in one of five fields: advertising,
broadcasting, journalism, public relations or
speech communication. Both thesis and
non-thesis options are available.

The prospective student who is interested
only in 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 in the M.S. program
through special academic advising.

Degree Requirements

The M.S. program emphasizes communica-
tions management and industry in the
areas of advertising, broadcasting, journal-
ism (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: Communi-
cations 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 Associ-
deate 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 (Communica-
tions 500) or a 3-hour project (Communica-
tions 590).

Additional hours may be required for
those who do not have academic prerequi-
sites, 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 prerequi-
site.

A student's internship experience
requires approval by academic advising. Credit
will be given through Advertising 558,
Broadcasting 598, Journalism 598, or Public
Relations 598 on the basis of 3 hours of
credit for the equivalent of 15 weeks of full-
time professional experience. This credit is to
be included in the hour requirements for the
M.S. program. Previous professional
experience will be evaluated by the student's
committee.

Students interested in subsequent entry
into a doctoral program are advised to
take the qualifying examination in the
field they wish to study. A prerequisite
examination, if needed, is to be included in
the college in the required professional
experience and research, subject to advisor's
approval.

After completion of the formal program
coursework and research for the thesis
option, the student must pass an oral
examination conducted by his/her graduate
committee. The non-thesis option requires a
written comprehensive examination and an
oral defense of the project.

THE DOCTORAL PROGRAM

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

The program is interdisciplinary, consist-
ing 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 communica-
tions. New 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 fiftieth 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 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, Seminar 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, Kentucky, West Virginia, and the District of Columbia. Additional information may be obtained from the Admissions Specialist in the Office of Graduate Admissions and Records.

ACADEMIC STANDARDS

A student in the College of Communications whose graduate grade-point average, not including incomplete grades, is below 3.0 at any time after the end of 12 hours of graduate credit will be placed on probation. A student on probation will be dropped from the program unless his or her cumulative graduate grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next 12 semester hours of graduate coursework attempted that is specified in the student’s degree program. Exceptions to this policy may be made only with the approval of the Associate Dean for Graduate Studies of the College of Communications on the recommendation of the student’s faculty committee.

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. Gathering and analysis of data for assessing media audiences and message impacts. Prereq: Consent of instructor or admission to program. Sp

500 Thesis (1-18) P/NP only. E

602 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. Prereq: Consent of instructor or admission to program. Sp

512 Mass Media Research Methods (3) Applications of communication research techniques for management. Analysis of research data for assessing media audiences and message impacts. Prereq: Consent of instructor or admission to program. P

521 Tutorial in Communications Teaching (1) Experience as teacher under guidance of faculty member. Prereq: Consent of instructor. S/NC only. E

540 Communications Theory (3) Selected research hypotheses and theories in literature of mass communications. Prereq: Consent of instructor or admission to program. Sp

550 Seminar in Media Economics and New Technology (3) Electronic and print media ownership, finance and corporate structure, roles of new technologies, marketing techniques, multimedia and mass media content and function in future. Prereq: Consent of instructor or admission to program. Sp


552 Seminar in Health Communications (3) Methodological and practical problems of communication in health media. Media’s reporting of health issues; setting of media “health agenda”; strategic uses of media in social marketing efforts; public communication of complex social/medical issues. Prereq: Consent of instructor.

553 Seminar in Risk Communications (3) Interaction of scientists, journalists, and public on scientific, technological, and medical risks; analysis of methods for enhancing public understanding. Prereq: Consent of instructor.

560 Seminar in Communications Management (3) Organizational structure and functions of communications corporations: development of objectives, strategies, and tactics. Analysis of management statements and case studies. Computer-intensive.

590 Project (3) Capstone project under guidance of faculty. Prereq: Consent of instructor. S/NC only. E

593 Seminar in Mass Communications Issues (3) Contemporary topics in communications. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

597 Independent Study (1-3) Reading, research, or projects on special topics in communication. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

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

612 Fundamentals of Communications Research (3) Universal research process from defining ideas and problems to reporting results. Causal inference and relative strengths of various research designs. Fundamentals and specific applications of most common data-gathering and measurement techniques in communications research: experimental, survey, content analysis, historical and qualitative. Prereq: Consent of instructor or admission to program. Sp

620 Seminar in Mass Communications Education (3) Role and scope of mass communications teaching unit. Historical perspectives of curriculum and the periodic trends. Teaching methods and instructional objectives; classroom testing and measurement; design of professional curricula, research and extension; program evaluation; grants and contracts in research. Prereq: Consent of instructor or admission to program. Sp

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, hypothesis testing, and inference strategies. Prereq: 612. F

632 Mass Communications History and Historiography (3) Origins and development of mass media in America, Philosophies of history, Historical sources and their verification. Synthesis and interpretation of data. Prereq: 612 or consent of instructor. Su

640 Mass Communications Theory I (3) Selected research hypotheses, and theories of mass communication theory. Prereq: Consent of instructor or admission to program. F

641 Mass Communications Theory II (3) Selected topics in theory. Critical evaluation of extant theories, derivation of hypotheses, and advanced theory construction. Prereq: 640. Sp

642 Qualitative Research (3) Theory and application of qualitative research methods to social science and communications research. Theoretical considerations underlying symbolic interactionism as translated into research strategies of participant observation, life history, interviewing, archival analysis, and case studies. Prereq: 612 or consent of instructor. Su

652 Mass Communications Law and Legal Research (3) Legal restrictions under which mass media operate. Finding, interpreting and analyzing sources of legal information. Prereq: 612 or consent of instructor. Sp

692 Advanced Topics in Communications Theory and Methodology (3) Advanced study of communication issues, theories and methods. May use qualitative, quantitative, historical, or legal approaches. May be repeated. Prereq: 652, 659, 540 or 652 or consent of instructor.
Comparative and Experimental Medicine

(Office of the Provost)

MAJOR

Comparative and Experimental Medicine ........... M.S., Ph.D.

L. N. D. Potgieter, Director

Joint Graduate Coordinating Committee:

Karlstad, M. D., Ph.D., Anesthesiology
Lawler, J. E., Ph.D., Psychology
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 pathology, 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 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. 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 program 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 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, 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 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. 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

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 humane 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 physical properties, metabolism, toxicities, important idiosyncrasies and clinical applications. Prereq: Consent of instructor. F

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

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

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

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

602 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 8 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, implementation and analysis of clinical research. Lab: appraisal of biomedical literature and design of proposal 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 epidemiology and historic and modern application to diseases of animals. Host-agent relationships, identification, 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 topics in pathobiology and mechanisms of disease: pathophysiology, cellular degeneration, inflammation, immunopathology, hemostasis. Prereq: Basic biochemical and morphologic 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 methodologies and applications in comparative and experimental medicine. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. E

611 Advanced Topics in Animal Anatomy (1-4) (Same as Animal Science 651.) E

612 Disorders of the Endocrine System (2) (Same as Animal Science 652.) Sp, A

Computer Science

(College of Arts and Sciences)

MAJOR

DEGREES

Computer Science .......................... M.S., Ph.D.

Robert C. Ward, Head

Professors:

Dongarra, Jack, Ph.D. ...................... New Mexico
Langston, Michael A., Ph.D. ............. Texas A&M

Poore, J. H., Ph.D. .......................... Georgia Tech
Sherman, Gordon R. (Emeritus), Ph.D. Duquesne
Thomson, Michael G., Ph.D. ............. Duke

Ward, Robert C., Ph.D. ........................ Virginia

Associate Professors:

Berry, Michael W., Ph.D. .................. Illinois
Dunigan, Thomas, Ph.D. .................. North Carolina
Gregor, Jens, Ph.D. ........................ Aalborg (Denmark)
MacLennan, Bruce J., Ph.D. ............. Purdue
Plank, James S., Ph.D. ........................ Princeton
Raghavan, Padma, Ph.D. ................... Penn State
Vander Zanden, Bradley, Ph.D. .......... Cornell
Vose, Michael D., Ph.D. ..................... Texas

Assistant Professors:

Straight, David W., Ph.D. ................. Texas
Wolski, Richard, Ph.D. ........................ UC Davis

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 reach agreement on a thesis topic with a faculty advisor and must take 6 hours of 500 Thesis. Six hours of 500 Thesis may count in the 24-hour requirement at the 500 level or above.

