living populations. Emphasis on North American Indians. Prereq: 2510 or consent of instructor.

4950 Primate Studies (3) Survey of field and laboratory investigations of comparative anatomy and non-human primate behavior. Prereq: 2510 or consent of instructor. F

4960 Primate Paleontology (3) Survey of fossil primate forms; origin and evolution of major primate lineages, emphasizing the human, hominid and related forms. Prereq: 2510. Recommended prereq: Zoology 4380. W


4975 Human Paleontology Laboratory (1) Detailed examination of casts and other materials pertinent to study of human paleontology. Prereq or coreq: 4970. Sp

5000 Thesis (1-15) E

5100 Graduate Research (1-9) Independent investigation of special problems in anthropology. May be repeated. Maximum 18 hrs. E

5101 Seminar in Cultural Anthropology (3-9)

5103 Independent Study (1-12) See page 99.

5104 Seminar in Zooarchaeology (3) Approaches to analysis and interpretation of archaeological faunal remains, with emphasis on evaluation of major faunal studies, guides to identification, methods of presenting faunal data. May be repeated. Maximum 6 hrs. A

5140 Laboratory Studies of the Vertebrate Skeleton (4) Examination and comparison of skeletons of major groups of fish, amphibians, reptiles, birds, mammals. Orientation toward identification of archaeologically derived faunas. May be repeated. Maximum 8 hrs. Sp, A

5150 Laboratory Study of the Mollusca (4) Examination and identification of terrestrial and freshwater mollusks of eastern U.S. Emphasis on living and archaeologically derived pelecypods. Prereq: 4640. 1 hr and 3 labs. Sp, A

5160 Seminar in Archaeology (3-9) Theoretical and practical issues central to contemporary archaeology. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. A

5200 Special Topics in Anthropology (3) Lecture and/or seminar course for advanced students on selected topics of current interest to field of anthropology. Consent of instructor. May be repeated. Maximum 9 hrs.

5210 Community Anthropology: The Local Community (3) Ethical issues, researcher roles, and field research methods on local community. Prereq: 4440 or consent of instructor. A

5340 Fieldwork in Archaeology (3-9) Practicum work surveying, excavating, processing, and analyzing of data, intensive reading. Prereq: 8 hours of introductory anthropology and consent of instructor. May be repeated. Maximum 9 hrs.

5400 History of Anthropological Theory (3) Theoretical contributions of more influential anthropologists, emphasis on latest developments.

5400 Peasant Societies (3) Historical analysis of existing literature and theories regarding rural-urban, social, and political relationships of different factors in determining and analyzing of data, intensive reading. Prereq: 8 hours of introductory anthropology and consent of instructor. May be repeated. Maximum 9 hrs.

5450 Comparative Social Organization (3) Social structure in non-Western societies. Kinship, age, sex, and property. Consent of instructor. A

5450 Comparative Social Organization (3) Social structure in non-Western societies. Kinship, age, sex, and property. Consent of instructor. A

5470 Comparative Methodology in Archaeology (3) Application of diverse methods to problems of archaeological interpretation. Correlation and derivative procedures, data analysis, discriminant analysis and implementation of computer routines. Prereq: Statistics 2100 or equivalent. F

5470 The Healer in Cross-Cultural Perspective (3) Graduate seminar dealing with socialization, methods of diagnosis, and therapeutic modes of healers in predominantly non-Euro-American milieu. Prereq: 4290. W

5480 Theory in Archaeology (3) Review of development of archaeological theory. Coverage up to and including recent systems approaches. F

5510 Problems in North American Archaeology (3) Seminar to explore specific research problems in North American archaeology. Research topics on prehistoric ecology and settlement patterns in North America. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. A

5620 Problems in Old World Archaeology (3) Selected topics and research problems in Europe, Asian, and African prehistory investigated in depth. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. W

5630 The Maya (3) Intensive survey of Mayan culture of Yucatan and Guatemala from pre-Columbian times to present. Prereq: 3550. A

5640 Archaeological Resource Management (3) Theory and practice—public, conservation, contract, and salvage/research archaeology. Legislation, contracts, responsibilities, and certification; agencies and policies; project design, administration, and logistics; standards of field work, analysis and publication. Tentative archaeology and public conservation as career. May be repeated. Maximum 6 hrs. W

5660 Seminar in Prehistoric Lithic Technology (3) Analysis of techniques employed in production of prehistoric stone industries, raw materials employed; resultant implements, morphology and function; and typological constructs utilized in archaeological analysis. Prereq: Consent of instructor.

5670 Seminar on Aboriginal Lithic Resources (3) Training in and storage of raw materials utilized by prehistoric stone industries; raw materials employed; resultant implements, morphology and function; and typological constructs utilized in archaeological analysis. Prereq: Consent of instructor.

5700 Theory in Folk Culture Studies (3) Seminar exploring specific research problems in European and American folklore and folklife study trends from inception to present.

5710 Problems in Folk Culture Studies (3) Topical seminar dealing with selected problems and aspects of traditional behavior in Euro-American culture. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. A

5990 Dental Anthropology (3) Dental anatomy, theories of dental evolution, genetic and environmental influences controlling dental morphology, comparative primate dental morphology, dental trait analyses, use of dentition for skeletal aging, and dental casting. Prereq: 3900. A

5910 Measurement of Man (3) Techniques of measuring and describing skeletal material and human subject with emphasis upon practical applications to growth, nutrition and human engineering. Prereq: Consent of instructor. A

5920 Advanced Physical Anthropology (3) Intensive investigation of theory and problems in physical anthropology.

5930 The Human Skeleton in Forensic Medicine (3) Application of physical anthropology to problems in human identification. Determination of age, sex, and sex of skeleton and preparation of reports for legal proceedings. Prereq: 4640. 1 hr and 3 labs. Sp, A

5940 Skeletal Biology of Early Human Population (3) Practical and theoretical approaches to analysis of prehistoric human skeletal populations. Demography, vital statistics, pathology, nutrition, and measurement of biological relationships as they relate to population as adaptive unit. Prereq: 3900. F

5945 Comparative Primate Anatomy (3) Laboratory-oriented course dealing with functional anatomy and genetics of primates. Musculoskeletal system and evolution of various primate adaptive patterns. Prereq: Osteology and one dissection course in zoology.

5950 Paleopathology (4) Identification of and diagnostic significance of skeletal elements: pathologic conditions affecting human skeleton. Roentgenological, histological, and gross visual examination of skeletal material. Prereq: 3900 and/or consent of instructor. Lecture and lab.

5960 Dermatoglyphics (3) Methods of dermatoglyphic analysis and determination of variation and relationship of variation to population structure.

5970 Emergence and Early Evolution of Man (3) Ancestry and evolutionary signification of Australopithecines. Prereq: 4970 or consent of instructor. W, A

5980 Neanderthal Man and Human Evolution (3) Morphology, distribution, and evolutionary relations of Neanderthals. Prereq: 4970 or consent of instructor. W, A

5990 Human Variation (3) Nature of human biological variation with emphasis on microevolutionary processes responsible for establishing and maintaining variation and relationship of variation to population structure. Prereq: 3900 or consent of instructor. A

6000 Doctoral Research and Dissertation (3-15) E

6100 Seminar in Cultural Anthropology (3, 3 credit hours offered each quarter for doctoral candidates)

6610 Selected Topics in Archaeology (3) May be repeated. Maximum 9 hrs.

6910 Selected Topics in Physical Anthropology (3) May be repeated. Maximum 9 hrs.

6970 Seminar in Human Paleontology (3) Prereq: 4970 or consent of instructor.

Archaeology—Greek and Roman

See Classics

Art

MAJOR

ART

DEGREES

M.A., M.F.A.

Professors:


Associate Professors:


Assistant Professors:


Instructors:

M. A. California (Los Angeles); L. Kocianis, M.F.A. California (Davis); T. Sarpe, M.F.A. Wisconsin.
The Art Department offers two graduate degrees: Master of Arts and Master of Fine Arts. In order to become a candidate, the applicant must be admitted by the Graduate School and approved by the Department of Art. In addition to the admission requirements of the Graduate School, the Department of Art specifically requires the following:

1. A detailed letter of intent.
2. Three letters of recommendation from former professors or professionals in the field.
3. An undergraduate major in art or evidence of equivalent proficiency.
4. A portfolio to be evaluated by the faculty. Application forms and further information are available by writing to the Department of Art.

MASTER OF ARTS

Areas of concentration consist of ceramics, communication design, drawing, fiber-fabrics, painting, printmaking, sculpture, and watercolor. One year of residence is required.

M.A. Core:

- Art history (12 credits)
- Electives (10 credits)

ART HISTORY

- Art Conservation (4 hours)
- Art History 5999, Projects in Lieu of Thesis (30 hours) is a third year of semi-independent study.
- Exhibition and oral examination: With the completion of all requirements for the M.F.A. the student must produce an exhibition, and, in the presence of the work, must satisfactorily complete an oral examination.

GRADUATE MINOR IN THE HISTORY OF ART

A graduate minor in Art History may be arranged with the consent of the student’s committee, the instructors involved, and the Graduate School. Prerequisite is an undergraduate Art History minor, or its equivalent, and reading knowledge of French, German, or Italian, unless waived by the art history faculty.

1. Three letters of recommendation from former professors or professionals in the field.
2. Twelve hours of art history for graduate credit.
3. Six quarters beyond the baccalaureate degree are required in residence. Residence is defined by the Department of Art as (1) a minimum enrollment of 6 hours per quarter, and (2) use of Department of Art facilities so that students are available for discussion and criticism. Final examinations are oral, concurrent with project exhibition.

MAYOR OF FINE ARTS

The Master of Fine Arts is the terminal degree in studio art. It is offered with concentrations in ceramics, communication design, drawing, fiber-fabrics, painting, printmaking, sculpture, and watercolor. Inter-area concentrations are available with consent of the faculty.

Six quarters beyond the baccalaureate degree are required in residence. Residence is defined by the Department of Art as (1) a minimum enrollment of 6 hours per quarter, and (2) use of Department of Art facilities so that students are available for discussion and criticism. Final examinations are oral, concurrent with project exhibition.

Curriculum:

Quarter hours

Project in Lieu of Thesis (30 hours) is a third year of semi-independent study.

ART HISTORY

- Art History (12 credits)
- Electives (10 credits)

Art Criticism (4 hours)

- Seminar in Art History (4 hours)

ART HISTORY

- Art Conservation (4 hours)
- Art History 5999, Projects in Lieu of Thesis (30 hours) is a third year of semi-independent study.
- Exhibition and oral examination: With the completion of all requirements for the M.F.A. the student must produce an exhibition, and, in the presence of the work, must satisfactorily complete an oral examination.

GRADUATE MINOR IN THE HISTORY OF ART

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1. Three letters of recommendation from former professors or professionals in the field.
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Curriculum:

Quarter hours

Project in Lieu of Thesis (30 hours) is a third year of semi-independent study.

ART HISTORY

- Art History (12 credits)
- Electives (10 credits)

Art Criticism (4 hours)

- Seminar in Art History (4 hours)

ART HISTORY

- Art Conservation (4 hours)
- Art History 5999, Projects in Lieu of Thesis (30 hours) is a third year of semi-independent study.
- Exhibition and oral examination: With the completion of all requirements for the M.F.A. the student must produce an exhibition, and, in the presence of the work, must satisfactorily complete an oral examination.

GRADUATE MINOR IN THE HISTORY OF ART

A graduate minor in Art History may be arranged with the consent of the student’s committee, the instructors involved, and the Graduate School. Prerequisite is an undergraduate Art History minor, or its equivalent, and reading knowledge of French, German, or Italian, unless waived by the art history faculty.

1. Three letters of recommendation from former professors or professionals in the field.
2. Twelve hours of art history for graduate credit.
3. Six quarters beyond the baccalaureate degree are required in residence. Residence is defined by the Department of Art as (1) a minimum enrollment of 6 hours per quarter, and (2) use of Department of Art facilities so that students are available for discussion and criticism. Final examinations are oral, concurrent with project exhibition.
THE MASTER'S PROGRAM

A major is offered in Audiology or in Speech Pathology. A minor is offered in each of the two areas when approved by the department.

The intent of each major program is to provide the student with the scholarly and professional skills necessary for functioning as an independent professional clinician in any of these subfields, or as an independent researcher in any of these areas.

Students majoring in the two areas are expected to complete the academic requirements for one of the programs from the American Speech and Hearing Association, including the required number of clock hours of clinical practicum. An exception to this rule must be approved by the Graduate Committee of the College of Liberal Arts.

Enrollment in clinical practicum courses is required for all clinical practice experiences. If the undergraduate preparation does not include sufficient course work in speech pathology, audiology, psychology, and related fields, the student may be required to make up such deficiencies.

Students may elect either the thesis program or the non-thesis option. Students in both programs are required to take the Graduate Record Examination with no less than 5110 and 5119. The Master's program with the thesis will include a minimum of 45 quarter hours of approved graduate credit, including 9 quarter hours of 5000 credit in the preparation of an acceptable thesis representing original independent work, and a final oral examination. At least one-half of these total courses must be at the 5000 or 6000 level. The non-thesis option program must present a total of 42 hour credits of approved graduate. Students in the non-thesis option program may present a total of 42 graduate credit and pass a final written examination. A minimum of 24 quarter hours must be at the 5000 or 6000 level. The decision as to which of the program or the non-thesis program is normally made following completion of 5110 and a conference with the student's advisor.

THE DOCTORAL PROGRAM

The Ph.D. program in Speech and Hearing Science seeks to develop individuals for research or college teaching careers in the areas of social, economic and ethical problems of contemporary social science.
field of speech and language pathology, audiology, or speech and hearing science. This degree program is research oriented, with primary emphasis upon developing the scientific and cognitive skills which allow individuals to identify and independently study important questions concerning the human act of oral and aural communication. Students will be expected to master the accumulated knowledge in the area of:

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

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

Specific programs of study will be determined by personal interests in consultation with his/her faculty committee. In addition to the general Graduate School requirements, specific requirements for the degree of Doctor of Philosophy in Speech and Hearing Science will include:
1. Successful completion of coursework in the study of one or more research tools, or other specific scientific methodological vehicle pertinent to the research interests of the candidate. The choice of research tool(s) is subject to departmental approval.
2. A minimum of 9 quarter hours of graduate credit obtained in course work in a cognate field as determined by the Department of Audiology and Speech Pathology. These hours are in addition to those required in item 1 above.
3. Sufficient course work within the department but outside the area of specialization to give a broad foundation and understanding.
4. A comprehensive examination to demonstrate a general knowledge of the basis of audiology, speech and language pathology, and speech and hearing science; advanced knowledge of the specifics of the area of specialization.
5. Research and dissertation to give at least 36 hours of graduate credit (6000 level). 6. A final oral examination.

4040 Appraisal of Speech and Language Disorders
(4) Diagnostic procedures for children and adults with speech and language problems including observation and practice with diagnostic tests. Prereq: 3040, 3050, or consent of instructor. (Same as Special Education 4040.) F, Sp

4070 Free Association
(4) Oral and written free association as process for diagnosing and treating communication disorders. Includes didactic self-analysis. W

4190 Speech Development of the Hearing Impaired
(3) (Same as Special Education 4190.)

4200 Practicum in Speech Development of the Hearing Impaired
(3) (Same as Special Education 4200.)

4210-20 Language Development of the Hearing Impaired I, II (3, 3) (Same as Special Education 4210-20.)

4250 Introduction to the Psychology and Education of the Hearing Impaired
(3) (Same as Special Education 4250.)

4310 Stuttering
(3) Nature and treatment. Review and integration of various theories. Prereq: 3040 or consent of instructor. (Same as Special Education 4310.) F, Su

4320 Introduction to Clinical Practice in Speech Pathology
(3) Prereq: 3040, 3050, 3310, 4040, and consent of instructor. (Same as Special Education 4320.) S/NC only. E

4330 Clinical Practice in Speech Pathology I
(1-6) Prereq: 4320 and consent of instructor. (Same as Special Education 4330) S/NC only. E

4340 Clinical Practice in Speech Pathology II
(1-6) Prereq: 4330 and consent of instructor. (Same as Special Education 4340). May be repeated. S/NC only. E

4400 Voice Disorders
(4) Etiology, diagnosis, and treatment of organic and functional voice disorders. Prereq: 3040, 3065, or consent of instructor. (Same as Special Education 4400.)

4450 Clinical Practice in Audiology
(1-6) Prereq: 4720 and 4930. E

4460 Clinical Practice in Audiology
(1-6) Prereq: 4460, 4720, and 4930. F, Sp

4700 Clinical Practice in Audiology
(1-6) Prereq: 4700, 4720, and 4930. May be repeated. Maximum 6 hrs. E

4520 Speech Pathology
(3) Independent study of special problems in speech pathology. Prereq: Consent of instructor. E

4550 Problems in Speech Pathology
(1-6) Prereq: Consent of instructor. E

4560 Problems in Audiology
(1-6) Prereq: Consent of instructor. May be repeated: Maximum 6 hrs. E

4610 Introduction to Language Pathology in Children

4620 Birth Defect Syndromes and Language Retardation
(3) Examination of research literature relevant to birth defects and language retardation including clinical, educational and socioemotional implications of such disorders. Prereq: 4610 or consent of instructor. F

4630 Practical Applications of Language Habilitation Techniques
(3) Discussion and demonstration of various methods and procedures used in treating language retarded children. Prereq: 4610 or consent of instructor. F

4640 Parent Participation in Language Habilitation Programs
(3) Nature of counseling and educational relationships with parents of exceptional children including emotional support for families, behavior management strategies, home training methods. Prereq: 4610 or consent of instructor. Sp

4650 Speech and Language of the Culturally Different Child
(3) Discussion of speech and language differences of children of various minority groups, of different ethnic and class membership and from different geographic regions, their causes, and their effects upon educational programs. F, W, Su

4660 Topics in Language Retardation and Its Habilitation
(3) Lectures on selected topics by representatives of such fields as special education, early childhood education, educational psychology, genetics, and psychology. Prereq: 4610 or consent of instructor. F

4720 Audiology II
(4) Basic principles of clinical audiometry; pure-tone, speech, masking and overview of special auditory tests. Prereq: 3710. (Same as Special Education 4720.) W, Su

4760 Introduction to Hearing Conservation

4930 Aural Rehabilitation: Speechreading and Auditory Training
(3) Rehabilitation of acoustically impaired by maximizing use of residual hearing and utilizing speechreading as receptive communicative process. Prereq: 4720. (Same as Special Education 4930.) F, W, Su

4940 Introduction to the Verbal-Tonal System
(4) Prereq: 3710 or 4700. Recommended prerequisites: 4300 and 3050. (Same as Special Education 4940.) F, W, Su

5000 Thesis
(1-15) E

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

5040 Advanced Clinical Practice in Audiology
(1-6) Prereq: 4720 and 4930. May be repeated. Maximum 12 hrs. (Same as Special Education 5040.) E

5045 Practicum in Hearing Aid Orientation and Communication Counseling
(1-6) Practical exposure to counseling hard of hearing and family members. Microscopic diagnosis and expectations of hearing aids, suggestions for better use of communication skills. Prereq: 4720, 4930 and consent of instructor. May be repeated. Maximum 9 hrs. E

5050 Practicum in Verbal-Tonal Habilitation
(1-6) Prereq: 4940, 5500, or consent of instructor. May be repeated. Maximum 9 hrs. E

5051 Practicum in Aural Rehabilitation
(1-6) Prereq: 4720, 4930, or consent of instructor. May be repeated. Maximum 6 hrs. E

5060 Anatomy and Physiology of Speech
(3) Structure and function of neuromuscular system involved in breathing, phonation, resonation, and articulation. Prereq: 3065. E

5070 Anatomy and Physiology of Hearing
(3) Structure of the human ear, pathology of hearing impairment, and psychacoustics of audition. Prereq: 3710. F

5071 Physiological Acoustics and Electrophysiology
(3) Techniques for electrophysiological measurement of auditory sensitivity, sound transmission by ear, distortion in ear, and ear as analytic mechanism. Prereq: 4720, 5070 or consent of instructor. Sp; Su

5100 Comparative Anatomy of the Peripheral Auditory Structures
(3) Tutorial laboratory course in comparative anatomy of temporal bone employing microdissection techniques. Prereq: 5070 or consent of instructor. E

5110 Introduction to Research in Speech and Hearing
(3) Analysis of research techniques, application of statistics, and pilot research project. Prereq: Elementary statistics. F, W, Su

5117 Instrumentation in Audiology and Speech Pathology
(2) Principles of instrumentation used in audiology and speech pathology. Prereq: 3010. W, Sp

5119 Laboratory in Instrumentation in Audiology and Speech Pathology
(1) Laboratory assignments designed to familiarize student with instruments for measuring speech and hearing processes. Prereq: 5117. E

5200 Seminar on Stuttering
(3) Current significant research in problem of stuttering. Prereq: 4310 or consent of instructor. W, Su

5201 Aphasia
(3) Historical review of aphasia literature; theories of brain functioning, aphasic classification and terminology, tests and rationale for testing, aetiology, therapy considerations and prognosis for recovery. Prereq: 5060 or equivalent or consent of instructor. W, Su

5230-30-40 Advanced Clinical Practice in Speech Disorders I, II, III, IV (1, 1-6) Prereq: Consent of instructor. 5230 may be repeated. Maximum 9 hrs. S/NC only. E

5350-60-70 Advanced Clinical Practice in Speech Diagnosis I, II, III, IV (1-6, 1-6, 1-6) Prereq: 4040, 4340 or equivalent. 5350 may be repeated. Maximum 9 hrs. S/NC only. E

5380 Cerebral Palsy
(3) Neurological foundations and speech and language training. Prereq: 5060. (Same as Special Education 5380.) F
4720 or equivalent and 5070. Supervised procedures to differentiate lesions of auditory disorders commonly encountered in medical culturally different children. Prereq: 4650. Su

5550 Special Problems in Language Pathology (3) Significant research in various areas of audiology. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

5490 Practicum in Hearing Conservation (1-6) Supervised on-site experience in hearing conservation programs at industrial settings. Prereq: 5605. May be repeated. Maximum 6 hrs. E, S

5500 Seminar in Audiology (3) Significant research in various areas of audiology. Prereq: Consent of instructor. May be repeated. Maximum 16 hrs. F, Sp

5503 Special Auditory Tests (3) Theoretical and practical aspects of auditory procedures used for differentiating between cochlear vs. retrocochlear auditory lesions, identifying central auditory threshold, and nonorganic hearing loss. Prereq: 5490. S

5600 Independent Study in Audiology (1-6) Prereq: 4720 or equivalent and consent of instructor. May be repeated. Maximum 6 hrs. E

5610 Practicum: Language Pathology in Children (3) Seminar and/or practicum involving discussion and utilization of testing and analyses of habilitative philosophies, specialties and techniques. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

5651 Seminar in Language Differences (3) Significant research relevant to language differences of culturally different children. Prereq: 4650. Su

5740 Pediatric Audiology (3) Advanced study of theoretical and practical considerations of procedures to evaluate hearing of infants and small children. Prereq: 4720 or equivalent. Sp

5750 Educational Audiology (3) Advanced case management of hearing impaired child: audiology follow-up, educational alternatives, teacher and parent counseling, social adjustment, classroom acoustics and state and federal guidelines. Prereq: 5490 and 5440.

5790 Seminar in Psycholinguistic Concepts in Speech Pathology (3) Psycholinguistic concepts and inteviews for studying the normal development, acquisition of language and certain disorders of language. Prereq: Consent of Instructor. (Same as Psychology 5760.) Sp

5950 The Verbo-Tonal System (3) Theory, procedures and instrumentation of Verbo-Tonal System in habilitation, rehabilitation, diagnosis, speech therapy, and foreign languages. Prereq: 3710. Recommended prereq: 3050, 4720, and 4930. F, Su, W

6000 Doctoral Research and Dissertation (3-15) E

6010 Experimental Phonetics (3) Acoustical and physiologic analyses of speech production and perception. Prereq: 5119 or consent of instructor. F

6019 Experimental Phonetics Laboratory (3) Must be taken concurrently with 6010.

6020 Psychoacoustics (3) Auditory reception and perception of non-speech stimuli. Prereq: 6010. W

6029 Psychacoustics Laboratory (2) Must be taken concurrently with 6020. W

6060 Applied Anatomy and Physiology of Speech Mechanism (3) Dissection and related readings. Prereq: 5490 or equivalent. Sp

6070 Experimental Techniques in Cochlear Physiology and Neurophysiology (3) Prereq: 5070 or equivalent. A

6080 Seminar in Speech Science (3) Advanced study of experimental areas such as speech physiology, acoustic analysis, recognition, perception and intelligibility of speech, communication theory, and psycholinguistic measurement of speech and language. Topics vary from quarter to quarter. Prereq: 6010 or consent of instructor. May be repeated. Maximum 9 hrs. Sp, A

6090 Seminar in Hearing Science (3) Advanced study of perception of non-speech acoustic signal; detectability, pitch, loudness, differential threshold, adaptation, masking, and nonauditory aspects of hearing. Prereq: 6010 or consent of instructor. May be repeated. Maximum 9 hrs. W, A

6110 Experimental Design in Speech and Hearing (3) Analysis of experimental design in theses and related journal articles. Prereq: 6090 or consent of instructor. May be repeated. Maximum 9 hrs. W, A

6177 Theories of Hearing (3) Physiological processes basic to classical theories of hearing related to sensitivity, loudness, pitch, and discrimination of acoustic stimuli. Prereq: 5070 or consent of instructor. W, A

6119 Advanced Instrumentation in Speech and Hearing Science (3) Selection, use and calibration of instrumentation used in speech and hearing research. Prereq: 5117, 5119 or equivalent. W, A

6500 Advanced Seminar in Audiology (3) Prereq: Consent of instructor. May be repeated. Sp

6520 Advanced Seminar in Speech and Language (3) Topics vary from quarter to quarter but include advanced study of aberrations of voice, articulation, speaking time, language development or use, and language symbolism. Prereq: Consent of instructor. May be repeated. F, Sp

6560 Directed Research (1-6) Participation in ongoing or non-dissertational research. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. E

6570 Directed Study in Speech Pathology (1-3) May be repeated. Maximum 9 hrs. E

6580 Directed Study in Audiology (1-3) May be repeated. Maximum 9 hrs. E

6590 Directed Study in Speech Science (1-3) May be repeated. Maximum 9 hrs. E

6600 Directed Study in Hearing Science (1-3) May be repeated. Maximum 9 hrs. E

Biochemistry

MAJOR

Biochemistry

DEGREE

M.Sc., Ph.D.

Professors: W. D. Wicks (Head), Ph.D. Harvard; J. E. Churchich, Ph.D. Sheffield (England); J. G. Joshi, Ph.D. Poona (India); K. J. Monty, Ph.D. Rochester, T. P. Salo (Associate Head), Ph.D. Michigan.

Asst. Professors: S. W. Hawkinson, Ph.D. Chicago; L. Huang, Ph.D. Michigan State.

Assistant Professors: L. B. Brattsten, Ph.D. Illinois; R. Bryant, Ph.D. Illinois; R. H. Feinberg, Ph.D. California (Berkeley).

The graduate program consists of an orientation examination to determine the most suitable course work for the incoming graduate student, successful completion of a series of graduate courses and seminars, and a qualifying examination at the end of the first year. In addition, the M.S. degree requires research leading to the writing and oral defense of a thesis, while the Ph.D. degree requires successful completion of a comprehensive examination and dissertation leading to the Ph.D. dissertation and its oral defense.

The orientation examination: Given fall quarter at 9:30 a.m. on the Thursday prior to the week in which classes begin, is taken by all incoming students without exception. The purpose of the examination is to aid in placing students in the proper courses to help ensure their success in the graduate programs. The examination will cover analytical, organic and physical chemistry and biochemistry. If the student's undergraduate program does not show appropriate courses in one of the subjects, the student will not take that part of the examination but will be enrolled in a suitable course. The results of the examination will help determine appropriate course work.

The qualifying examination: At the conclusion of the first year's work in 5510-20-30, 5310-20-30 and 4230, a comprehensive qualifying examination covering all of the material will be taken by all first year graduate students, without exception, in the first week of the summer quarter. On the basis of results of the examination, the student will be counseled concerning his/her future in the biochemistry program.