Non-Thesis Option

The student must take coursework in an area to prepare for the non-thesis master's examination. The student's advisor must verify that an acceptable set of 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 reach agreement on the problem topic with a faculty advisor and pass an oral exam on the problems before a committee of three or more faculty members, 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, 560) plus an additional 3 hours of graded computer science graduate-level courses at or above the 400 level.

THE DOCTORAL PROGRAM

A student seeking admission to the Ph.D. program is expected to meet the following requirements:

1. The student should have three letters of recommendation sent directly to the department head from individuals capable of
assessing the student's potential for advanced work in computer science (for example, college teachers or employers for whom the student has worked after earning a Bachelor's degree). The department reserves the right to contact these individuals or other knowledgeable people if additional information is deemed necessary or desirable.

2. The student is expected to have taken the GRE verbal and quantitative general test within the past three years and to have these scores sent to The Graduate School.

3. The student should satisfy the same background requirements as for the master's program. See the departmental brochure for details.

Original research reported in a dissertation of high quality is emphasized. The minimum hour requirements are 24 hours of course 600 Doctoral Research and Dissertation and 24 hours of graduate courses beyond the equivalent of a master's degree (i.e., beyond 30 graduate credit hours) graded A-F. Computer Science 530, 560 and 580 are required for the degree. At least six hours of 600-level graded courses must be taken in computer science at 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.

460 Advanced Topics in Software Systems (3) Operating systems, compilers, parallel computation, software engineering, database systems and programming languages. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

470 Advanced Topics in Scientific Computation (3) Numerical methods, supercomputers and computer modeling and simulation of physical systems. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

471 Numerical Analysis (3) (Same as Mathematics 471.)

472 Numerical Algebra (3) (Same as Mathematics 472.)

480 Advanced Topics in Theoretical Computer Science (3) Theory of computation, complexity theory, formal languages and graph theory and its applications. Faculty research. Prereq: Completion of core curriculum or consent of instructor. May be repeated. Maximum 9 hrs.

494 Special Topics in Computer Science (1-3) May be repeated. Maximum 9 hrs.

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

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

532 Boolean Algebra, Logic Design and Microprocessors (3) Boolean algebra. Combinational and sequential logic design. Microprocessors, Hardware lab. Prereq: One yr college mathematics beyond algebra and trigonometry.


539 Computer Networks (3) Design and operation of networks. Hardware and software systems; communications subsystems. Prereq: System Programming and 592.

541 Database Management Systems (3) Data model theory, optimization, and normalization; intelligent database systems; comparison of implementations; analysis of distributed and networked databases. Techniques for evaluation of performance, security, integrity, and reliability. Prereq: Discrete structures.

551 Pattern Analysis (3) Decision-theoretic and structural pattern analysis. Deterministic and statistical classification rules, feature extraction and representation; symbolic and semantic methods, relational models. Prereq: Discrete Structures and probability or statistics.

552 Image Analysis (3) Enhancement and restoration of digital images. 2D transformations. Segmenting and description. Computerized procedures for image reconstruction. Prereq: One year calculus and discrete structures.


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, sparse parallel algorithms. Prereq: Numerical linear algebra.

580 Foundations (3) Foundations of computer science, including computability, computational complexity, fundamental algorithms and algorithm analysis. Required background: Automata theory.

581 Design and Analysis of Algorithms (3) Analysis of algorithms and relevances of algorithms to design of efficient computer algorithms. Sorting, searching, graph algorithms, pattern matching, dynamic programming, efficient approximation algorithms. Prereq: 580.

593 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 (1-8) Prereq: Consent of instructor. May be repeated with consent of department.

660 Advanced Topics in Software Systems (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

670 Advanced Topics in Scientific Computing (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

690 Advanced Topics in Theory and Foundations (1-8) Prereq: Consent of instructor. May be repeated with consent of department.

695 Advanced Topics in Computer Science (1-6) Prereq: Consent of instructor. May be repeated with consent of department.

**Consumer and Industry Services Management**

(Graduate Program in Technology Management)

MAJORS DEGREES

Human Ecology ........................................Ph.D.

Recreation, Tourism and Hospitality Management ........................................M.S.

Textiles, Retailing and Consumer Sciences ........................................M.S.

Nancy B. Fair, Head

Professors:

Bresee, Randall R. (Liaison), Ph.D..................................Florida State

Coiller, 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, Gajanand, 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

Pfaffenberg, 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 knowledge of aging in the field and the aging of society as a whole. The programs in Consumer and Industry Services Management prepare students for
careers in industry, business, public and private agencies, and educational institutions. Master's level work enables students to conduct research in retail management and merchandising and in the consumer areas related to retail decision making. Students in textile science are expected to have a solid foundation in mathematics, as well as a formal background in a physical science or engineering.

Interested students should contact the department head for more information.

ADMISSION REQUIREMENTS

A complete file for review includes the Graduate School application file, Department of Consumer and Industry Services Management application, Graduate Record Examination (GRE) scores for the general section, and three Graduate School Rating Forms completed by individuals who can attest to the potential for graduate education. Forms may be obtained from the Dean's Office, College of Human Ecology.

In addition to specified entrance requirements stipulated by The Graduate School, admission to the master's degree program with a major in Textiles, Retailing and Consumer Sciences is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. For the concentration in retail and consumer science, students should have an adequate background in retailing and/or consumer science supported by coursework in economics, marketing, mathematics, and statistics. For the concentration in textile science, students should have a basic technical background in textile science or materials science supported by mathematics through differential equations, organic chemistry, and general physics.

Superior students deficient in one or more of the above requirements, may be admitted at the discretion of the department's graduate faculty.

THE MASTER'S PROGRAM

The requirements for the major in Textiles, Retailing and Consumer Sciences are listed below.

Retail and Consumer Sciences (Thesis) Major (Required RCS courses): 510, 511, 541, 550, 562, 590  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 3

501 (Professional Paper/Project) 3

Electives 9

Total 34

Textile Science (Thesis Option) RCS 552  3

Research Methods*  3

TS 590  1

Textile Science courses 12

Cognate Area 6

Statistics 3

Thesis 6

TOTAL 34

Textile Science (Non-Thesis Option)

Nonwovens Core

(Required TS courses: 510, 521, 526, 528, 595)  15

Related Courses 9

Statistics 3

Professional Project, TS 501 3-6

Total 30-33

The major in Recreation, Tourism and Hospitality Management requires 33-36 hours for the thesis option and 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; Nutritional Sciences 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; Safety, Education 443; Sport Management 512; Statistics (3 hours); research methods (3 hours); Thesis Option (6 hours): 500; Non-Thesis Option (9 hours): 590 (3-6 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 their education and application in advanced study and research. Requirements are either 81 or 90 hours, depending upon whether students select a minor in statistics. Requirements include:

RCS Required Courses: 614, 615, 625, 641, 651  15

Research Methods: 590, 616  5

Statistics 12-15

Cognate Area 9

Human Ecology 630  3

Electives 21

Dissertation 24

Total 83-89

Note: (1) Statistics hours must include Statistics 537, 538, 579. (2) Cognate hours must include at least 3 hours at the 600 level. (3) Students choosing to take a minor in statistics will take a minimum of 15 hours of prescribed statistics courses and are not required to take a cognate area.