THE MASTER'S PROGRAM

This program requires about two years of full-time study and provides both breadth and depth of training by mixing classroom instruction with research laboratory experience. Students completing this program will have a sound foundation in modern biology and chemistry and will be equipped to follow and absorb future advances in these fields. Recent graduates of this program are now involved in such occupations as industrial pharmaceutical
The following courses: work and the mastery of the subject matter of either biology or chemistry. Departmental teaching, hospital laboratory work, cancer required, they may not be taken for graduate credit. which should be identified early so that credit in an approved area of specialization least 3 hours of genetics and 3 hours of physiology. 3. An orientation examination as described above. 4. Biochemistry 5510-20-30, 5310-20-30, 4230; and at least one special topics course (5450), or 5610 or 5120 or 5130 or 5210. 5. A qualifying examination as described above. 6. At least 9 hours of advanced lecture-seminar courses from the following: Biochemistry 6410, 5010. 7. At least 9 hours of Master’s research and a thesis. 8. A final comprehensive examination which will cover both the thesis endeavor and the substance of the course requirements.

THE DOCTORAL PROGRAM

An incoming student must present course work covered by an undergraduate major in either chemistry or biology. Departmental requirements for the awarding of the Ph.D. include mastery of the subject matter indicated in the following list of courses. Course contents listed in items 1 and 3 are prerequisites to taking the comprehensive examination; applicants usually should expect to complete these requirements within the first two years of graduate school.

1. Introductory Organic Chemistry with laboratory (at least 1 year)*, at least one quarter of analytical chemistry, and a minimum of three quarters of approved physical chemistry. 2. A minimum of 12 quarter hours of approved biology courses beyond the introductory level, including at least 3 hours of genetics and 3 hours of physiology. 3. An orientation examination as described above.

4. Biochemistry 5510-20-30, 5310-20-30, 4230; and at least one special topics course (5450), or 5610 or 5120 or 5130 or 5210. 5. A qualifying examination as described above. 6. At least 9 hours of advanced lecture-seminar courses from the following: Biochemistry 6410, 5010. 7. At least 9 hours of Master’s research and a thesis. 8. A final comprehensive examination which will cover both the thesis endeavor and the substance of the course requirements.

THE DOCTORAL PROGRAM

An incoming student must present course work covered by an undergraduate major in either chemistry or biology. Departmental requirements for the awarding of the Ph.D. include mastery of the subject matter indicated in the following list of courses. Course contents listed in items 1 and 3 are prerequisites to taking the comprehensive examination; applicants usually should expect to complete these requirements within the first two years of graduate school.

1. Introductory Organic Chemistry with laboratory (at least 1 year)*, at least one quarter of analytical chemistry, and a minimum of three quarters of approved physical chemistry. 2. A minimum of 12 quarter hours of approved biology courses beyond the introductory level, including at least 3 hours of genetics and 3 hours of physiology. 3. An orientation examination as described above.

*Though completion of these courses or the equivalent is required, they may not be taken for graduate credit.
4610 Current Topics in Biochemistry (1) Seminars and lectures dealing with current advances in the field of chemical biology. May be repeated with consent of department. S/NC only. F, W, Sp

4620 Current Topics in Biological Membrane Research (1) Conf. current literature on biological membrane research. Prereq: 4110-20 or equivalent. May be repeated. Maximum 9 hrs. S/NC only. (Same as Microbiology 6420) F, W, Sp

4631 Current Topics in Environmental Toxicology (1) Critical reviews of research problems and methods in environmental toxicology, behavioral toxicology, biochemical and ecological effects, biostatistics and epidemiology. Presentations by students, faculty and guest lecturers from academia and industry. May be repeated with consent of department. Maximum 6 hrs. S/NC only. F, W, Sp

4650 Advanced Special Topics (1-3) Registration only by prior arrangement with department. For students who have passed Ph.D. preliminary examinations or are in advanced state of graduate studies. Topic title posted in advance. May be repeated. Maximum 9 hrs.

**Biology**

<table>
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<tr>
<th>MAJOR</th>
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<td>Biology</td>
<td>MACT</td>
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K. J. Monty, Coordinator.

The Master of Arts in College Teaching program is administered by an interdepartmental committee composed of one representative from each of the following departments: Biochemistry, Botany, Microbiology and Zoology. Inquiries regarding the program should be addressed to the chairperson of the committee.

The admission requirements are:
1. Bachelor's degree with satisfactory record.
2. Nine quarter hours of college mathematics.
3. Twelve quarter hours of general biology, general botany, or general zoology.
4. Twelve quarter hours of general biology courses.
5. Eighteen quarter hours of advanced biology courses.

Requirements for the degree:
All candidates for the MACT degree in Biology will meet a minimum distribution of graduate and undergraduate courses as follows:
1. Eight quarter hours in each of the following:
   a. Taxonomy and/or Ecology.
   b. Morphology, Developmental Biology and/or Anatomy.
   c. Physiology and/or Biochemistry.
   d. Genetics, Cytology and/or Cytogenetics.
   e. Inorganic chemistry.
   f. Biology of plants.

2. Satisfactory completion of 2 credit hours at the 6000 level (excluding dissertation).

3. Presentation or oral defense of a dissertation.

4. Satisfactory performance on a written comprehensive examination.

5. Presentation of a thirty-minute departmental seminar.

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

B. Non-Thesis Program

1. Satisfactory completion of 51 quarter hours of approved graduate courses of which 30 quarter hours must be in botany including Botany 5003 and 5004.

2. Satisfactory completion of 2 credit hours at the 6000 level.

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

4. Satisfactory performance on a written comprehensive examination. A final written examination covering all work offered for the degree. The department may or may not follow this examination with an oral examination.

**The DOCTORAL PROGRAM**

1. Satisfactory presentation of a written formulation and oral defense to the student's committee of a research proposal suitable for a dissertation program. Must be completed before enrollment in Botany 6000.

2. Satisfactory performance on a written comprehensive examination.

3. Presentation of one or more cognate areas outside of the department totaling nine graduate credit hours with at least a B average.

4. Satisfactory performance on an examination in one modern foreign language or an A or B in French 3030 or German 3030.

5. Satisfactory completion of 9 credit hours at the 6000 level (excluding dissertation).


7. Presentation of a one-hour departmental seminar near the end of the doctoral program.

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

Note: Graduate School requirements are described by arc 19-30. These requirements should be interpreted as minimal requirements and specific stipulations or requirements such as additional foreign languages, additional oral preliminary examinations may be required by the individual student's faculty committee.

**2010-20 Plants in Evolution (4, 4) Monera to angiospermas; emphasis on evolutionary relationships, morphology and development. Prereq: 8 hrs. in biological sciences.**

**3030 Field Botany (4) Study of plants in natural environments including plant identification, collection, preservation and basic ecological concepts. Prereq: 8 hrs in biological sciences.**

**3031-32 Field Botany (4, 4) Emphasis on fall and winter flora respectively. Prereq: 3030. Need not be taken in sequence.**

**3050 Socioeconomic Impact of Plants (3) Significance of plants in origin and development of human cultures, evolution of cultivated plants, and role of plants in present civilizations. Occasional field trips.**

Sp, Su

*Not for graduate credit for botany majors.*
**3070 Genetics and Society (3) An introduction to genetics, anthropology and evolution with emphasis on their implications for human society. (Same as Anthropology 3070.)**

**3090 Biology and Human Affairs (3) Basic biological principles involved in deterioration and preservation of an environment in which human cultures may survive.**

**3210 Introductory Plant Physiology (4) Organismal physiology of plants; water relations, mineral nutrition, morphogenesis, elements of metabolic physiology and effects of environmental factors. Lectures and laboratory.**

4017 Field Mycology (3) Field experience on identification of higher fungi. Frequent field trips, field recognition of species and habitats; laboratory sessions. **Prereq: 6 hrs of botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4021 Field Bryology (3) Field experience on identification of mosses and liverworts. Frequent field trips, field recognition of species and habitats; laboratory sessions. **Prereq: 6 hrs of botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4022 Field Lichenology (3) Field experience on identification of lichens and their host plant. Frequent field trips, field recognition of species and habitats; laboratory sessions. **Prereq: 6 hrs botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4023 Field Agrostology (3) Field experience on identification of grasses. Frequent field trips, field recognition of species and habitats; laboratory sessions. **Prereq: 6 hrs botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4030 Mechanisms of Plant Speciation (3) Processes of plant speciation emphasizing population genetics, isolation, drift, hybridization, variation in populations, differentiation, inbreeding, and other aspects of plant speciation. **Prereq: 3010-20 and Biology 3110. W, A.**

4045 Aquatic Vascular Plants (3) Field experience on identification of aquatic vascular plants. Frequent field trips, field recognition of species and habitats; laboratory sessions. **Prereq: 6 hrs botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4050 Synantherology (3) Field experience on identification of compositeae. Frequent field trips, field recognition of species and habitats; laboratory sessions. **Prereq: 6 hrs botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4055 Identification of Woody Plants (3) Field identification of native trees, shrubs and woody vines of South Carolina and vicinity. Identification of hardwoods and softwoods, recognition of key characteristics, significant aspects of natural history of local species. **Prereq: 3010-20 and 5011 or consent of instructor.** Field and laboratory study. **Prereq: 6 hrs botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4061 Field Phycology (3) Field experience on identification of aquatic algal plants. Frequent field trips, field recognition of species and habitats; laboratory sessions. **Prereq: 6 hrs botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4075 Botanical Photography (3) Photography of natural history subjects and achievement of technical and aesthetic skills and knowledge to produce illustrations for class, seminar or public lecture. Landscape, habitat and species or objects of photography, in color, using 35 mm format. Lectures and laboratory courses, individually, exchange of own equipment. Film and processing costs paid by student. Photos processed and critiqued in class. **Prereq: 6 hrs of botany. Recommended prereq: Botany 3010-20 or equivalent.** Su, A.

4120 Plant Anatomy (4) Comparative structure of vascular plants. Review of anatomy, development, taxonomy. **Prereq: 4240 Paleobotany (4) (Same as Geology 4240.)**

4310 Plant Ecology (4) Interactions between individual species, communities and their environment. Circulation of energy and matter in ecosystems. Frequent field trips or laboratory periods, and at least two weekend field trips. **Prereq: 3000 or equivalent.** F, Sp, A, Su, A.

5000 Thesis (1-15) E

5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during the fall or spring term. A student must use university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. **S/NCR only.**

5003-04 Non-Thesis Research (3, 3) Library, field, or laboratory research under supervision of staff members. Students must be enrolled in a non-thesis option. Not for thesis candidates. **S/NCR only.**

5011 Mycology (4) Intensive survey of fungi, including major classes, utilizing lecture, laboratory and field information. Occasional field trips. **Prereq: 3010. 3 hrs and 1 lab.** Sp

5012 Morphology and Evolution of the Phycocyanetes (4) Similar to 5090, but dealing with Phycocyanetes fungi. **Prereq: 5011 or consent of instructor.**

5021 Bryology (4) Taxonomy, phylology, ecology, physiology, and developmental morphology of bryophytes. Field and laboratory studies and current research. **Prereq: 3020. 1 hr and 3 labs. W.**

5022 Lichenology (4) Taxonomy, phylology, ecology, economics and symbiosis of lichens with emphasis on fungi and algae and current research. **Prereq: 5011, 5010 or 4017. Recommended prereq: 5061. 1 hr and 3 labs. F, A.**

5031 Vascular Plant Taxonomy (4) Family characteristics of vascular plants, including principles of phylology and classification, based primarily on plants of local flora. **Prereq: 3030 or equivalent. 2 hrs and 2 labs.** F.

5065 Phytoplankton Ecology (4) Interaction between environment and phytoplankton. Nutrient uptake, primary production, competition, ecological theory applied to phytoplankton communities, and physiological adaptations by populations to environment. **Prereq: 3010 or consent of instructor.**

5070 Principles of Biological Illustration (3) Principles and applications for producing student biological illustrations, including principles of photomicrography and microphotomacrography, drawing graphics, and other methods for recording and presentation of biological materials. Technical aspects of data in pictorial or graphic form. **1 hr and 2 labs.** W.

5080 Pteridology (4) Evolutionary study of lower vascular plants: morphology, cytology, ecology, life cycles and reproduction. Bioecological studies and recognition of local species. **Prereq: 3000-30 or consent of instructor. 2 hrs and 2 labs or field trips.** F, A.

5090 Morphology and Evolution of Basidiozymes (4) Structure and function of somatic and sexual life cycles as applied to evolution in group. Cultures and specimens in laboratory. **Prereq: 3010 or equivalent.** F, A.

5120 Agrostology (4) Collection, identification, classification, and phylology of tribes of grasses. **Prereq: 3030 or consent of instructor. 2 hrs and 2 labs.** F.

5121 Advanced Morphology of Flowering Plants (4) Vegetative and reproductive organography: regulary, phylology, and evolutionary mechanisms, embryo and deviations, seed and fruit development. **Prereq: 3020-30 or 4120; 3210 or consent of instructor.** Sp, A.

5150 Systematics (5) Major experimental methods used in systematics and application to specific types of systematic problems. **Prereq: Consent of instructor.** F.

5210 Advanced Plant Physiology I (3) Plant cell metabolism: carbon, nitrogen and sulfur assimilation, respiration and biosynthesis of specialized plant products such as terpenoids, alkaloids and pigments. **Prereq: 5220.**

5220 Advanced Plant Physiology II (3) Photosynthesis, response of plants to light: photosynthesis, photorespiration, and phychrome mediated responses to photoperiod and light quality, mal physiology of plants; water relations, mineral nutrition. **Prereq: 5210 or Biochemistry 4120 and consent of instructor.** Recommended prereq: 1 yr of physics. W.

5235 Advanced Plant Physiology III (3) Growth and differentiation of plants at molecular, cellular and organismic levels. Hormonal regulation of development; macromolecular interpretation of differentiation, corym, germination; flowering; senescence. **Prereq: 5210 or Biochemistry 4120 and a plant cell physiology course. Recommended prereq: 5220.**

5290 Quarterly Problems (4) (Same as Geology 5290.)

5310-20-30 Special Problems in Botany (1-6, 1-6, 1-6)

5340 Plant Geography (4) Distribution of ecosystems with emphasis on American types. Vegetation, climate and historical aspects. **Prereq: 4310. 2 hrs and 2 labs. W.**

5350 Analysis of Plant Communities (4) Plants as species and ecosystems components considered from standpoint of ecology, organization, and ecosystem function. **Prereq: 4310, 2 hrs and 2 periods (field trips). Sp.**

5360 Marine Ecology (3) Relationships of marine organisms to environment and their interactions with each other. Trophic relationships in estuarine, coastal and estuarine ecosystems; succession; deep-sea ecology. **Prereq: One previous ecology course. W.**

5410-20-30 Seminar in the Teaching of College Botany (1, 1, 1) Objectives in teaching of general botany. Supervised teaching in general course; seminars; techniques. May be repeated. **S/NCR only.** F, A.

5440 Seminar in Botany (1) Readings and discussions of current literature and/or selected topics in botanical research. May be repeated. **Maximum 12 hrs. S/NCR only.** E


5780 Plant Cytology (4) Intensive consideration of cellular organization, structure and function with emphasis on correlation where possible of ultra-structure, biochemistry and function of subcellular organelles. Principles and application of various analytical and electron microscopic techniques; cell fractionation and isolation of subcellular components; differentiation and regeneration; photomicrography and microcinematography. **Prereq: For graduate students in the biological sciences. 2 hrs and 2 labs. F, A.**

5810 Cytogenetics (4) Chromosome structure and behavior during mitotic and meiotic divisions in relation to structural changes, genetic controls, hybridization, specialization and polyploidy. Laboratory emphasis on normal and aberrant meiotic systems and systemic chromosomal changes from plants and animals. **Prereq: Biology 3110 and at least 6 additional hrs in biological sciences. Sp.**

5820-21-22-23-24 Methods and Instrumentation In Botany (1, 1, 1, 1, 1) Laboratory courses providing project experience and theoretical background in various research methods. **In-
Chemistry

MAJOR
Chemistry
M.S., MACT, Ph.D.

Professors:
G. Mamantov (Head), Ph.D. Louisiana State;
H. S. Bowman (Emeritus), Ph.D. California (Berkeley);
A. Buehler* (Emeritus), Ph.D. Ohio State;
E. E. Bull, Ph.D. Illinois;
J. O. Chambers, Ph.D. Kansas;
J. A. Dean, Ph.D. Illinois;
J. F. Eastham, Ph.D. California (Berkeley);
W. E. Fletcher, Ph.D. Minnesota;
C. W. Keenan, Ph.D. Texas;
D. C. Kiewit, Ph.D. Wisconsin;
W. J. Larson, Ph.D. Purdue;
M. H. Licht, Ph.D. Wisconsin;
G. D. O'Keeley, Ph.D. California (Berkeley);
J. R. Peterson, Ph.D. California (Berkeley);
K. G. Schweitzer, Ph.D. Illinois;
A. A. Shirley (Emeritus), Ph.D. Iowa State;
H. A. Smith (Emeritus), Ph.D. Harvard;
W. T. Smith (Emeritus), Ph.D. Ohio State;
W. A. Van Hook, Ph.D. Purdue;
D. Johns Hopkins;
E. L. Wherry, Ph.D. Purdue;
T. F. Williams, Ph.D. London;
J. H. Wood (Emeritus), Ph.D. North Carolina.

Associate Professors:
J. E. Bloor, Ph.D. Manchester;
F. A. Grimm, Ph.D.
D. Cornell, W. Baaka, Ph.D. Purdue;
J. F. Kinstle, Ph.D. Akron;
C. A. Lane, Ph.D. California (Berkeley);
R. A. Magid, Ph.D. Yale;
R. M. Pagini, Ph.D. Wisconsin;
M. Schell, Ph.D. Indiana.

Assistant Professors:
J. J. Adcock, Ph.D. Texas;
J. K. Kao, Ph.D. Yale;
L. J. Magid, Ph.D. Pennsylvania;

Students majoring in Chemistry for the Master's or doctoral degree are required to present as a prerequisite one year each of general, analytical, organic and physical chemistry with a satisfactory record. Students lacking any of these prerequisites may be admitted with appropriate deficiencies which must be removed without graduate credit.

For students minoring in Chemistry, the prerequisite is two years of chemistry including quantitative analysis.

THE MASTER'S PROGRAM

The department offers specialization in seven areas for the M.S. degree: analytical chemistry, environmental chemistry, energy, inorganic chemistry, organic chemistry, polymer science, and physical chemistry. The requirements for the M.S. degree in Chemistry consist of the satisfactory completion of:

1. Research and a thesis to give 9 to 18 hours of graduate credit (5000).

2. Chemistry 4160-70, 5531, 5140-50, Polymer Engineering 4910.

3. Sufficient additional graduate course work in chemistry and/or related fields to make an overall total of 45 hours.

4. Participation in the Polymer Seminar (5911-21-31) and the Polymer Seminar Program during the entire period of graduate study.

5. A final oral examination.

The requirements for the M.S. degree in Chemistry with specialization in environment or energy consist of the satisfactory completion of:

1. Research and a thesis on an environment- or energy-related problem to give 9 to 18 hours of graduate credit.

2. Chemistry 4160-70 and two of the following: 5511, 5521, 5531.

3. Sufficient additional graduate course work in chemistry and/or related fields to give a total of 45 hours. For emphasis in environment, these additional courses must include Chemistry 5220, 5250-59-60-69-70-79, Ecology 5310, and Mechanical Engineering 4180. For emphasis in energy, all course selections must be approved by the appropriate departmental committee.

4. Participation in the Polymer Seminar (5911-21-31) during the entire period of graduate study. (No more than 3 credit hours of seminar may be applied to the above requirements.)

5. A final oral examination.

MAJOR IN CHEMISTRY

The requirements for the M.A.C.T. degree in Chemistry consist of the satisfactory completion of:

1. Chemistry 4160-70 and two of the following: 5511, 5521, 5531.

2. Sufficient additional graduate course work in chemistry and/or related fields to make an overall total of 45 hours. The additional hours must include at least 3 credit hours of seminar. (No more than 3 credit hours of seminar may be applied to the above requirements.)

3. A final oral examination.

THE DOCTORAL PROGRAM

The department offers specialization in nine areas for the Ph.D. degree: analytical chemistry, environmental chemistry, energy, inorganic chemistry, organic chemistry, physical chemistry, polymer science, and theoretical chemistry. The requirements for the Ph.D. degree in Chemistry with specialization in analytical, inorganic, organic, physical, or theoretical chemistry, the satisfactory completion of the following is required:

1. Research and a dissertation to give at least 36 hours of graduate credit (6000).

2. Chemistry 4160-70 and two of the following: 5511, 5521, 5531.

3. Participation in seminar (5911-21-31) during the entire period of graduate study.

4. A final oral examination.
during the entire period of graduate study.

4. Thirty-nine hours of additional graduate course work including at least 6 hours at the 6000 level and one of the following groups: (a) for analytical chemistry: (i) inorganic, 5420, 5710-20-30; (ii) organic, 5110-20-29-30-35 and at least 9 hours from the following courses: 5250-60-70, 5340-50, 5410-20-30-50, 5710-20-30; (d) for physical, 5340-50, 5410-20-30-50, Physics 5210.

Graduate course work in related fields may be used for undesignated course work in this requirement upon approval of the student's faculty committee.

5. A comprehensive advanced examination in the field of specialization.

6. Demonstration of a reading knowledge of one of the following languages: French, German, Russian, or an approved alternate.

7. A final oral examination.

The requirements for the Ph.D. degree in Chemistry with specialization in environment or energy consist of the satisfactory completion of the following:

1. Research and a dissertation on an environment or energy-related problem to give at least 36 hours of graduate credit.

2. Chemistry 4160-70 and one of the following groups: (a) for analytical chemistry: (i) inorganic, 5420, 5710-20-30; (ii) organic, 5110-20-29-30-35; (e) for theoretical, 5340-50, 5410-20-30-50, Physics 5210.

3. Participation in seminar in Chemistry Seminar (5911-21-31) and the Seminar Program during the entire period of graduate study.

4. Thirty hours of additional graduate course work, including at least 6 hours at the 6000 level and at least 12 hours from the Department of Chemistry offerings.

5. A comprehensive advanced examination in polymer science.

6. Demonstration of a reading knowledge of one of the following languages: French, German, Russian, or an approved alternate.

7. A final oral examination.

*3211-21-31 Organic Chemistry (3, 3, 3) Compounds of carbon with emphasis on organic mechanisms, spectroscopic and other physical properties. Must be taken in sequence. Prereq: 1110-20-30. Corresponding laboratory (5211-21-31) is a coreq for students not having credit for the laboratory. E

*3219-29-39 Organic Chemistry Laboratory (1, 1, 1) Experiments on topics discussed in 3211-21-31. Corresponding lecture (5211-21-31) is a coreq for students not having credit for the lecture. E


Coreq: Analytical chemistry. F, W, Sp

*3429-39 Physical Chemistry Laboratory (1, 1) Gases, liquids, chemical equilibria, solutions, phase equilibria, and elementary kinetics. Prereq or coreq: 3420-30. 1 lab. F, W, Sp

*3511-21-31 Principles of Organic Chemistry (3, 3, 3) Structure and reactivity of aliphatic and aromatic compounds with emphasis on the differences in chemical utility. Use of spectroscopic and physical techniques to elucidate reaction mechanisms. Recommended for chemistry majors and students planning careers in physical or biological sciences. Must be taken in sequence. Prereq: 1110-29-30. Corresponding laboratory: 3519-29-30 or 3519-29, 3529-39 as a coreq; latter is recommended.

*3529-39 Organic Chemistry Laboratory (1, 1) Experiments on topics discussed in 3521-31. Similar to 3529-38 except designed for students who have need for operating knowledge of various spectroscopic and chromatographic techniques. Corresponding lecture (3521-31) is a coreq for students not having credit for the lecture.

*3519-29 Density and Its Application (3) Density and its application to formulation of organic materials. Radiometric decay, detection apparatus and techniques, tracer procedures and safety precautions in agriculture, biology, medicine, nutrition. Not for credit by chemistry or physics majors or minors. Prereq: 1 yr of general mathematics or equivalent; 1 yr of general chemistry.


4119 Physical Chemistry Laboratory (1) Solutions, phase equilibria, reaction kinetics and spectroscopy. The corresponding course 4110 is coreq. F, W

1410 Introductory Polymer Chemistry (3) Fundamental principles, role of chemistry in interdisciplinary fields of polymer science; relation of molecular structure to bulk properties of polymers. Prereq: 1 yr each undergraduate organic and physical chemistry.
5100 Kinetics of Polymerization (3) Kinetics of formation and molecular weight distributions of polymerizations; macromolecular structure and growth and chain growth polymerizations. Prereq: 5140 and 4160-70 or equivalent.

5160 Organic Chemistry of Polymers (3) Synthesis of organic polymers and their reactivity; modern understandings of sequence distribution of polymerizations. Formation of block, graft, and network polymers. Reactions of monomers, including degradation. Prereq: 5140 and 5531. A

5170 Physical Chemistry of Polymers (3) Rubber elasticity; solution properties of macromolecules; structure and conformational analysis and conformational statistics of polymers. Prereq: 5150. A

5220 Analytical Chemistry of Environmental Pollutants (3) Application of modern analytical chemistry to problems in aquatic and atmospheric pollution. Prereq: 5250-60-70 or consent of instructor. Sp

5240 Electronics for Chemists (4) Includes material of Chemistry 4640 plus special project. Prereq: Consent of instructor.

5250-60-70 Advanced Analytical Chemistry (3, 3, 3) 5250—Absorption and emission spectrophotometry, structure elucidation by IR, NMR, UV, and mass spectra; 5260—Chemical separation methods: solvent extraction, chromatography, electrophoresis; radiochemical methods; fluorescence; x-ray methods; 5270—Electroanalytical, magnetic, and nuclear analytical methods; on stream and automatic analysis. Prereq: 1 yr of physical chemistry. F, W, Sp

5340 Quantum Chemistry (3) Postulate approach to fundamental principles of quantum mechanics. Accuracy and limitations of Schrödinger equation; approximate solutions. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

5350 Quantum Chemistry (3) Electronic excited states; introduction to group theory; perturbation theory, reactivity of organic molecules. F, 5340 W

5410-20-30 Advanced Physical Chemistry (3, 3, 3) 5410—Classical thermodynamics, 5420—Molecular spectroscopy and structure, 5430—Chemical kinetics. Prereq: 4110 or 4160-70. F, W, Sp

5450 Statistical Thermodynamics (3) Statistical treatment of the equation of state of regular solutions, of electrolyte solutions; measurement of thermodynamic functions of solutions. Prereq: 5440. A

5511 Survey of Inorganic Chemistry (3) Atomic structure, wave mechanical atomic, ionic and covalent bonds, periodic relationship of elements, inorganic stereochemistry, coordination chemistry, and descriptive chemistry of the elements. F

5521 Survey of Analytical Chemistry (3) Volumetric and gravimetric analysis, spectrophotometry, colorimetry, titrimetry, atomic absorption, complexation and precipitation equilibria; spectroscopic, electroanalytical, and separation methods. F

5531 Survey of Organic Chemistry (3) Bonding in organic molecules, chemistry of hydrocarbons, allylic compounds and conformational analysis, functional oxygenated derivatives, carbonyl compounds, stereochemistry, aromatics, and conformational analysis of organic molecules by infrared, ultraviolet, nuclear magnetic resonance and mass spectral techniques. F

5550 Industrial Chemical Research (3) Practice of modern industrial research taught by case studies and industrial research projects. Prereq: Completion of a 5000 chemistry course sequence.

5610-30 Chemical Energy Conversion (1, 1, 1) Chemistry of various energy and fuel interconversion systems. Introduction to homogeneous and heterogeneous catalysis, thermodynamics of energy conversion systems, fossil fuels chemistry, and electrochemical and photochemical conversion systems. Prereq: 5410 and one 5000 sequence. F, W, Sp

5710-20-30 Theoretical Inorganic Chemistry (3, 3, 3) 5710—Nuclear reactions and mechanisms, 5720—Coordination compounds, 5730—Investigational methods of structural inorganic chemistry. Prereq: 1 yr of physical chemistry. F, W, Sp

5810 Nuclear Chemistry (3) Nuclear properties, radioactivity, radioactive decay processes, nuclear structure and models, nuclear reactions and fission and fission detection. Prereq: 1 yr of physical chemistry. A

5911-21-31 Chemistry Seminar (1, 1, 1) Discussion of departmental research, recent research literature and general topics. May be registered. Registration required each quarter except summer resident graduate students. END only. F, W, Sp

6000 Doctoral Research and Dissertation (3-15) E

6111 Selected Topics in Organic Chemistry (3) Subject matter varies among important topics of current significance. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6130 Natural Product Chemistry (3) Structure, chemistry, and synthesis of naturally occurring substances of biological or environmental significance. Course content may vary with each offering to reflect areas of current chemical interest. Prereq: Two of 5110-20-30-35.