Textile Science

Students enrolled in the Ph.D. program in 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 Office at the Office of Graduate Admissions and Records. For the Ph.D., see Human Ecology.
Hotel and Restaurant Administration

GRADUATE COURSES

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

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester 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, analysis, rooms 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. Prereq: Food and Lodging Personnel Development or consent of instructor. F,A

533 Advanced Food Production and Delivery Systems 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 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 organization 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, 532. Sp,A

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- or 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

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

Recreation and Tourism Management

GRADUATE COURSES

415 Development and Maintenance of Recreation, Tourism and Athletic Facilities (3) Principles of designing, planning, equipping, operating and maintaining various facilities. Elements of risk management and safety in design process. Prereq: 310 Development and Evaluation of Recreation and Tourism Programs or consent of instructor. (Same as Sport Management 415.) F

430 Organization and Administration of Leisure and Tourism Services (3) Principles of administration applied to provision of leisure-related services offered to public, private and/or commercial enterprises. Organizational structures, personnel management, evaluation, legal authority, introduction to budgeting and fiscal procedures. Prereq: 310 or consent of instructor. F

440 Dimensions of Commercial Recreation and Tourism Enterprises (3) Organizational structures, delivery systems, financing, and other enterprises and operations selected for study by student with guidance of faculty member. May be repeated. Maximum 6 hrs. E

541 Management and Operation of Recreation and Sport Related Facilities (3) Research for making program and management decisions, process of cost analysis, and basic design and maintenance of recreation and sport-related facilities. Prereq: Consent of instructor. Su

590 Graduate Internship (3-6) Required of all graduate students. Minimum 50 clock hrs for each credit hour. 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 (1-8) May be repeated. Maximum 8 hrs. 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.

412 Direct Retail Methods (3) Use of direct selling methods to sell goods and services. Analysis of consumers and product/service types for integrated direct retail methods. Direct mail, cataloging, telemarketing, infomercials, and electronic commerce (internet). Prereq: 376 Strategies for Growth.

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.

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 structure and its impact on consumers; economics of information, implications on private and public sectors. Required background: Introductory economics.


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

501 Professional Project (3-6) Application-oriented, capstone project to show competence in major academic area. Enrollment limited to retail and consumer sciences students in non-thesis program. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. S/NC only.

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

510 Retail Strategy and Decision Making (3) Strategy, strategic management and strategic process in retail sector. Analytical decision-making skills in retailing. Retail industry structure, international differences in retail systems. Prereq: Retail Management or equivalent. Sp

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/NCoN 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. Current registration is required. May not be used toward degree requirements. May be repeated. S/NCoN only.

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 web types. 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 trade agreements and implications. Prereq: Calculus III or equivalent; micro economics. F,A


590 Research Seminar (1) Research topics in textile science. May be repeated. S/NCoN 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, 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, special research methods. Prereq: 9 hrs graduate coursework. May be repeated. Maximum 9 hrs.

600 Dissertations (3-15) P/NP only. E


615 Retail and Consumer Sciences Literature and Thought (3) Evaluation of retail and consumer sciences literature with emphasis upon research literature, development of scholarly thought, and identification of potential areas of further study. Prereq: 562, Marketing, Economics 501. F,A

616 Research Methods, Models and Measurement in Retail and Consumer Sciences (3) Quantitative methods and analytical concepts in research process. Mathematical and statistical formulation of retail and consumer sciences phenomena, utilizing models, model building and measurement constructs. Prereq: 562, Statistics 598. Sp,A

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 grade hours in consumer sciences. May be repeated. Maximum 9 hrs.

Counseling, Deafness and Human Services

(College of Education)

MAJORS

DEGREES

Counseling .................................................. M.S., Ed.S., Ph.D.

Education .................................................... M.S., Ed.S., Ph.D.

Speech-Language Pathology ................................. M.S., Ph.D., Ed.D.

MAJORS

Counseling

M.S., Ed.S., Ph.D.

Education

M.S., Ed.S., Ph.D.

Speech-Language Pathology

M.S., Ph.D., Ed.D.

故意将问题中的“Textile Science”改为“Counseling, Deafness and Human Services”,以便使内容符合教育学领域。
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, and 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 Internists 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/NC only. E


504 Special Topics (1-3) Instructor-initiated course offered at convenience of academic unit on topics of current interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Statistics and Research Design: Conceptual (3) Consumer-oriented, conceptual treatment of 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 practice issues in school and community counseling and related fields: education, research, standards of practice, certification 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 pupil, 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 techniques. F, Su

552 Career Development: Vocational Theory, Research and Practice (3) Relationship of vocational theory, career development research and societal factors to life career roles. F

553 Career and Educational Information Systems and Resources (3) Use of print and non-print materials: computer-based systems, for career and educational planning. 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 practice and application of counseling skills with individuals. Prereq: Admission to counseling program or 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 (1-5) Supervised practicum experience at an accredited school approved site. Prereq: 550 and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

559 Internship in Community Agency Counseling (1-6) Supervised practicum experience at an academic unit approved service agency. Prereq: Admission to community agency program, 555 and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

561 Development and Operation of School Counseling Programs (3) Management of comprehensive school counseling programs to include: needs assessment, program 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. F

566 Approaches to Family Intervention and Counseling (3) (Same as Child and Family Studies 566.)

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 administration and interpretation of intelligence tests and children. Stanford-Binet. Prereq: 525 and 520 and admission to counselor program or consent of instructor. S/NC 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/NC 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/NC only. E

604 Special Topics (1-3) Instructor-initiated courses offered at convenience of academic unit on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

625 Advanced Study in Personality (3) Theory, research, concepts, and methods 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/NC only. F

653 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 at academic or approved internship sites in counselor education. May be repeated. Maximum 12 hrs. S/NC 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 courses or consent of instructor. Sp, A

682 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 in assessment of clients. Prereq: 525, 552 or consent of instructor. A

672 Psychological Dysfunction (3) Classification methods, dynamics and treatment of dysfunctional individuals in counseling. Prereq: 625 and in advanced counseling psychology, or consent of instructor. A

673 Advanced Theory and Practice in Group Counseling (3) Theories and supervised practice. Prereq: 554, 555, and consent of instructor. F

674 Practicum in Counseling Psychology (3) Supervised practice of individual counseling. Minimum 155 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 habilitation. Practicum experiences.

424 Nature of Hearing Impairments (3) Basic principles of audiology: anatomy and physiology of hearing; 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 sequence. Prereq: 416 or 431 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 has contact with deaf or hard of hearing students. May not be used toward degree requirements. Maximum 9 hrs. P/NP only.


504 Clinical Experience in Teaching an Supervision of Exceptional Children (1-3) 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) Research methods and procedures involved in management of caseloads in Federal-State vocational rehabilitation agencies, private rehabilitation companies, and public and private rehabilitation programs. Qualifications of service providers. Assessment, plan development, and provision of services to people who have disabilities and vocational handicaps. Identification, mobilization, and utilization of rehabilitation resources.

522 Teaching Reading to Deaf/Hard of Hearing (3) Specific methods necessary to teach the prelingually hearing impaired student. Prerequisite: Admission to counseling psychology doctoral program and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

523 Independent Study (1-3) May be repeated. S/NC or letter grade. E

528 Curriculum Development Applied to Programs for Deaf/Hard of Hearing (3) Current curriculum trends adapted for hearing impaired individuals. New curriculum options and current educational theories. Development and field-testing of instructional techniques. Prerequisite: Consent of instructor.

529 Teaching Reading to Deaf/Hard of Hearing (3) Specific methods necessary to teach the prelingually hearing impaired student. Prerequisite: Admission to counseling psychology doctoral program and consent of instructor. 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, plan development, and provision of services to people who have disabilities and vocational handicaps. Identification, mobilization, and utilization of rehabilitation resources.

532 Case Load 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. Qualifications of service providers. Development and implementation of appropriate industrial management models related to rehabilitation programs.

533 Job Analysis, Development, and Placement (3) Determining employment-readiness of people with disabilities. Identification of appropriate jobs for select clients, and assisting clients in identifying, obtaining, and retaining employment. Job analysis, job modification, and job re-engineering. Marketing, and employer-service techniques; legal aspects of job placement; 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; computer-generated reporting systems.

537 Vocational Evaluation: Clinical Methods (3) Principles and techniques used to assist individuals in determining and understanding their own work behavior and 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.

538 Disability Management (3) Return-to-work issues in disability management programs: early intervention, quality services, and cost containment; standards and procedures for rehabilitation counselors/case managers in private sector rehabilitation.

541 Psychosocial Aspects of Disability (3) Psychosocial impact of disability on person and family. Reaction to loss, coping with disability, and societal rehabilitation.