6160 Physical Organic Chemistry (3) Solvent and substrates as determinants of organic reaction mechanisms. Prereq: Two of 5110-20-35.

6165 Orbital Symmetry Control (3) Application of Woodward-Hoffman rules and other theories to problems in molecular structure and behavior. Prereq: 5140 or equivalent.

6210 Advanced Analytical Spectroscopy (3) Newer methods of spectroscopic analysis, including transform methods, lasers in spectroscopy, fiber optics, introductory nonlinear optics, and spectroscopic techniques for remote sensing. Prereq: 5250.

6211 Selected Topics in Analytical Chemistry (3) Subject matter varies among important topics of current significance: electron spectroscopy, photoelectron spectroscopy, transuranium chemistry, organometallic compounds, inorganic solution kinetics and mechanisms, crystal chemistry, nonaqueous chemistry, chemistry of halogens and compounds. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6230 Natural Polymers (3) Structure, modification, and nonbiochemical utilization of natural polymers and polymers derived from naturally-occurring monomers. Prereq: 5410 or two of 5110-20-35.

6411 Selected Topics in Physical and Theoretical Chemistry (3) Subject matter varies among important topics of current significance. Prereq: Two of 5410-20-35, 5430-50. May be repeated. A

6420 Nuclear Magnetic Resonance (3) Theory of nuclear magnetic resonance spectroscopy with emphasis on high-resolution methods. Applications to problems in organic, inorganic, and biochemical chemistry. Prereq: Two of 5110-20-30-35.

6430 Photochemistry and Radiation Chemistry (3) Fundamental physical and chemical processes involved in the interaction of radiation with molecules by photons and electrons; multiphoton processes and uses of laser sources; fluorescence and phosphorescence; radiationless transitions studied by optoacoustic spectroscopy, chemical reactivity of excited states; ion-molecule and free radical reactions; electron capture and electron-transfer processes. Prereq: 5430.

6450 Electrochemistry (3) Electrical double layer; electrode kinetics; transport properties of electrolytes; electroanalytical methods. Prereq: 5430 or 5570.

6475 Electronic Structure of Radicals (3) Applications of electron spin resonance to study of molecular conformation, structure, and bonding in organic and inorganic radicals; comparison of experimental results with theoretical predictions based on Walsh rules and magnetically allowed orbital calculations. Prereq: 5340-50 and 5620.

6480 Statistical Thermodynamics (3) Application of statistical mechanical methods to systems of chemical interest such as solutions, gases, and rarefied plasmas; potential energy surfaces, reactivity, conformation, electronic states. Prereq: 5140, 5450.

6495 Advanced Chemical Kinetics (3) Mechanism of elementary chemical reactions with emphasis on the quantum mechanical level including topics such as dynamics of molecular collisions, potential-energy surfaces, reactions across conformational barriers, and the complex modes of reaction and photofragmentation, energy partitioning and transfer, chemiluminescence, and chemical lasers. Prereq: 5430.

6510 Thermodynamics of Solutions (3) Theory of regular solutions and of electrolyte solutions; measurement of activity coefficients and other thermochemical properties, selected topics from literature. Prereq: 5410.

6520 Magnetic Resonance (3) Principles of magnetic resonance spectroscopy underlying nuclear magnetic resonance and electron spin resonance. Chemical applications to solid and liquid systems. Prereq: 5340.

6711 Selected Topics in Inorganic Chemistry (3) Subject matter varies among important topics of current significance: photoelectron spectroscopy, transuranium chemistry, organometallic compounds, inorganic solution kinetics and mechanisms, crystal chemistry, inorganic chemistry, chemistry of halogens and compounds. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6730 Topics in Quantum Chemistry (3) Application of newer methods to complex systems including metal complexes, polymers, and molecules of biological significance. Time dependent phenomena. Effect of external fields and collision processes on quantum chemical problems of chemical reactivity. Prereq: 5340-50.

6750 Molten Salt Chemistry (3) Structure, spectroscopic properties, solution thermodynamics, electrochemistry and phase equilibria of molten salts. Solutions of metals in molten salts. Prereq: 5410 and 5410 or equivalent.

6810 Vibrational Problems in Molecular Spectra (Same as Physics 6810.)

6811 Selected Topics in Nuclear Chemistry (3) Subject matter varies among important topics of current significance: nuclear decay schemes, nuclear models, nuclear reaction theory, nuclear detection techniques, activation analyses. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6820 Molecular Vibration-Rotation Theory (3) Same as Physics 6820.)
3340 Cities of the Greek and Roman World (3) Archaeological survey of Greek and Roman cities from 3000 B.C. to 500 A.D. with emphasis on development of city planning and quality of life. Such cities as Mycenae, Athens, Priene, Alexandria, Rome, and Lepcis Magna will be studied. F

3350 Shrines and Sanctuaries of the Greek and Roman World (3) Study of shrines and sanctuaries of Greek and Roman world with emphasis on archaeological remains. Such sites as Olympia, Epidaurus, Paestum, Cumae, Praeneste, and Baalbek will be considered. Readings in selected classical authors will add to understanding of place of shrines and sanctuaries in Greek and Roman life. Sp

4010 Greek Drama in English Translation (3) Survey of dramatic masterpieces of Greek literature. A

4210 Teaching of Latin (3) Carries no language credit. Purposes, techniques, mate- rials, and evaluation; directed observation in public schools; preparation of teaching plans and materials. A

4220 Seminar in Classical Studies (3) Special problems in literature and other arts of Greece and Rome. May be repeated with consent of department. W

4230 Classical Mythology and its Uses (3) Intensive review and survey of Greek and Roman mythology. Emphasis on philosophical, religious, and political implications of mythology in literature, music, and plastic arts, especially of modern times. A

5430 Selected Readings in Latin Literature in Translation (3) Content varies; may be repeated with consent of department. A

5620 Problems in Old World Archaeology (3) (Same as Anthropology 5620.) A

Computer Science

MAJOR

DEGREE

Computer Science

M.S.

Professors:

F. Donaldson, Ph.D. Texas;
R. C. Gonzalez, Ph.D. Florida (Electrical Engineering); D. W. Straight, Ph.D. Texas.

Computer Science

DEGREE

Plan A: Thesis Option

Plan B: Non-Thesis Option

4. Computer Science

5. Computer Science 3510 and 3520 or equivalent courses in advanced FORTRAN programming, machine organization and assembler language programming.

THE MASTER'S PROGRAM

All students must receive departmental credit for the following courses:

1. Computer Science 4550, 4510, 5100 and 5109.

2. Electrical Engineering/Computer Science 5175 and 5940.

3. Three of the courses Computer Science 4710, 4730, or 4225. The student may then select either Plan A or Plan B.

Plan A: Thesis Option

1. Complete 36 hours of courses at the 4000 level or above, including at least 16 hours at the 5000 level, exclusive of Electrical Engineering/Computer Science 5175 and 5940.

2. Complete at least 9 additional hours of thesis credit, Computer Science 5900.

3. Pass an oral examination by a committee of at least three faculty members.

Plan B: Non-Thesis Option

1. Complete 45 hours of courses at the 4000 level or above, including at least 27 hours at the 5000 level, exclusive of Electrical Engineering/Computer Science 5175 and 5940.

2. Pass written and oral comprehensive examinations.

Under either plan, courses which are taken from a department other than computer science must have the approval of the Computer Science Department.

3150 Introduction to Numerical Algorithms and Programming (3) Roots of equations, systems of linear equations, least-squares data fitting, numerical integration, numerical methods for ordinary differential equations. Introduction to programming in FORTRAN. 3150 and 3155 may not both be taken for credit. Students with a knowledge of FORTRAN should take 3155. Prereq or coreq: Mathematics 2860. (Same as Mathematics 3150.) E

3155 Introduction to Numerical Algorithms (3) Roots of equations, systems of linear equations, least-squares data fitting, numerical integration, numerical methods for ordinary differential equations. 3150 and 3155 may not both be taken for credit. Students with a knowledge of FORTRAN should take 3155. Prereq: 1510 or 1610 or consent of instructor. Prereq or coreq: Mathematics 2860. (Same as Mathematics 3155.) E

3510 Computer Organization and Programming I (3) Problem formulation and advanced programming in FORTRAN: operation and control of digital computers. Prereq: 1510, 2510, 3150, or consent of instructor. E


3715 Discrete Structures (3) Introduction to discrete structures useful in computer science. Sets, set logic, Relations, functions, Proof techniques, induction, logic. Graphical representations and algorithms. Prereq: 1510 or 1610 or 3150 or equivalents. Prereq or coreq: Mathematics 2860. (Same as Mathematics 3715.) F, Sp

3725 Advanced Discrete Structures (3) Advanced topics in discrete structures useful in computer science. Graphs and algorithms for manipulating data, algebraic structures, Boolean algebra, lattices, groups, monoids, Prereq: 3715 or equivalent. (Same as Mathematics 3725.)

4950 Number Systems for Digital Computers (2) Floating-point number representation, mixed-radix number representation, multiple-modulus residue number representation, finite-segment p-adic
4106 Systems Programming (3) Computer organization and advanced programming. Programming languages, operating systems, input-output systems, processors, operating systems, process control, data control, and storage management. Detailed discussion and programming experience in LISP and either SNOBOL, APL, or SIMULA. Prerequisite: 4510.

4510 Data Structures and Algorithms (3) Data structures and algorithms for the manipulation of arrays and orthogonal lists; stacks, queues, rings, doubly-linked lists, trees, dynamic storage allocation; organization of files; programming languages for information structures. Prerequisite: 2710 and 1610 or 2610.

4550 Systems Programming (3) Computer organization and advanced programming. Machine language, computer architecture, programming languages, representation of information, microprogramming, software systems, input-output systems, interpreters, macro-assemblers, and preprocessors. Prerequisite: 4106 or equivalent. E, F, W.

4750 Interactive Computer Graphics (3) Point plotting, vector generation, interactive graphical techniques, two- and three-dimensional transformation, perspective depth, hidden line elimination, shading, software/hardware interface system design. Discussion of use of these techniques in design, problem solving, mapping, architecture, and many other areas. Prerequisite: Senior standing in Computer Science. Electrical Engineering or Geography and a knowledge of computer programming, or consent of instructor. (Same as Geography 4750).

4820 Introduction to Pattern Recognition (3) (Same as Electrical Engineering 4820.) W

4830 Digital Image Processing (3) (Same as Electrical Engineering 4830.)

4850 Small Computer Systems (3) (Same as Electrical Engineering 4850.) E

4910 Analysis and Management of Computer Information Systems (3) Prerequisite: 1510 or equivalent. (Same as Mathematics 4225.) Numerical Solutions to Equations and Numerical Approximations (3) (Same as Mathematics 4225.) Numerical Mathematics (3, 3, 3) (Same as Mathematics 5465-65-75.) F, W, Sp

5655-65-75 Numerical Mathematics (3, 3, 3) (Same as Mathematics 5655-65-75.) W, Sp

5730 Computability and Computational Complexity (3) Computability and decidability; Turing machines and halting problems; recursive and recursively enumerable sets; partial and total recursive functions; time and space bounded computations; the P vs NP problems. Prerequisite: 4710. A

5790 Theory of Formal Languages (3) Phrase-structure languages, their generators and processors. Operations, Nondeterministic, incompletely specified and linear automata. Prerequisite: 4710. A

5810 Information Organization and Retrieval (3) Organization, storage, searching and retrieval of information. Development of IR systems from off-line to on-line information retrieval. Information organization and retrieval approaches. Computer solution of simplified pattern recognition problems. Data base retrieval systems. Prerequisites: 4510 or 4550. F


5860 Data Security (3) Need for security and methods for achieving it; encryption, machine architecture, hardware and software implementations, historical and current approaches. Case studies in fraud and misuse. Prerequisite: 3520 or consent of instructor.

5910-20-30 Special Topics in Computer Science (1-6, 1-8, 1-6) May be repeated. Maximum 9 hrs.

5940-50 Advanced Small Computer Systems (3, 3) (Same as Electrical Engineering 5940-50.)
Linguistics

4000 Topics in Linguistics (3) Content varies. May be repeated. Maximum 9 hrs.

4020-30 Historical Linguistics, Neogrammian School, and Growth of Structuralism (3, 3) 4020—Traces development of scientific approach to linguistics from Jacob Grimm and Franz Bopp through nineteenth century. 4030—Traces change in linguistic interest brought about by Saussure's Course and growing impact of anthropology and behaviorism on linguistic studies.

4250 Introduction to Descriptive Linguistics (3) (Same as French, German, Russian, Spanish 4260.)

4260 Introduction to Historical and Comparative Linguistics (3) (Same as French, German, Russian, Spanish 4260.)

4270 Introduction to Romance Linguistics (3) (Same as French, Spanish 4270.)

4271 Introduction to Slavic Linguistics (3) (Same as Russian 4271.)

4440 Sociolinguistics (3) (Same as English 4440.)

4450 Dialectology (3) (Same as English 4450.)

4460 Special Topics in English Linguistics (3) (Same as English 4460.)

4471-81 English as a Second or Foreign Language (3, 3) (Same as English 4471-81.)

Economics

See College of Business Administration.

English

MAJOR

DEGREES

English

M.A., M.A.C.T, Ph.D.

Professors:

J. B. Trachten (Head), Ph.D. Princeton; W. L. Magoun, Ph.D. Yale; R. M. Kelly (Director of Graduate Studies), Ph.D. Illinois; B. O. Jaffee, Ph.D. Harvard, Ph.D. Illinois; E. J. Keating, Ph.D. Cornell; J. E. Reese, Ph.D. Illinois; J. N. Sanders, Ph.D. Shakespeare Institute, Stratford-upon-Avon; J. Schneider, Ph.D. Northwestern; B. T. Stewart, Ph.D. Northwestern; R. Walker, M. A. Texas; T. V. Wheeler, Ph.D. North Carolina; J. M. White, M. A. Cambridge; N. Wright, Ph.D. Yale.

Associate Professors:


Assistant Professors:

D. R. Cox, Ph.D. Masiouri; T. A. J. Heffernan, Ph.D. Cambridge; M. A. Lofaro, Ph.D. Maryland; C. J. Maland, Ph.D. Michigan; M. L. Praye, Ph.D. California (Santa Cruz).

Visiting Lecturers:

W. Dykeman, B. A. Northwestern; G. Griffith, Ph.D. Vanderbilt; F. M. O'Hara, Ph.D. Illinois.

Detailed information about the Master's and doctoral programs, and about individual graduate courses, may be obtained by writing the Director of Graduate Studies of English, McClung Tower. For admission forms, write to the Graduate School.

THE MASTER'S PROGRAM

The departmental requirements for the M.A. degree in English include (1) thesis and 36 quarter hours of courses in the Department of English or 45 quarter hours without a thesis, (2) evidence of proficiency in one foreign language, and (3) a final examination. The courses should include 12 hours at the 6000 level, 12 hours of additional courses at the 5000-6000 level, and 12 hours at any level for graduate credit, including the 3000-4000 level.

For the degree of Master of Arts in College Teaching (M.A.T.C.) the requirements include (1) 45 quarter hours of courses in English, arranged as for the non-thesis M.A., (2) 2 hours in a special course designed for M.A.T.C. students, (3) 3 hours of a tutorial in the teaching of freshman composition, (4) a thesis or 9 additional quarter hours of 5000- and/or 6000-level courses in English, (5) evidence of proficiency in one foreign language, (6) a final examination, and (7) a program of supervised teaching approved by the department.

THE DOCTORAL PROGRAM

The departmental requirements for the Ph.D. degree in English in completion of a minimum of three academic years of resident graduate study. This includes a balanced program of at least 72 quarter hours (or the equivalent) in English: 36 hours at the 6000 level; 24 additional hours at the 5000-6000 level; and 12 hours for graduate credit at any level, including the 3000-4000 level. In addition, 9 (or 6) hours approved by the department must be taken for graduate credit in a subject or subjects other than English. Normally a student with the M.A. from another university may transfer at least 36 quarter hours. After all, or most, of the course work has been taken and after the two language requirements have been satisfied, the student will take four comprehensive examinations from several areas divided as the department directs. Successful completion of these examinations will be followed by the writing of the dissertation and by an oral examination in the field of the dissertation.

Any course in the 5000 or 6000 series may be repeated for credit with the permission of the department.

*1211 Written and Oral English for Foreign Students (6) Rapid review of English grammar structures and pronunciation with intensive oral, aural, and written drill. Required during the first quarter of residence of all foreign students (graduates, undergraduates, and transfer students) who are not exempted from it. The English Proficiency Examination is required of every new foreign student. A, B, C, I, F, W grading. Students registered for this course are permitted to register for only 2 other courses.

*1221 Written and Oral English for Foreign Students (6) Emphasis on the more advanced structures of English grammar and on paragraph writing. Required during the first quarter of residence of foreign students who were not exempted from it. The English Proficiency Examination is required of every new foreign student. A, B, C, I, F, W grading. Students registered for this course are permitted to register for only 2 other courses.

3070 Modern British Poetry (3) From Housman and Thomas and more recent poets.

*BNot available for graduate credit.
6550 Studies in Mode and Genre (3) Content varies. May treat drama, novel, short story, poetry, or satire, the comic, the tragic, etc., depending on professor.
6590 Special Topics (3) Content varies. History, history of ideas, biography, autobiography, literature of travel, extra-literary disciplines, etc.
6610-20-30 Studies in English Romanticism (3, 3, 3)
6710-20-30 Studies in Eighteenth-century Literary and extra-literary disciplines, etc. May treat drama, novel, short story, poetry, or satire, the comic, the tragic, etc., depending on professor. Comprehensive examinations required for admission to candidacy include a written comprehensive, written examinations on two special fields and an oral examination on the dissertation proposal. Also required is a final oral examination on the dissertation and on other aspects of the program as determined by the student's faculty committee.
3410 Intermediate Economic Geography (4) Concepts, theories, and practices in location planning. Registration at each offering required of resident graduate students. May be repeated with consent of instructor.

French
See Romance Languages

Geography

MAJOR

DEGREES

Geography
M.S., Ph.D.

Professors:
S. R. Jumper (Head), Ph.D. Tennessee; C. S. Aiken, Ph.D. Georgia; E. H. Hammond, Ph.D. California (Berkeley); W. D. Mink, Ph.D. Syracuse; T. H. Schmude, Ph.D. Wisconsin.

Associate Professors:
T. L. Bell, Ph.D. Iowa; L. W. Brinkman, Jr.; Ph.D. California (Berkeley); C. W. Minkel, Geography

Assistant Professors:
W. N. Cherry, M.S. Tennessee; R. Forest, Ph.D. Rutgers; L. Pulsipher (Visiting); Ph.D. Southern Illinois; B. Ralston, Ph.D. Northwestern.

The Department of Geography offers the degrees of Master of Science and Doctor of Philosophy with concentrations in geography of development, physical geography and human systems, urban geography, and rural nonmetropolitan geography.

THE MASTER'S PROGRAM

The department requires a minimum of 45 quarter hours beyond completion of a sound undergraduate major program. At least one-half of the total courses in the graduate program must be at or above the 5000 level, of which no more than 9 hours may be thesis courses, and must include 5150, 5160, and (at each offering during residency) 5100. Thesis and final examination required.

THE DOCTORAL PROGRAM

The doctorate is a research degree and is granted only to those persons who demonstrate proficiency in conducting independent research. Students must have achieved the equivalent of a comprehensive Master's program before they will be admitted to the doctoral program. Course requirements for the degree shall be determined by the student's faculty committee in accordance with specific interests and needs. The program of study must include sufficient course work within the independent research. Students may be required to give a broad foundation and understanding of the discipline. The program must include 5160, 5170, 5720, and (at each offering during residency) 5100. A minimum of 15 hours in credit must be earned in related fields outside the department. Competence in a foreign language, cartography, and quantitative techniques is required. Other techniques pertinent to the student's area of specialization may be required. The language will be chosen for the major. Foreign language may be required unless otherwise approved by the student's faculty committee. Comprehensive examinations required for admission to candidacy include a written comprehensive, written examinations on two special fields and an oral examination on the dissertation proposal. Also required is a final oral examination on the dissertation and on other aspects of the program as determined by the student's doctoral committee.

3140 Advanced Cartographic Design and Production (4) Principles and practice of design, construction, and reproduction of maps. Recommended prereq: 3700; 2 hrs and 2 labs. Prereq: Consent of instructor.

3160 Geography of Agriculture (4) A

3170 Cartographic Design and Production (4) Principles and practice of design, construction, and reproduction of maps. Recommended prereq: 3700 and knowledge of a computer language.

3175 Interactive Computer Graphics (3) (Same as Computer Science 4750)

4799 Practicum in Cartography/Remote Sensing (2-6) May be repeated. Maximum 6 hrs.

5000 Thesis (1-15) E

5100 Colloquium in Geography (1) Discussion of departmental research, current research literature, and general topics. Registration at each offering required of resident graduate students. May be repeated. Maximum 8 hrs. SNC only. W; Sp

5101 Foreign Study (1-12) See page 99. E

5102 Off-campus Study (1-12) See page 99. E

5110 Introduction to Geographical Research (3) Aims of geographical research; survey of printed source materials; practice in effective presentation of research findings. F

5160 Research Design and Field Problems (4-6) Development of research problems, preparation of appropriate study designs, and practical field application.

5170 Geographic Concept and Method (3) Traditional and modern themes in geography, scope, problems, and methods of geography. A

5200 Special Problems in Geography (2-6) Reading and research on problems or topics of interest to individual students. Students must define topic and receive instructor's approval of study plan before registering for course. May be repeated with consent of instructor.

5250 Topics in Historical Geography (3) Examination of trends, concepts and methods in historical geography. Prereq: 4240 or consent of instructor. May be repeated with consent of instructor. Maximum 9 hrs.

5260 Advanced Cultural Geography (3) Geographic analysis of population and social phenomena. May be repeated with consent of instructor. Prereq: 4240 or consent of instructor. Maximum 9 hrs.

5310 Topics in Regional Geography of the United States (3) Intensive analysis of problems and trends in one or more regions of the United States, except Appalachia. May be repeated with consent of instructor. Maximum 9 hrs.

5320 Topics in the Geography of the American South

4240 Historical Geography of the United States (4) Survey of changing human geography of United States during four centuries of settlement and development. Emphasis on interaction patterns, development of agricultural regions and patterns of urban development. Sp

4510 Principles of Geomorphology (4) (Same as Geology 4310)

4550 Geology of Soils (4) Soils as physical systems and their relationship to environments. Investigation of specific cases of the role of soil in management of environment. Fall.

4610 Industrial Geography (4) Factors affecting location of manufacturing activities, with emphasis on the United States. Prereq: 3410 or consent of instructor.

4630 Geography of Agriculture (4) A


4720 Data Mapping (4) Automated techniques of representing surfaces, using Geographic information systems. Recommended prereq: 3700 and knowledge of a computer language.

4730 Advanced Cartography (4) Map production from design through color proofs. Prereq: 3700, 4710, and 4720 or consent of instructor.

4740 Remote Sensing: Types and Applications (4) Basic principles and uses of aerial photography and other remote sensing techniques. Emphasis on value of various types of imagery for geographic interpretation and simple mapping. Prereq: Consent of instructor. W

4750 Interactive Computer Graphics (3) (Same as Computer Science 4750)
South (3) Geographic perspective on economic and cultural aspects of southeastern United States. Topical may be repeated with consent of instructor. Maximum 9 hrs.

5410 Advanced Topics in Economic Geography (3) Examination of trends, problems, and methods in modern economic geography. Prereq: 3410 or consent of instructor. May be repeated. Maximum 9 hrs.

5520 Advanced Urban Geography (3) Analysis of research on urban systems, internal morphology, urbanization, and urban spatial behavior. Prereq: 3430 or consent of instructor.

5550 Topics in Geography of Land-Surface System (3) Examination of trends, problems, and methods in geography of land-surface system. Prereq: 3530 or consent of instructor. May be repeated with consent of instructor.

5610 Topics in Climatology (3) Examination of trends, problems, and methods in modern climatology. Prereq: 3530 or consent of instructor. May be repeated with consent of instructor.

5710 Seminar in Geography (3)

5720 Topics in Quantitative Geography (3) Multivariate analysis applied to problems in geography; research problems using appropriate packaged computer programs; usefulness to geographic research of techniques developed by other disciplines. Prereq: 5740 or consent of instructor. Sp

5740 Advanced Topics in Remote Sensing (3) Applied research using remote sensing and aerial photographic imagery for interpretation and mapping of geographic data. Prereq: 4740 or consent of instructor. Summer

5790 Topics in Cartography (3) Trends, concepts, problems, and methods in cartography. Prereq: 4740, or consent of instructor. May be repeated with consent of instructor. Maximum 9 hrs.

5915 Regional Geomorphology (4) (Same as Geol 5915.)

6000 Doctoral Research and Dissertation (3-15) E

6110-20 Seminar in Economic Geography (3, 3) A

6220-30 Seminar in Urban Geography (3, 3) A

6240-50 Seminar in Historical Geography (3, 3) A

6260-70 Seminar in Cultural Geography (3, 3) A

6310-20 Seminar in Rural Geography (3, 3) A

6410-20 Seminar in Regional Geography of the United States (3, 3) A

6610-20 Seminar in Regional Geography of Latin America (3, 3) A

6711-20 Seminar in Physical Geography (3, 3) A

NOTE: Registration in 6000-level courses may be repeated with consent of department.

Geological Sciences

MAJOR DEGREES

M.S., Ph.D.

Professors:

K. R. Walker (Head), Ph.D. Yale; G. Briggs

Associate Professors:

D. H. Roeder, Ph.D. Goethe (Germany); O. C. Kopp, Ph.D. Tennessee; P. A. Delcourt, Ph.D. Ohio State; C. C. Kope, Ph.D. Columbia; R. E. McLaughlin, Ph.D. Tennessee; D. H. Roeder, Ph.D. Goethe (Germany); L. A. Taylor, Ph.D. Lehman; J. W. Weiss (Emeritus), Ph.D. North Carolina.

Associated Professors:

G. M. Clark, Ph.D. Pennsylvania State; K. C. Miller, Ph.D. Western Ontario.

Assistant Professors:

T. W. Broadhead, Ph.D. Iowa; D. W. Byerly, Ph.D. Tennessee; P. A. Delcourt, Ph.D. Minnesota; J. B. Higgins, Ph.D. Virginia Polytechnic Institute; N. V. McCord, Ph.D. California; P. D. Harvard; A. Tankard, Ph.D. Rhode.

THE MASTER'S PROGRAM

The department requires a minimum of 45 quarter hours including at least 18 hours in courses (other than thesis) numbered above 5000. A minimum of 24 hours in geology courses, in addition to thesis, is required. Students who enter without having had an acceptable background and are required to take Geology 4440, or an equivalent course elsewhere, as part of the above department requirements. One year of general physics is required, if not taken as an undergraduate. Thesis committee must be formed. An approved by graduate program committee. Qualifying examination is given the second quarter.

THE DOCTORAL PROGRAM

Specific course program and thesis topic determined by candidate's faculty committee.

1. Program to be determined by faculty committee. Requirements include minimum of 84 quarter hours in courses for graduate credit, in addition to dissertation. These courses must include a minimum of 45 hours in the 5000 or 6000 series, of which at least 15 hours must be in the 6000 series. Up to one-third of the required hours may be taken in related fields. A Master's degree is recommended.

2. Comprehensive examination will be both written and oral. The exam must be taken by the end of the second academic year.

3. Each Ph.D. student must satisfy a research tool requirement which will be determined by his/her faculty committee and which will consist of one of the following: a. Demonstration by examination of a reading knowledge in one modern foreign language in which there is a significant body of geological literature.

b. Completion of course 3030 in an appropriate foreign language with a B or higher.

c. Courses (minimum of 6 hours) at 3000 level or higher taken for undergraduate credit and completed with a grade of B or better.

4. Each Ph.D. student must satisfy a research tool requirement which will be determined by his/her faculty committee and which will consist of one of the following: a. Demonstration by examination of a reading knowledge in one modern foreign language in which there is a significant body of geological literature.

b. Completion of course 3030 in an appropriate foreign language with a B or higher.

c. Courses (minimum of 6 hours) at 3000 level or higher taken for undergraduate credit and completed with a grade of B or better.