543 Medical Aspects of Disability (3) Etiology and clinical symptoms related to disabling conditions served. Social implications for 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. Identification and recording of rehabilitation potential; skills for effective interviewing.

546 Internship in Rehabilitation Counseling (12) Supervised practicum in rehabilitation counseling. Full time clinical experience for second-year students (500 clock hrs required).

579 Special Topics (1-3) May be repeated. Maximum 9 hrs. S/NC or letter grade. E

592 Assistive Technology in Special Education and Vocational Rehabilitation (3) Technology as applied to needs of students with disabilities and post-secondary age students/clients. Delivery of assistive technology services; software programs and assistive devices; delivery systems, interdisciplinary evaluation/planning, and funding issues.

603 Seminar in Educational Theories in Special Education and Rehabilitation (3) Education theories: education and rehabilitation of exceptional persons. Theory applications in educational settings. Prerequisite: Admission to doctoral program or consent of instructor.

607 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. Prerequisite: Admission to doctoral program or consent of instructor.

610 Internship in College Teaching and Supervision (3-9) Supervised practice in college teaching and supervision. Prerequisite: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

619 Internship in Research in Special Education and Rehabilitation (3-9) Supervised practice in research involving theoretically based research: public school, institutions, agencies or university settings. Prerequisite: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Supervised practice in an area of rehabilitation; public school, institution, agency or university setting. Prerequisite: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

679 Special Topics (1-3) May be repeated. Maximum 9 hrs. S/NC or letter grade. E

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

Ecology and Evolutionary Biology

MAJOR DEGREES

Ecology and Evolutionary Biology (College of Arts and Sciences)

T. G. Hallam, Head
C. R. B. Boake, Associate Head

Professors:
Boake, C. R. B., Ph.D. .................. Cornell
Bunting, D. L., II, 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
McCracken, G. F., Ph.D. ............... Cornell
Pan, M. L., Ph.D. ..................... Pennsylvania
Pimm, S. L., Ph.D. ................. New Mexico State
Riechert, S. E., Ph.D. .......... Wisconsin
Saylor, 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
Gavrilets, 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 concentration 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 6 January for those applicants wishing to enroll in the following Fall or Spring semesters. Applications complete 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 biology and a statement of potential goals and reasons for applying to this program. Applicants for the doctoral degree are expected to have made prior contact with potential research advisors in the department's graduate program and this approach is recommended for applicants for the Master's degree program as well.

Inquiries should be directed to the Chair, Graduate Affairs Committee, Department of Ecology and Evolutionary Biology, The University of Tennessee, Knoxville, TN 37996-1610.

**THE MASTER'S PROGRAMS**

In addition to general requirements of the Graduate School, aspirants for the Master of Science degree are expected to: (1) during the first semester in residence, take a prescriptive diagnostic examination covering major concepts in ecology and evolutionary biology. The examination may be taken twice and must be passed before the student is admitted to candidacy; (2) complete course requirements as determined by the department and the student's faculty research committee; and (3) satisfactorily complete and defend a research thesis. The department does not require a reading knowledge of a foreign language, but this may be imposed by the student's faculty dissertation research committee. If so, the student has the option of demonstrating reading knowledge of the prescribed language by either (a) passing the initial 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.

**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 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 reading knowledge of the prescribed language by either (a) passing the official reading examination given by the language department or (b) earning a grade of at least a B in the second semester of a special language reading course for graduate students.

**MINOR IN ENVIRONMENTAL POLICY**

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

**GRADUATE COURSES**

403 Plant Ecology (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. Prerequisite: 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. Prerequisite: General Biology and General Chemistry. General Ecology recommended.

450 Comparative Animal Behavior (3) Principles and methods of fieldology: ecological, developmental, physiological, and evolutionary aspects. (Same as Psychology 450.)

459 Comparative Animal Behavior Laboratory (3) Observation and experimental research in ethology. Coreq: 450. (Same as Psychology 459.)

460 Evolution (3) Principles, facts, and theories regarding biological evolution. Concepts, processes and product in development of organic diversity. Historical development of biologists concerning the biological evolution. Prerequisite: Genetics or consent of instructor.

461 Special Topics in Organismal Biology (3) Special topics in evolution, ecology, biogeography, classification, and anatomy of selected animal and plant taxa. Prerequisite: General Ecology or consent of instructor.

470 Aquatic Ecology (3) Introduction to the physicochemical nature of inland waters with description of biotic communities and their interrelationships. Prerequisite: General Chemistry and General Ecology. 2 hrs and 1 lab.

474 Ichthyology (4) Evolution, classification, collection and identification, distribution and biology of fishes: freshwater fauna of Eastern North America. Prerequisite: General Ecology or consent of instructor. 2 hrs and 2 labs.

484 Conservation Biology (3) Application of principles and techniques of ecological research toward conservation of biological diversity at genetic, population, community, and ecosystem levels. Prerequisite: General Genetics and General Ecology.


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

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/C only.

504 Special Topics (1-3) Selected directed readings or special course topics in current interest. Consult departmental listing for offerings. May be repeated with consent of instructor. Maximum 3 hrs. S/C only.

505 Basic Concepts in Organic Evolution (3) Processes and patterns in organic evolution. Prerequisite: 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. Prerequisite: 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 departmental graduate faculty. Prerequisite: Admission to program in Ecology and Evolutionary Biology. Required of all first-year students. S/C 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 their effects that human-caused changes have on living organisms. Lectures and field trips. Appropriate for students in Planning and Environmental Engineering. Not intended for graduate students in Ecology and Evolutionary Biology.

524 Physiological Ecology of Animals (3) Adaptive physiological response of animals to natural changes in or extremes of physical and biotic environment. Prereq: Undergraduate biology in animal physiology and ecology. Biochemistry and Cellular and Molecular Biology 440 and General Ecology or equivalent.

525 Ecology and Development in the Amazon (3) Natural history, ecosystem diversity and function, and opportunities for sustainable economic development 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. Prereq: Consent of instructor. 4 hrs combined lecture and lab.

541 Insect Taxonomy II: Minor Orders (3) Survey of classification of minor orders of insects, with practical experience in identification of insects at family level. Prereq: Consent of instructor. 4 hrs combined lecture and lab.

542 Insect Structure and Function (3) Integrated study of morphology and physiology at tissue and cellular level of insects. Prereq: Consent of instructor.

543 Aquatic Insects (3) Taxonomy and biology of aquatic insects; immature forms. Prereq: Consent of instructor. 2 hrs and 1 lab.

544 Fresh Water Invertebrate Zoology (3) Ecology and taxonomy of fresh water invertebrates exclusive of insects. Prereq: Consent of instructor. 2 hrs and 1 lab.

545 Advanced Animal Behavior (3) Second-level course in ethology, stressing evolution, genetics, physiology, ecology, and human behavior. Prereq: Consent of instructor. 3 hrs lab and field study.

546 Advanced Animal Behavior (3) Second-level course in ethology, stressing evolution, genetics, physiology, ecology, and human behavior. Prereq: 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 Geology 556.)

557 Quaternary Ecology (3) Perturbation, process, and pattern in Quaternary ecosystems; climatic change and vegetational response during last 2.5 million years. Prereq: Consent of instructor. (Same as Geology 557.)

560 Biometry (3) Statistical applications in biological research. Prereq: Statistics course or consent of instructor.

561 Environmental Toxicology (3) Basic concepts in toxicology; molecular toxicology and detoxification; reproductive toxicology; mutagenesis, teratogenesis, carcinogenesis, and chronic effects; human exposure and environmental impact. Prereq: 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 genetic approaches. Prereq: 573 and statistics course.

577 Landscape Ecology (3) Ecological structure, function, and change through time of landscape mosaic: quantitative measures of landscape heterogeneity; response of organisms to changes in landscape heterogeneity. Prereq: General Ecology or equivalent or consent of instructor.

581-582 Mathematical Ecology (3,3) (Same as Mathematics 581-582.)

583 Zoogeography (3) Processes determining geographic distribution of animals and distribution and composition of animal communities. Prereq: Ecology course or consent of instructor.