*3160 Introduction to Earth Materials (4) Study of minerals and rocks. Laboratory includes both hand specimen and analytical methods of identification. Prereq: 1410; Chemistry 1110-20 or equivalent. 3 hrs and 1 lab.

*3160 Mineralogy (4) Introduction to crystallography and study of minerals. Laboratory includes hand specimen, chemical and x-ray methods of identification. Prereq: 1410; Chemistry 1110-20 or equivalent. 3 hrs and 1 lab.

*3210-20 Invertebrate Paleontology (4, 4) Systematic review of important Metazoan invertebrate fossil groups. 3210-Perforata to Annelida, including cnidaria, ctenophora, echinoderms, and conodonts. 3220-Mollusca through lower Chordata, including arthropods and echinoderms. May be taken separately or in sequence. Prereq: 3200; Biology 1210 or consent of instructor. 3 hrs and 1 lab or field period.

*3250 Micropaleontology (4) Microscopic remains of animals and plants with special emphasis on stratigraphically important groups. Prereq: 3210 or consent of instructor. 3 hrs and 1 lab or field period.

*3260 Palaeoecology (4) Introduction to principles and materials of palaeoecology as applied to interpretation of earth history. Prereq: 1420. 3 hrs and 1 lab or field period.

*3270 Geological History of Land Organisms (4) Geological history and development of terrestrial biota and ecosystems. Prereq: Ecol 2310 and knowledge of record of land plants and vertebrates. Prereq: Biology 1210 or consent of instructor. 3 hrs and 1 lab or field period.

*3310 Introductory Petrology (4) Introduction to classification and properties of igneous and metamorphic rocks, processes which produce them, and tectonic and geochemical implications of the rock form. Laboratory emphasizes both hand specimen and microscopic study of important rock types. Prereq: 3180. 3 hrs and 1 lab.

*3330 Geology of East Tennessee (4) Lectures and field excursions. Prereq: 12 hrs of geology and consent of instructor.

*3380 Stratigraphy-Sedimentation (4) Introductory study of stratigraphic principles and practices and of sedimentary processes and interpretation of depositional environments. Prereq: 1420 and 3180. 3 hrs and 1 lab or field period.

*3370 Structural Geology (4) Introductory discussion of structures such as folds, faults, joints, cleavage, and primary structures. Laboratory work includes depth and thickness problems, structure sections, structure contour maps. Prereq: 1420; Mathematics 1540 or equivalent. 3 hrs and 1 lab.

*3410 Principles of Ground Water Geology (3) Geological materials and processes affecting the occurrence and behavior of water. 2 hrs and 1 lab.

*3510 Introductory Environmental Geology (4) Geological problems involving earth environment and resources, and geologic parameters associated with their control and misuse. Prereq: 1420 or consent of instructor. 1 hr and 2 lab periods.

*3610 Quaternary Geology for Engineers (3) Erosional and depositional processes, landforms, ground water. Prereq: 2610 or equivalent. 2 hrs and 1 lab or field period.

4110 Principles of Economic Geology (4) Formation of mineral deposits. Prereq: 3180, 3370, or equivalent.

4115 Elementary Applied Geophysics (4) Basic principles of electrical, seismic, gravity and magnetic surveying. Recommended: 1420, Physics 2220 or 2320. 3 hrs and 1 lab.

4130 Sedimentology (4) Introduction to physical processes of sedimentation: transport of sediments and formation of sedimentary structures, river flows, waves, tides, and ocean circulation. Prereq: 3310. 3 hrs and 1 lab.

4230 Paleoenvironmental Analysis of environmental analysis applied to fossil assemblages and associated lithologies. Prereq: 3260 or consent of instructor. 3 hrs and 1 lab.

4240 Paleobotany (4) Survey of fossil record of plants, with particular emphasis on comparative morphology and evolutionary trends in major plant groups, and chronological succession and geological distribution of past floras on earth. Prereq: 1420 or 2210; Botany 3010 or consent of instructor. (Same as Botany 4240.) 3 hrs and 1 lab or field period.

4250 Evolution of Higher Taxa (4) Current evolutionary theory in context of paleontology, patterns of evolution in fossil organisms at family level or higher. Prereq: 3260. Recommended prerequisite: 3210- 20, 2 hrs and 1 2-hr seminar.

4260 Biostratigraphy (3) Application of paleontologic data to stratigraphic study, codification of stratigraphic techniques and recommended practice. Prereq: 3260 and 3600. 1 hr and 1 2-hr seminar.

4310 Geologic Mapping (4) Interpretation of maps and reports of geologic maps. Prereq: 12 hrs of geology. 3 hrs and 1 lab or field period.

4331 Quaternary Geology of North America (4) Quaternary geologic processes, stratigraphy, palaeoecology and geomorphology of glaciated and unglaciated North America and oceans. Prereq: 12
Germanic and Slavic Languages

MAJORS

DEGREES

German
M.A., M.A.C.T.

German Language and Literature
Ph.D.

Emeritus Professors:
E. T. Hanks, Ph.D. Bonn (Germany);
R. L. W. Nordsieck, Ph.D. Ohio State.

Professors:
K. Hatz (Head), Ph.D. Ohio State;
J. E. Felsen, Ph.D. Pennsylvania;
H. W. Foster, Ph.D. Wisconsin;
R. L. Hiller, Ph.D. Cornell;
J. C. Osborne, Ph.D. Northwestern;
M. P. Rice, Ph.D. Vanderbilt.

Associate Professors:
J. L. Elliott, Ph.D. Michigan;
D. M. Flane, Ph.D. Indiana;
M. A. Lautzenheiser, Ph.D. Wisconsin;
D. E. Lee, Ph.D. Stanford.

Assistant Professors:
C. J. Mellor, Ph.D. Chicago;
U. Rittenhoft, Ph.D. Connecticut.

The Department of Germanic and Slavic Languages offers three advanced degrees.

They are the Master of Arts (M.A.) in German, the Master of Arts in College Teaching (M.A.C.T.) in German, and the Doctor of Philosophy (Ph.D.) in German Language and Literature.

THE MASTER'S PROGRAM

In addition to the general Graduate School requirements as stated on page 19, the department requires 36 quarter hours in approved courses, including at least 18 hours in courses numbered above 5000. In addition to course work, the student is required to write a thesis, for which he/she may get a maximum of 9 hours credit. The minimum quarter hour credit for the M.A. is 45 quarter hours.

MASTER OF ARTS IN COLLEGE TEACHING PROGRAM

The MACT program is essentially an expanded M.A. program. The minimum requirement is 60 hours of graduate study, including 9 hours of thesis and a 3 quarter-hour seminar in college teaching. The aim of this program is to prepare highly qualified college teachers. Students receiving the MACT degree would be well prepared to go to the Ph.D.

THE DOCTORAL PROGRAM

The student must fulfill the general requirements for the Ph.D. degree set by the Graduate School. The candidate for the doctoral degree must complete a minimum of 81 quarter hours of course work beyond the Bachelor's degree in addition to 36 hours of doctoral research and dissertation. At least 45 quarter hours of the minimum must be taken in 5000 or 6000 courses. Of these 45 hours, a minimum of 18 hours must be chosen from the proseminar (5200) and the literary or philological courses (5100-20-30-40-50-60 and 6310-20-30). At least 9 hours must be taken in a cognate field. Students are encouraged to take additional work in allied fields. A minor in an allied field must consist of at least 18 hours of 5000 or 6000 courses. Students must show a fluent command of German, both oral and written. A knowledge of two foreign languages, French and another language, such as Italian, Latin or Russian, appropriate to the field of research. A comprehensive examination, both written and oral, on German language and literature and the minor field or fields, must be passed before the student may be admitted to candidacy. The student will be examined on an extensive reading list which covers the whole range of German literature, and will be expected to show familiarity with major works of world literature. The candidate will be required to defend a dissertation in an oral examination, which will cover also the general area of the dissertation. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

The field of study is divided into (1) German literature and (2) German (or Germanic) philology or linguistics. A student may concentrate on one or the other. Dissertation and seminar research topics will be chosen in accordance with the varying preferences and specific interests of the faculty. Detailed programs will be established in each case by the student's faculty committee.

3010-30-30 Elements of German for Upper Division and Graduate Students (3, 3, 3) Elements of language, elementary and advanced readings. Open to graduate students preparing for language examinations, and upper division students desiring reading knowledge of the language. Undergraduate credit only. Required for students having completed Germanic elementary.

3210-20-30 German Literature in English Translation (3-4, 3-4, 3-4) No foreign language credit. No change in credit hours after add deadline. Students opting for 4 hrs credit will be expected to present an appropriate amount of extra work above that required for 3 hrs. F; W; Sp.

3260 Old Norse Literature in English Translation (3-4) Prose readings of sagas of Norwegian kings, great icelandic family sagas, and Vinland sagas, narrating discovery of America around year 1000. Mythological and heroic poems of the Edda.

4110-20-30 Studies in Classical and Modern Writers (3, 3, 3) Content varies. Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation) or equivalent. May be repeated with consent of department.

4140-50 Selected Topics in German Literature from 1750 to the Present (3, 3) Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation) or equivalent. Su.

4160 Studies in German Authors (3) Life and works of a single outstanding German literary figure. Content varies. Prose courses (exclusive of 3010-20-30, or courses in English translation). May be repeated. Su.

4170 Theatrical German (1-3) Performance in one or more German plays. Prereq: Intermediate German or equivalent or consent of instructor. May be repeated with consent of department. F, W, Sp.

4210-20-30 Studies in German Literary Types (3, 3, 3) 4210-Lyric poetry. 4220-Drama. 4230—Representative prose readings. 4240-Stories. Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation) or equivalent. W.

4250 Introduction to Descriptive Linguistics (3) (Same as French, Russian, Spanish, and Linguistics 4260.) F.

4260 Introduction to Historical and Comparative Linguistics (3) Linguistic change, protolanguages, phonology, morphology, and syntax. Cultural, historical, sociological influences upon the development of language. Semantic change. Lexicography. All these topics copiously illustrated by selected examples from Indo-European languages. Prereq: 9 hrs of upper division English, or 9 hrs of upper division courses in a modern or ancient language (exclusive of German and French 3010-20-30, courses in literature in old languages, and general courses in Latin and Greek requiring no knowledge of these languages), or consent of department. (Same as French, Russian, Spanish, and Linguistics 4260.) W.

4310-20 History of German Language (3, 3)

4610-20-30 German Civilization (3, 3, 3) Prereq: Intermediate German or equivalent.

4810-20-30 Advanced Conversation andComposition (3, 3, 3) Prereq: 3610-20-30 or equivalent or consent of department. F; W; Sp.

5000 Thesis (1-15) E.

5101 Foreign Study (1-12) See page 99. E.

5102 Off-campus Study (1-12) See page 99. E.

5103 Independent Study (1-12) See page 99. E.

5200 Proseminar (3) Bibliography; methods; illustrative problems; language problems; literature of papers. F.

5210-30 College Teaching of German (1, 1, 1) Required of all M.A., MACT, or Ph.D. candidates, except those whose previous teaching experience warrants excuse from this requirement or who wish to pursue vocations other than teaching. F; W; Sp.

5410-20-30 Medieval German Language and Literature (3, 3, 3) 5410—Introduction to Middle High German. 5420—Readings in Medieval German Literature. F; W; Sp.

5500 Studies in German Literature (3) Content varies. May be repeated. Maximum 9 hrs. Su.

5510 German Humanism and the Reformation (3)

5520 German Baroque Literature (3)

5530 The Enlightenment and the Rococo (3)

5540 German Classicism (3)

5550 Goethe's Faust (3)

5560 German Romanticism (3)

5570 German Realism and Naturalism (3)

5590 Modern German Literature (1889-1945) (3)

5590 Modern German Literature (1945-Present) (3)

5600 German Literary Theory and Criticism (3) W.

5610-20-30-40-50-60 Directed Readings in German Language and Literature (3, 3, 3, 3, 3, 3) E.

5710 Introduction to Old Norse (3) Phonology, morphology, and syntax of Old Norse. Representative readings in Old Norse.

5720 Readings in Old Norse Prose (3) Intensive readings of Old Norse prose works. Icelandic saga as literary genre.

5730 Readings in Old Norse Poetry (3) Intensive reading of Eddic poems as a literary genre and possession of ancient Germanic customs, legends, and mythology.

6000 Doctoral Research and Dissertation (15-19) E.

6100 Gothic (3) Phonology, morphology, and syntax of Gothic language. Relationship to Indo-European languages and to other Germanic languages. Readings from Gothic Bible.

6120-20 Old High German (3, 3) 6120—Introduction: phonology; morphology, and syntax of Old High German of eighth and ninth centuries. Dialects. Representative prose readings. 6130—Literature and Linguistics; prose and poetry of period from linguistic and literary point of view. Development of language in Old High German period.

6140 Old Saxon (3) Phonology, morphology, and syntax of Old Saxon. Representative readings.

6210-20-30-40-50-60 Seminar in German Literature (3, 3, 3, 3, 3, 3) E.

6310-30 Seminar in German and Germanic Philology (3, 3, 3) May be repeated. E.

Russian

3010-30-30 Elements of Russian for Graduate Students (3, 3, 3) For graduate students preparing for language examinations and seniors desiring reading knowledge of a second foreign language. Prereq: 2 years of some foreign language in college or consent of department. Undergraduate credit only. No credit for students having completed 1 yr of Elementary Russian.

3210 Nineteenth-century Russian Literature in-
glish Translation (3-4) Realism and the novel; selections from works of Pushkin, etc.

3220 Works of Leo Tolstoy in English Translation (3-4) War and Peace, Anna Karenina, and other works.

3221 Works of F. M. Dostoevsky in English Translation (3-4) Crime and Punishment, Brothers Karamazov and other works.

3230 Twentieth-century Russian Literature in English Translation (3-4) Russian modernism and literature under the soviet. Ph.D. Emory; C. E. Alpert.

3240 The Russian Drama in English Translation (3-4) Selections from works of Fonvizin, Gribedov, Pushkin, Gogol, Ostrovsky, Turgenyev, Chekhov, and others.

3250 The Works of Ivan Turgenev and Anton Chekhov in English Translation (3-4)

3260 Russian Folklore in English Translation (3-4)

3270 Russian Philosophical and Theological Thought (4) A survey of the development of philosophical and theological thought in Russia from the Middle Ages to the Revolution. Special emphasis on the expression of this thought in Russian literature and literary criticism. No knowledge of Russian required. (Same as Philosophy 3270 and Religious Studies 3270.)