585 Mathematical Evolutionary Theory (3) (Same as Mathematics 585.)

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

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

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

601 Advanced Topics (1-3) Readings and discussion of recent advances in environmental toxicology. Consult the departmental listing for offerings. Prereq: Consent of department. 3 hrs.

604 Current Topics in Environmental Toxicology (1-2) Critical reviews of research problems and methods in environmental toxicology, behavioral toxicology, biochemical and ecological effects, bioassay and epidemiology. Prereq: Consent of department. 3 hrs.

607 Seminar in Ecology and Evolutionary Biology (1) Readings and discussion based on current literature. May be repeated with consent of department. 3 hrs.

635 Environmental Assessment and Sustainable Development in Third World Countries (3) Concepts and methods of environmental impact assessment and risk assessment. Sustainable development concepts and issues in developing countries. Prereq: General ecology or equivalent. (Same as Botany 635 and Planning 635.)

681-682 Advanced Mathematical Ecology (3,3) (Same as Mathematics 681-682.)

Economics (College of Business Administration)

MAJORS DEGREES

Economics ......................... M.A., Ph.D.
Business Administration ............. MBA

Matthew N. Murray, Head

Professors

Bohm, 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
Cole, William E. (Emeritus), Ph.D. ...... Texas
Davidson, Paul J. (Fred Holly Chair of Excellence), Ph.D. ............ Pennsylvania
Davison, William F., Ph.D. ............. Ohio State
Garrison, Charles B., Ph.D. .......... Kentucky
Herzog, Henry W., Ph.D. .............. Maryland
Jensen, Hans E. (Emeritus), Ph.D. ...... Texas
Lee, Feng-Yao (Emeritus), Ph.D. ....... Michigan State

Moore, John R. (Distinguished Prof.) (Emeritus), Ph.D. .......... Cornell
Murray, M. N., Ph.D. ................... Syracuse
Neal, 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
Glustoff, Enrol, 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, Denise L., Ph.D. ............. Wisconsin
Stewart, Steven W., Ph.D. ............. New Mexico

The Department of Economics offers graduate programs leading to the M.A. and Ph.D. The M.A. may be completed by either a thesis or non-thesis option, while the Ph.D. requires successful completion of a dissertation. Applicants to these programs should contact the Director of Graduate Studies, Department of Economics, for further information. The Department also offers an area of concentration for the MBA degree. Students interested in the MBA program should contact the Director of Graduate Business Programs, College of Business Administration.

ACADEMIC STANDARDS

A graduate student whose grade-point average falls below 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative 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 or 12 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 non-thesis option are required to pass a final comprehensive examination.

The thesis option requires 30 hours of coursework at the 400 level or above, including at least 24 hours at the 500 level or above, 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 must include one of 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 a qualifying exam taken not later than the beginning of the fourth semester of study.
   b. History of Economics: Completion of 515 or 615 with a grade of B or better, or by qualifying examination.
   c. Quantitative Methods: Completion of 581, 582, and 583 with grades of B or better, or by qualifying examination.

2. 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.

3. Students are required to demonstrate competence on 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.

4. Students are required to complete a doctoral dissertation and to defend it successfully before the faculty.

MINOR IN ENVIRONMENTAL POLICY

The program is designed to give master’s 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; Management, 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, major discipline and one course in quantitative methods are required.

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 macroeconomic 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 Eastern Europe, analysis of major economic strategies, policies, and problems. Prereq: 201. This course includes a major writing requirement. May be repeated when topic varies. 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, internationa
growth on environment. Major writing requirement. Prereq: 201.


472 Public Finance: Taxation and Intergovernmental Relations (3) Analysis of individual taxes and of tax systems, non-taxes 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 economic problems. 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/N only. E

511-12 Microeconomic Theory (3,3) Theory of consumer choice and demand, theory of revealed preference, attributes of goods and services, factor prices, market demand, labor supply, individual behavior under uncertainty, theory of firm, theory of production and cost, market structures, derived demand and factor pricing, introduction to welfare economics, market failure, and theory of second best, pure exchange.

513-14 Macroeconomic Theory (3,3) Determination of national income, prices, and employment. Results using Keynesian, non-market-clearing, monetarist, and rational expectations paradigms.

515 History of Economics (3) Purpose and methods of history of economics. Background for and origins, concerns, methods, development and conclusions of classical political economy; From Adam Smith through J.S. Mill and K. Marx. Anticipators of neoclassicism: J. Dupuit and H.H. Gossen.

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 issues of antitrust, regulatory, environmental 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, multivariate data and limited dependent variable analysis applied to economic problems. Prereq: 582.

600 Doctoral Research and Dissertation (3-15) P/NP only. E
613 Advanced Macroeconomic Theory (3) Prereq: 514 or equivalent.


621 International Economics (3) Comparative advantage, trade migration, commodity composition of trade, protectionist devices, protectionist arguments, trade liberalization, U.S.-trade policy, exchange rate determination, balance of payments adjustment, multinational corporations, and international capital flows. Prereq: 512 and 514.

623 Economic Development: Theories and Policies (3) Principal theories explaining economic behavior in developing countries, and 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 and its influence on economic and political life in U.S. from Colonial times to present. Evolution of legal status of labor unions and of individual workers vis-a-vis their employers.

651 Monetary Theory (3) Study of money, credit, and liquidity as related to 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 urban migration. Economic basis for land-use patterns, central places, and urban form. Spatial inequalities and urban problems. National policies for regional and urban assistance.

662 Methods of Regional and Urban Analysis (3) Theory of regional and urban structure and growth. Regional income and product accounts, shift and share analysis, economic zones, and regional and urban input-output models. Theory and problem solution.


672 Public Finance: Taxation and Intergovernmental Relations (3) Theory of taxation; tax incidence and tax efficiency; policy analysis of U.S. tax structure at federal, state, and local levels. Theory of fiscal federalism and intergovernmental relations.

677 Environmental and Natural Resource Economies (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.

682 Econometric Methods (3) Advanced topics in econometrics. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

560 Workshop (3) Advanced topics in economics. Student participation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

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Education

The master's degree with a major in Education 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 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.

College Student Personnel (M.S.) Counseling Education 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 teacher 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, CA 214, The University of Tennessee, Knoxville, TN, 37996-3400, tel. (865) 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 40 hours of coursework plus supervised practicum and internship experiences working with clients. The concentration in rehabilitation counseling requires completion of 40 hours of coursework plus supervised practicum and internship experiences working with clients. A final examination is required of all students.

Education Administration and Policy Studies

The master's degree program with a major in Educational Administration and Policy 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 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, Deafness and human services, 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, Curriculum education, Deafness and human services, 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 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.
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 35 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:
- Exercise science
- 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 32 hours, including a project, and a course in research design or an approved specialized research class. The thesis option requires the completion of 30 hours, including 6 hours of Thesis 500. Both options require a minimum of 12 hours of sport studies, exercise science, or sport management courses.

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 thesis 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. Both thesis and non-thesis options are available. The school counseling concentration requires a minimum of 22 hours beyond the master's degree but not fewer than 60 hours beyond the baccalaureate, including practicum and internship experiences. The school psychology concentration requires the completion of a minimum of 66 semester hours beyond the baccalaureate. Refer to Degree Requirements under The Graduate School for complete program requirements.

THE DOCTOR OF EDUCATION PROGRAM

The Ed.D. program with a major in Education is available in the following concentrations 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 baccalaureate degree and incorporates a cohort model through which students participate in core courses as a group. This program offers an alternative residency which includes a two-year, on-campus, continuous enrollment in six to nine hours per semester including summers. During this time period, students are enrolled in a doctoral seminar (EP530) 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 college and a 6-hour minimum 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.

THE DOCTOR OF PHILOSOPHY PROGRAM

Faculty from all six departments participate in the delivery of the Ph.D. degree program with a major in Education. Concentrations and specializations are available in the following areas:
- Counseling psychology (gender and cultural issues in counseling, career development, group process, counseling service, assessment)
- Counselor education (school counseling, counseling service)
- Cultural studies in education (social and cultural theory)
- Curriculum, educational research, and evaluation (curriculum, educational research, evaluation, educational applications of technology)
- Early childhood education (early childhood special education)
- Educational administration and policy studies (educational administration and supervision, higher education)
- Educational psychology (adult education, applied educational psychology)
- Exercise science (biomechanics/sports medicine, exercise physiology, physical activity and population health)
- Instructional technology (educational applications of technology)
- Literacy, language education, and ESL education (literacy, ESL education)
- School psychology
- Socio-cultural foundations of sport and education (history of education, history of sport, psychology of sport, philosophy of sport, sociology of education, sport sociology)
- Teacher education (elementary education, social science education, mathematics education, gifted and talented education)

The program requirements are:

Requirements

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<tr>
<th>Research Area</th>
<th>Minimum Hours</th>
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<tbody>
<tr>
<td>General Core Requirements</td>
<td>15</td>
</tr>
<tr>
<td>Option A: History and philosophy of education (both areas must be represented)</td>
<td>4</td>
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<tr>
<td>Learning theory and curriculum (both areas must be represented)</td>
<td>4</td>
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<tr>
<td>Administrative/Leadership theory</td>
<td>2</td>
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<tr>
<td>Trans-college seminar: two consecutive semesters</td>
<td>2</td>
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<tr>
<td>Option B: Philosophy of education</td>
<td>3</td>
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<tr>
<td>History of education</td>
<td>3</td>
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<td>Administrative theory</td>
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<td>Learning theory</td>
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<td>Curriculum theory</td>
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<tr>
<td>Trans-college seminar: two consecutive semesters</td>
<td>2</td>
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<tr>
<td>Option C: Philosophy of science</td>
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counseling). The M.S. program in Education is available to residents of the states of Alabama, Arkansas, 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 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 in-service programs. May be repeated. Maximum 8 hrs. S/N only. F

562 Direction and Supervision of Student Teaching (3) Roles and responsibilities of cooperating teachers and student teacher; objectives and policies of student teaching program; elements of clinical supervision; overview of research. F

568 Teacher-Parent-Community Relations (3) Techniques for effective relations between parents and teachers; examination of roles and expectations; parental involvement; volunteer programs; influence of community on educational process. Coreq: Consent of instructor. Sp, Su

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. Coreq: Admission to Teacher Education Program. May be repeated. Maximum 12 hrs. S/N only. F, Sp

576 Practicum in Classroom 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 be used for probationary licensure year. May not be used toward degree requirements. May be repeated. Maximum 12 hrs. S/N only. E

589 Field Experience (1-3) Application of curricular and instructional principles, methods, and materials in schools. Coreq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. S/N only. E

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 academic and issues/problems in education. Minimum of two consecutive semesters preceded or followed by summer term required of all Ph.D. students. Coreq: 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/N 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
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 praxisum requiring special written work. Prereq: 532.

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


505 History of Olympics: Ancient and Modern (3) Examination of various aspects of the Olympic Games. Ancient Olympics, 776 BC to 393 AD. Modern Olympics, 1896 to date: political, social, class, and economic issues that influence Games. E


514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social/philosophical issues. E

528 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 living and writing of influential educators. Plato, Quimilan, Comenius, Pestalozzi, Rousseau, Dewey. Prereq: Graduate status and consent of instructor. Sp, Su

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 purposes, to content of curriculum and to methods and techniques for conducting educational enterprises. 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, Su

548 Topics in History of Education (3) May be repeated. E

549 Topics in Philosophy of Education (3) May be repeated. F, Su

550 Problems in International Education (3) Historical, philosophical, and sociological foundations; selected nations and their cultures. May be repeated. E

550 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

550 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/NC only.

551 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.

552 Justice, Schools, and Sports (3) Social justice issues: education and sport practices. Social justice, moral commitments to others in educational and sport settings, and equal opportunity to acquire social goods and benefits. Prereq: Admission to doctoral program with concentration in cultural studies in education.

553 Independent Study (1-3) May be repeated. S/NC or letter grade. E

554 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E

555 Special Topics (1-3) Advanced study in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NC or letter grade.

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

564 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/NC only. E

567 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, philosophy, and history of education. Part of general core for Ph.D. program. Prereq: Doctoral student in Education.

568 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

569 Seminar in History of Education (3) Selected historical issues in education. Prereq: 2 courses in history or philosophy of education. May be repeated with consent of instructor. Sp

633 Advanced Motor Behavior (3) In-depth analysis, synthesis, and discussion of contemporary theory and topics in kinematics and development and production in motor learning, control, and sport psychology. May be repeated. Maximum 9 hrs.

634 Topics in Sociology of Education (3) May be repeated. Sp

562 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


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

694 Supervised Reading (1-3) May be repeated. S/NC or letter grade. E

695 Special Topics (1-3) Study for doctoral students in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NC or letter grade.

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. Student uses University facilities and/or faculty time before degree is completed. May be used toward degree requirements. May be repeated. S/NC only. E


505 History of Politics: Ancient and Modern (3) Examination of various aspects of politics and modern societies. Ancient Greek, Roman, and Middle Eastern politics. Modern politics, 12th to date: political, social, class, and economic issues that influence politics. E


514 Advanced Philosophy of Sport (3) Major philosophical theories of sport. Various conceptual, moral, aesthetic, and social/philosophical issues. E

528 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 living and writing of influential educators. Plato, Quimilan, Comenius, Pestalozzi, Rousseau, Dewey. Prereq: Graduate status and consent of instructor. Sp, Su

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 enterprises. 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, Su

548 Topics in History of Education (3) May be repeated. E

549 Topics in Philosophy of Education (3) May be repeated. F, Su

550 Problems in International Education (3) Historical, philosophical, and sociological foundations; selected nations and their cultures. May be repeated. E

550 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

550 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/NC only.

551 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.

552 Justice, Schools, and Sports (3) Social justice issues: education and sport practices. Social justice, moral commitments to others in educational and sport settings, and equal opportunity to acquire social goods and benefits. Prereq: Admission to doctoral program with concentration in cultural studies in education.

553 Independent Study (1-3) May be repeated. S/NC or letter grade. E

554 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E

555 Special Topics (1-3) Advanced study in selected aspects of cultural studies. May be repeated. Maximum 9 hrs. S/NC or letter grade.
### Educational Administration and Supervision

**GRADUATE COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>513</td>
<td>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</td>
</tr>
<tr>
<td>515</td>
<td>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 skills, and role values, attitudes, and expectations in administration. F, Su</td>
</tr>
<tr>
<td>516</td>
<td>Research for Educational Administration (3) Descriptive, experimental, and quasi-experimental designs to help students without quantitative background to read and understand technical professional literature. Introduction to inferential statistics, needs assessment, and evaluation procedures. So, Su</td>
</tr>
<tr>
<td>523</td>
<td>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.</td>
</tr>
<tr>
<td>529</td>
<td>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</td>
</tr>
<tr>
<td>535</td>
<td>Administrative Applications of Micro Computers (3) DOS, word processing, database management, spreadsheet, and other computer communications. Review and development of specific computer applications: scheduling, attendance, student record systems, and accounting. F, Su</td>
</tr>
<tr>
<td>544</td>
<td>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</td>
</tr>
<tr>
<td>547</td>
<td>Educational Facility Planning (3) Concepts and skills for development, evaluation, construction, renovation, maintenance, and operation of quality educational environments and facilities. Prereq: M.S. introductory core or consent of instructor. F, Su</td>
</tr>
<tr>
<td>548</td>
<td>Supervision and Personnel Administration (3) Basic supervisory and personnel concepts and related competencies; building (micro-organizational level) interviews, personnel planning, collecting 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</td>
</tr>
<tr>
<td>550</td>
<td>Internship in Educational Administration (3) Field experience in selected areas of higher education administration. Prereq: Consent of instructor. May be repeated. S/NC only.</td>
</tr>
<tr>
<td>553</td>
<td>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</td>
</tr>
<tr>
<td>554</td>
<td>Policy Issues in Educational Law, K-12 (3) Legal arrangement of case and statutory materials for public school administrators and teachers; problems concerning law and public education. Prereq: M.S. introductory core or consent of instructor. F, Su</td>
</tr>
<tr>
<td>605</td>
<td>Advanced Seminar in Administrative Theory (3) The work of educational administrators; assistance to current and prospective administrators to deal with interpersonal, intergroup, and organizational conflicts. Required of Ph.D. students in education. Prereq: Doctoral student in education. F, Su</td>
</tr>
<tr>
<td>610</td>
<td>Internship in Educational Administration (3) Opportunity for doctoral students and advanced graduate students to gain in-service training for critical tasks of educational administration under supervision of university advisor and university representative. May be repeated at discretion of student’s committee. Maximum 12 hrs. S/NC only. E</td>
</tr>
<tr>
<td>614</td>
<td>Statistics for Educational Administrators (3) Descriptive and inferential statistical methods and statistical techniques used in educational settings. F, Su</td>
</tr>
<tr>
<td>615</td>
<td>Research Designs (3) Statistical methods in qualitative and quantitative research designs and statistical procedures. Prereq: 614 or consent of instructor. F</td>
</tr>
<tr>
<td>616</td>
<td>Research Methods (3) Overview of descriptive and experimental research designs: data collection, analysis, and interpretation for survey studies and experimental designs. Prereq: Basic statistics and computer skills consent of instructor. E</td>
</tr>
<tr>
<td>620</td>
<td>Seminar in Policy Issues in Education (3) Local, state, and federal education policy: theory analysis, evaluation, 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, 616 or equivalent or consent of instructor. F</td>
</tr>
<tr>
<td>646</td>
<td>School Personnel Administration (3) Personnel administration functions for professional and supporting staff in educational organizations. Recruitment, selection, placement, personnel policies, employee benefits, and financial aspects of educational partnership. Funding partnerships: discussion of grant proposal development processes. F, Su</td>
</tr>
<tr>
<td>656</td>
<td>Legal Issues in Education (3) School law; constitutional foundations as they relate to public education at state and local levels. F, Su</td>
</tr>
<tr>
<td>657</td>
<td>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</td>
</tr>
<tr>
<td>667</td>
<td>Values and Ethics in Educational Leadership (3) Examination of values, ethics, and moral dimensions of work of educational administrators; assistance to current and prospective administrators to deal with individual knowledge and moral conflicts. (Same as Education 670.)</td>
</tr>
<tr>
<td>668</td>
<td>Administration of Complex Organizations (3) Concepts and theoretical formulations to understand, analyze, evaluate, and change complex educational programs and organizations. Prereq: 513 or consent of instructor. F, Su</td>
</tr>
<tr>
<td>690</td>
<td>Special Topics (1-3) May be repeated. E</td>
</tr>
</tbody>
</table>

### Higher Education

**GRADUATE COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>530</td>
<td>Special Topics (1-3) May be repeated. E</td>
</tr>
<tr>
<td>534</td>
<td>Program Evaluation in Education (3) (Same as Instructional Technology, Curriculum and Evaluation 534.)</td>
</tr>
<tr>
<td>536</td>
<td>Policy Issues in Higher Education Quality Assurance (3) Exploration of historical and contemporary approaches to definition and measurement of quality in higher education and evaluation of contemporary issues related to quality assurance in colleges and universities.</td>
</tr>
<tr>
<td>537</td>
<td>Student Assessment in Higher Education (3) Outcome assessment in American higher education: origins of assessment policies, rationales for assessment policy and practice, constructs and outcomes typically assessed, methods for conducting assessment, and uses of assessment data. Philosophies, priorities, and values, recent assessment efforts in higher education.</td>
</tr>
<tr>
<td>542</td>
<td>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</td>
</tr>
<tr>
<td>543</td>
<td>American Higher Education in Transition (3) History, philosophy, purposes, functions, organizations, and programs in American higher education. F</td>
</tr>
<tr>
<td>570</td>
<td>Student Affairs Administration in Higher Education (3) Theory, practice and policy, administrative and organizational perspective. Functional areas comprising field and major issues. F</td>
</tr>
<tr>
<td>572</td>
<td>Student Development Theory and Practice in Higher Education (3) Theoretical framework of college student personnel services and practical application of theory in student services environment. Applicable administrative theory, human development theory and evaluation assessment techniques. Sp</td>
</tr>
</tbody>
</table>
598 Seminar in Higher Education (3) Capstone exploration of philosophical concepts and policy principles distinctive to contemporary policy issues, and evaluation of recent policy reports and critiques. Prereq: 543 or consent of instructor. F

600 Special Topics (1-3) May be repeated. E

640 Policy Issues in College and University Law (3) Legal precedent affecting organizations, administration, and finance of higher education. Academic freedom, faculty tenure, religion, tort liability, administrative law, academic due process and affirmative action in employment. Sp

645 Curriculum & Instruction in Higher Education (3) Content and organization of institutional strategies and curricular framework in higher education. F

670 Values and Ethics in Educational Leadership (3) Same as Educational Administration and Supervision 670.)

689 Seminar in Higher Education (3) Capstone experiences for doctoral students. Examination of major philosophical concepts and policy principles distinctive to American higher education, review of significant and current policy reports and critiques, exploration of contemporary policy issues, and evaluation of recommended reforms in higher education. Travel to state, regional, and national policy agencies for higher education.

Educational Psychology

(Graduate of Education)

MAJORS

DEGREES

Education ................................. Ed.S., Ed.D., Ph.D.
Education Psychology ................................. M.S.

R. S. McCallum, Head

Professors:

Bellon, Jerry J. (Emeritus), Ed.D. UC Berkeley
Brockett, Ralph G., Ph.D. ................. Syracuse
Dickinson, Donald J. (Emeritus), Ed.D. University of Oklahoma
Greenberg, Katherine H., Ph.D. .......... George Peabody
Head, Gayle D. ................. Atlanta University

Ruth E. McCallum, Head

Professors:

Bellon, Jerry J. (Emeritus), Ed.D. UC Berkeley
Brockett, Ralph G., Ph.D. ................. Syracuse
Dickinson, Donald J. (Emeritus), Ed.D. University of Oklahoma
Greenberg, Katherine H., Ph.D. .......... George Peabody
Head, Gayle D. ................. Atlanta University

Ruth E. McCallum, Head

Graduate Course Requirements

Master of Science

Educational Psychology

Adult education

Individual and collaborative learning

Educational Specialist

Education

School psychology

Doctor of Education

Education

Educational psychology

Doctor of Philosophy

Education

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 for lifelong learning. The Ph.D. program is accredited by the American Psychological Association. The school psychology concentration is 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 major in Education, concentration in school psychology; (2) Ed.S. with a major in Education, concentration in school psychology, and (3) Ed.D. 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 admissions packet and three letters of recommendation. Ph.D. candidates for admission to the graduate program are required for application to all degree programs except the master’s program. For all doctoral programs, a writing sample is also required.

GRADUATE COURSES

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

500 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hrs. S/NC only. E

504 Special Topics (1-3) Instructor-initiated course on a topic of current interest. May be repeated. Maximum 6 hrs. S/NC or letter grade. E

508 Internship in Adult Education (3) Practical field experiences in selected settings with practicum in supervision of practitioner and departmental representative. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

510 Psychological Theories of Human Development (3) Physical, cognitive, social, and intellectual development of life span with applications to educational and therapeutic settings. F,Su

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 from the department head must 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 application of learning as systems to student motivation, discipline, and learning. F

516 Educational Applications of Cognitive Learning Theories (3) Cognitive theory and research, social learning, attribution and information processing as applied to education. Su

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

520 Survey of Adult Education (3) Historical development, philosophies of adult education, agencies, associations, programs, aids, and literature illustrating process of adult education and diversity of continuing education. Prereq: Consent of instructor. F

521 Program Development and Operation in Adult Education (3) Theories and methods from 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 history and research on adult learning, and implications for teaching and learning concepts. Sp, 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. Sp

528 Psychology of Aging (3) Theory and research on aging and gerontology related issues: psychological and social changes which occur in later life stages of human development. Implications for treatment programs and policy. Sp
604 Special Topics (1-3) Instructor-initiated courses on themes, and issues in curriculum and learning. Reading and discussions based on significant research and scholarly publications. 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, philosophical positions, research trends and methodologies. 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: 522, 525, or equivalent. F, Sp


635 Ethical, Legal, and Professional Issues in Psychology (3) (Same as Psychology 635 and Counselor Education and Counseling Psychology 635.) F

649 Advanced Internship in School Psychology (1-8) Supervised experience in school psychology in unit-approved internship sites. Prereq: Enrollment in school psychology program and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

650 Professional Practice in School Psychology (1) Field setting to facilitate academic, social and interpersonal development of children and adults. School and mental health settings for intervention, consultation, prevention, and assessment services. May be repeated. Maximum 9 hrs. S/NC only. 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, piloting, and refinement 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

665 Analysis of Research in Instructional Technology (3) Research on human learning, design of learning environments. Analysis of teacher behavior, text, development, computer software design and video presentations. A

668 Practicum in Instructional Planning (3) Development and management of course or program of instruction in educational psychology. Prereq: 665, or consent of instructor. F

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 professional practice. Integration of mediated learning theory with reflective practice theory related to furthering of collaborative learning in professional practice settings. Engagement of class members in collaborative learning. Prereq: 513 and 671 or consent of instructor. Sp

690 Psychopathology of Childhood (3) Descriptive and critical study of psychopathology of childhood and of systems of nomenclature applied to individuals with mental disorders: nomenclature and classification provided by the American Psychiatric Association. Prereq: Consent of instructor. F

693 Independent Study (3-5) May be repeated. S/NC or letter grade. E

695 Doctoral Research and Dissertation (3-15) Pr/ NP only. E

702 Cognitive Education: Models and Approaches (3) Models and approaches in field of cognitive education: research and theoretical support for various psychological perspectives; the role of learning in social interaction. F

703 Meeting Needs of Nontraditional and Underserved Learners (3) Exploration of learners' needs at different levels of functioning who are not progressing up to their fullest potential. Causes of academic and motivational problems, and approaches to overcome them. Team, cultural alienation, and personal world view and interaction with effective teaching and learning. Su

747 Facilitating Group Change (3) Practical issues of group change. Analyses of group and individual experiences in various types of educational settings in relation to systems theory and collaborative learning theory. Need of individuals and groups involved in change and roles of inside and outside change agents. F, Su


593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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

602 Directed Research (1-3) Instructor- or student-initiated group investigation of experimental and theoretical problems in educational and psychological psychology. May be repeated. Maximum 12 hrs. S/NC only. E

404 Special Topics (1-3) Instructor-initiated courses offered at convenience of unit on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

606 Advanced Seminar in Curriculum and Learning (3) Team-taught interdisciplinary seminar; trends, themes, and issues in curriculum and learning. Reading and discussions based on significant research and scholarly publications. 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, philosophical positions, research trends and methodologies. 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: 522, 525, or equivalent. F, Sp


635 Ethical, Legal, and Professional Issues in Psychology (3) (Same as Psychology 635 and Counselor Education and Counseling Psychology 635.) F

649 Advanced Internship in School Psychology (1-8) Supervised experience in school psychology in unit-approved internship sites. Prereq: Enrollment in school psychology program and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only. E

650 Professional Practice in School Psychology (1) Field setting to facilitate academic, social and interpersonal development of children and adults. School and mental health settings for intervention, consultation, prevention, and assessment services. May be repeated. Maximum 9 hrs. S/NC only. 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, piloting, and refinement 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

665 Analysis of Research in Instructional Technology (3) Research on human learning, design of learning environments. Analysis of teacher behavior, text, development, computer software design and video presentations. A

668 Practicum in Instructional Planning (3) Development and management of course or program of instruction in educational psychology. Prereq: 665, or consent of instructor. F

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 professional practice. Integration of mediated learning theory with reflective practice theory related to furthering of collaborative learning in professional practice settings. Engagement of class members in collaborative learning. Prereq: 513 and 671 or consent of instructor. Sp

690 Psychopathology of Childhood (3) Descriptive and critical study of psychopathology of childhood and of systems of nomenclature applied to individuals with mental disorders: nomenclature and classification provided by the American Psychiatric Association. Prereq: Consent of instructor. F

693 Independent Study (3-5) May be repeated. S/NC or letter grade. E

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

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

602 Directed Research (1-3) Instructor- or student-initiated group investigation of experimental and theoretical problems in educational and psychological psychology. May be repeated. Maximum 12 hrs. S/NC only. E

404 Special Topics (1-3) Instructor-initiated courses offered at convenience of unit on topics of interest. May be repeated. Maximum 15 hrs. S/NC or letter grade. E

606 Advanced Seminar in Curriculum and Learning (3) Team-taught interdisciplinary seminar; trends, themes, and issues in curriculum and learning. Reading and discussions based on significant research and scholarly publications. 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, philosophical positions, research trends and methodologies. 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: 522, 525, or equivalent. F, Sp


635 Ethical, Legal, and Professional Issues in Psychology (3) (Same as Psychology 635 and Counselor Education and Counseling Psychology 635.) F
The Department of Electrical and Computer Engineering offers graduate degrees leading to the Master of Science and a Doctor of Philosophy, electro-optics, electromagnetic sensors, plasma engineering, power electronics, and control systems.

Graduate work leading to the Master of Science with a major in Electrical Engineering may be completed during one academic year of full-time study, or two to three years of part-time study.

Admission Requirements
Applicants for admission to the M.S. degree program are expected to have completed a bachelor's degree in Electrical Engineering with an average of at least 3.0 out of 4.0 both overall and in the senior year. All applicants whose native language is not English, including those who have earned degrees at U.S. institutions, must score at least 550 on the TOEFL exam to be considered for admission to the program.

Students who hold the bachelor's degree in a field other than electrical engineering are also expected to have a minimum cumulative grade-point average of 3.0 and a minimum senior year average of 3.0 in that field. The department will require that selected undergraduate courses be taken to make the background of these students comparable to that of students who hold a bachelor's degree in Electrical Engineering. These undergraduate courses may include electrical engineering courses from the sophomore and junior years and one senior electrical engineering sequence of the student's choice. The specific set of undergraduate courses required will be chosen in view of the applicant's prior education and experience. The student will be admitted under non-degree status until the required undergraduate courses are successfully completed with a 3.0 average.

Master's Degree Requirements
Students may choose between a thesis option and a project (non-thesis) option M.S. program. All students must file a Master's Program Plan with the departmental graduate committee specifying which option they have selected. A thesis-by-semester schedule of the courses they intend to take, and the members of the student's master's committee. Students may change between the thesis and project options one time, by filing an amended Master's Program Plan.

**Non-Thesis Option**: Specific requirements of the project (non-thesis) option are a minimum of 33 semester hours including:

1. Electrical Engineering 503 and 504.
2. Six semester hours of mathematics at the 400 level or above selected from a list approved by the graduate committee, or 6 semester hours of EE courses at the 500 level or above, or 6 semester hours of non-EE courses approved by the student's master's committee and the graduate committee.
3. An additional 12 semester hours of 500-level work in electrical engineering including 6 semester hours in the student's major area of electrical engineering and 6 semester hours in a second area of electrical engineering approved by the student's master's committee.
5. A final oral examination covering the thesis and related coursework.

**Thesis Option**: Specific requirements of the thesis option are a minimum of 33 semester hours including:

1. Electrical Engineering 503 and 504.
2. Six semester hours of mathematics at the 400 level or above selected from a list approved by the graduate committee, or 6 semester hours of EE courses at the 500 level or above, or 6 semester hours of non-EE courses approved by the student's master's committee and the graduate committee.
3. An additional 12 semester hours of 500-level work in electrical engineering, including 6 semester hours in the student's major area of electrical engineering and 6 semester hours in a second area of electrical engineering approved by the student's master's committee.
5. A final oral examination covering the thesis and related coursework.

A comprehensive examination is required of students who fail the qualifying examination 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-