4010 Selected Topics in Russian and East European Area Studies (3) Interdisciplinary seminar on selected topic using comparative approach.


4250 Introduction to Descriptive Linguistics (3) (Same as French, Spanish, Linguistics, and German 4250.)

4260 Introduction to Historical and Comparative Linguistics (3) (Same as German, French, Spanish, and Linguistics 4260.)

4271 Introduction to Slavic Linguistics (3) (Same as Linguistics 4271.)

4310-30-30 Advanced Studies in Russian Language (3, 3) Intended primarily for students majoring or minoring in Russian who are interested in language and linguistics. Includes problems in morphology and syntax, semantics and translation techniques, and history of Russian language as well as other special problems for advanced students of Russian. May be repeated. Maximum 9 hrs each.

4410-30-30 Directed Readings in Russian (3, 3, 3) Intended primarily for students participating in program in Russian and East European Area Studies. course will involve individual study relating to student's major field. Prereq: 9 hrs of 3000 courses in Russian (exclusive of 3010-20-30, 3210-20-30-40-50-60-70, 3310) or equivalent.

Greek

See Classics

History

MAJOR DEGREES Ph.D.

History

M.A., MACT, Ph.D.

Professors: P. H. Bergeron, Ph.D. Vanderbilt; E. V. Chmielowski, Ph.D. Harvard; R. E. Duncan, Ph.D. California (Berkeley); H. S. Fink (emeritus); Ph.D. Princeton; L. P. Graf; Ph.D. Harvard; R. W. Hawkins, Ph.D. California (Berkeley); C. O. Jackson, Ph.D. Emory; M. M. Klein; Ph.D. Columbia; R. G. Landen, Ph.D. Princeton.


Assistant Professors: S. D. Becker, Ph.D. Case-Western Reserve; J. Bonstedt, Ph.D. Harvard; N. L. Brann, Ph.D. Stanford; R. B. Rice, Ph.D. Harvard.

THE MASTER'S PROGRAM

Master of Arts—Plan I: Course requirements include History 5240, and either 5250 or 5260; one M.A. reading course; at least 6 additional hours 5300 or above of which 3 hours must be 6300 or above. Total hours, including thesis—45. Plan II: History 5240, and either 5250 or 5260; two M.A. reading courses; 12 additional hours 5300 or above, at least 2 of which must be 6300 or above. Total hours—45. Plan I and Plan II require evidence of proficiency in one foreign language before the M.A. degree is granted.

MASTER OF ARTS IN COLLEGE TEACHING

Course requirements include History 5240-50-60, 5271-72-73, and Continuing and Higher Education 5110. Students must spend one year as a graduate assistant and one year as a teaching assistant. Total hours, including thesis—60. Students seeking the MACT degree may substitute 9 quarter hours of course numbers 6300 or above for the Master's thesis.

THE DOCTORAL PROGRAM

1. Admission: (a) Acceptable scores on the Graduate Record Examination (General Aptitude and History Achievement). (b) Students successfully completing the M.A. degree at The University of Tennessee must be recommended by the Department of History. (c) Students from other institutions should have an M.A. degree and must be reviewed and approved by the Graduate Awards and Review Committee after their first year of work at The University of Tennessee.

2. Residence and Course Work: Beyond the Bachelor's degree a minimum of 75 credit hours in course work is required, of which not less than 45 must be in courses that are numbered above 5000. Not less than 6 quarters of the required 9 quarters of residence work shall be under the supervision of the staff of The University of Tennessee.

3. Language Requirements: Candidates must possess a reading knowledge of one foreign language and such additional languages as may be determined by the student's committee. Under normal circumstances, those specializing in a language department (or an intermediate sequence in a language in which no 3010-30-30 sequence is available). Satisfactory completion requires that a student must have at least a B in the final quarter.

4. Comprehensive Examination and Committee: Incoming students will be advised by the department head. The comprehensive examination must be taken after all course work is completed, language requirements fulfilled, and at least nine months before the degree is expected. This exam should normally be taken before beginning the ninth quarter of work toward the doctorate. The candidate must present four fields, distributed as follows: one major field (history); two minor fields (history); and one minor field which may be either in history or outside the department. In any case, the student is required to have 9 hours of graduate course work outside the History Department. For the comprehensive examination the four areas listed below must be represented by a major or a minor field, or both.

I. Ancient and Medieval (1) Ancient Near East (2) Greece (3) Rome (4) Early Middle Ages, 375-1122 (5) Late Middle Ages, 1095-1450

II. Early Modern (1) Renaissance and Reformation (2) Europe, 1559-1615 (3) American History to 1815 (4) Latin America 1492-1825

III. Modern (1) Europe, 1815-1914 (2) European World Since 1914 (3) United States, 1815-present (4) Latin America, 1879-persent (5) East Asia, 1492-present (6) Middle East, 1798-present


The comprehensive examination will be both written and oral.

5. Dissertation and Final Examination: Original research forms the basis for the dissertation. After the dissertation has been completed, a final oral examination will be given on the dissertation in its historical context.

3060-70-80 History of Western Religious Thought
3) 4120-Background; age of discovery and exploration.

2450-60-70 European Intellectual and Cultural History (3, 3, 3) 4250—To 1714; 4260—To 1775; 4270—From the Scientific Revolution, 1500-1700. 4280—From the Enlightenment to the Age of Revolution, 1770-1870.

2400 Women in European History (4) Comparative analysis of role and image of women in Medieval, Renaissance, and Victorian periods. Attention given to parallel changes in structure of family as well as transition between Western culture and women’s movements.

2400 Women in American History (4) Approaches of 2400 applied to American Society.


4360 The United States in World War II (4) Military, diplomatic, and domestic experience.

4370 U.S. Military History, 1754 to the Present (4) Examination of nation’s broad strategic aims and means used to attain them, shifting strategy, tactics and weaponry involved in our wars, and relationship between American society and its armed forces.

4380 Civilian-Military Relationships in the Modern World (3) Civilian-military affairs from about 1900 to the present. Emphasis in the relationship between economic, demographic and social foundations of cities and political and cultural development.

4390 Soviet Foreign Policy (3)

4500 History of Medieval England (3)

4510-20 Tudor-Stuart England (3, 3) 4510—1485-1603. 4520—1603-1714.

4551 Great Britain from Burke to Burke (1789-1848) (3)

4570 Twentieth-century Britain (3)

4580 Revolution and Reform: Ireland in the Nineteenth and Twentieth Centuries (4)

4590 History of Canada, 1775 to the Present (3)

4610-20-30 The American Frontier and Westward Movement I, II, III (3, 3, 3) Settlement and development of the “West” throughout American history. 4610—From the Atlantic to the Mississippi. 4620-30—The Trans-Mississippi West.

4640-50-60 Social and Cultural History of the United States (3, 3, 3) 4640—Colonial Society and Early Nation to 1825. 4650—1825-1850. 4660—1860-1890.

4670 Cities and Urbanization in American History (4) Origins, growth and influence of American cities in development of the nation, from colonial era to present.


4741 Italian City-States, 1250-1500 (3) Evolution of urban civilization in northern and central Italy in medieval and Renaissance periods. Architectural and townscape forms studied in socioeconomic as well as cultural contexts. Florence is focal point, but other major centers are considered.

4770-80 Austria and Central Europe (3, 3) 4770—To 1667. 4780—Since 1667.

4781 Modernization of the Middle East (3) Advanced reading and discussion course which examines key facets of political, economic, and social dynamics in the Middle East with emphasis on political trends, economically and ideologically. Prereq: 3795 or consent of instructor.

4792 Historical Writers in Islamic History (3) Advanced reading course which introduces the student to the major historical writers of the Middle East from Ibn Khaldun to modern times. Prereq: 6 hours of History of the Middle East or consent of instructor.

4811-21 History of Japan (4, 4) 4840 History of Mexico (3)

4860 History of the Caribbean (3) Caribbean region from discovery and colonization to contemporary times.

4870-80-90 China (3, 3, 3) 4870—Cultural history of China. 4880—History of modern China. 4890—History of contemporary China.


5000 Thesis (1-15) E

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

5015 Periods in European History (3) May be repeated. Maximum 9 hrs.

5016 Periods in American History (3) May be repeated. Maximum 9 hrs.

5011 Foreign Study (1-12) See page 99. E

5012 Off-campus Study (1-12) See page 99. E

5013 Independent Study (1-12) See page 99. E

5211-5225 M.A. Reading Courses (3 hrs each) Required for Master’s oral examination. 5211: Ancient; 5212: Medieval; 5213: Early Modern Europe; 5214: Europe Since 1789; 5215: American History to 1815; 5216: American History Since 1789; 5217: Latin America; 5218: Far East; 5219: Colonialism and Imperialism; 5221: England; 5222: Russia; 5223: Germany; 5224: France, 5225: Middle East. Open only to Master’s candidates in history. S/N only. E

5240 Introduction to Historical Research (3) Principles and techniques of research in the study of history. Required of all candidates for advanced degrees who do not present evidence of similar training elsewhere.

5250 European Historiography (3) Introduces the student to the historical literature of leading European nations.

5260 American Historiography (3) Like 5250 in the American field.

5271-72-73 The Teaching of College History (0, 0, 3) Introduction to problems of teaching at college level. Practice of teaching in curriculum, types of courses and techniques of teaching. Prereq: Consent of instructor. Required of candidates for the M.I.C. Credit will be withheld until the completion of 5271, with grades of "S" or "NC" submitted at end of each of first two quarters. E

5280 Philosophy and Methodology (3) Philosophies of history and their relationship to methodologies of which they emerge; modern trends in historical methodology. Sp

5290 Quantitative Analysis of Historical Data (3) Prereq: Sociology 5320 and 5330, or consent of instructor. Sp

5300 Topics in History (3)

5310 Topics in Women’s History (3)

5320 Topics in Historical Editing (3) Principles and practices of editing historical documents. Sp

5360 Topics in American Foreign Relations (3)

5410 Topics in Early Modern European History (3)
Before admission to this program, the applicant must have either (a) certification for teaching secondary mathematics in at least one of the states of the United States, or (b) three years of successful elementary or secondary school teaching experience. Evidence of the previous teaching being met must be supplied by the student.

Applicants for admission to this program must take the Graduate Record Examination (aptitude portion), and have had at least one year of college mathematics including analytic geometry.

The following requirements must be met:
1. Completing 45 hours of course work, of which at least 9 must be at the 5000 level.
2. A 3.0 grade point average or better in courses numbered above 5000.
3. Passing a comprehensive examination upon completion of all course work.

THE MASTER'S PROGRAMS

The Master of Arts degree and the Master of Science degree are designed to prepare students for teaching elementary mathematics and for teaching at the high school and junior college level.

The department offers two options for these degrees. The first option requires a thesis for which 9 hours must be earned along with 36 additional hours of work in acceptable mathematics courses numbered 3050 or above. The second option requires 27 hours (at least 24 of which are in mathematics) and 9 additional hours, 9 of which may be in an area outside of the department.

THE DOCTORAL PROGRAM

For the Ph.D. in Mathematics, the student must meet the following departmental requirements:
1. Pass written examinations covering four subjects, at least three of which must be from the following list:
   a. Algebra 5110-20-30
   b. Functions of a Complex Variable 5110-20-30
   c. Topology 5910-20-30
   d. Functions of a Real Variable 5210-20-30
   e. Linear Algebra 5320-30-60
   f. Partial Differential Equations 5450-60-70
   g. Ordinary Differential Equations 5870-80-90
   h. Numerical Mathematics 5665-65-75

2. The Master of Mathematics degree is introduced primarily for teachers of high school mathematics.

*Space Institute, Tullahoma.
Students may take as many of the written examinations as desired at any time these exams are given subject to the following conditions:

1. The exams to be taken must be approved in advance by the student's supervisory committee.

2. At most 4-n exams may be taken at any one time, where n denotes the number of exams previously passed by the student.

3. The conditions for the doctoral degree are to include a demonstrated proficiency in one foreign language, normally from among French, German, or Russian; this requirement is to be met prior to the examination in the area of specialization. The student's doctoral committee may require that the student pass a second language exam.

In addition, the department requires that each student take a one-year, 6000-level course in mathematics outside of his/her area of concentration. The use of the course selected to fulfill this requirement must be approved by the department head and either the student's supervisory committee or the student's Doctoral Committee. (Such approval may occur after completion of the course.)

The written exams mentioned in 1. are normally given twice each year, once in the fall and once in the spring. The fall exams usually are given before the fall quarter begins, and the spring exams are given during the spring quarter.

*3050 Elementary Probability and Statistical Analysis (3) Combinatorial problems; sample spaces, sets, and events; statistical independence; axioms, probability, and theorems; random variables and their distributions; simple random processes. Does not satisfy requirements of major or minor in mathematics.

*3060 Elementary Statistical Analysis (3) Elementary probability distributions used in statistics: binomial, Poisson, and normal and their properties; sampling distributions; statistical tests of hypotheses; least squares and linear regression. Does not satisfy requirements of major or minor in mathematics.

3090 Polynomials and Rings (3) An introduction to abstract algebra, beginning with study of integers, integral domains, and fields. Emphasis is given to certain ring theoretic properties shared by integers and polynomials over fields. Prereq: 3050 or consent of instructor. Sp, Su

3100 Logic and Sets (3) Elements of mathematical logic; elementary algebra of sets. Primarily for students in the College of Education. Does not satisfy requirements of major or minor in mathematics. Prereq: 1 yr college mathematics. Su

*3110 Real Number System (3) Laws of arithmetic; rational and irrational numbers; fields. Prereq: 1 yr of college mathematics. Primarily for students in the College of Education. Does not satisfy requirements of major or minor in mathematics. Prereq: 1 yr of college mathematics. W

3140 Mathematical Modeling (3) Survey of construction and development of mathematical models used in science and industry. Markov chains, linear optimization, differential equations and integral equations, understanding of models and associated scientific problem it approximates. Projects may be done over several quarters. Sp

3150 Introduction to Numerical Algorithms and Programming (3) (Same as Computer Science 3150.) E

3155 Introduction to Numerical Algorithms (3) (Same as Computer Science 3155.) F

3220 History of Mathematics (3) Survey of development of various branches of mathematics, from ancient to modern times. Prereq: 1860 or 2550 or equivalent.

3310 Advanced Euclidean Geometry (3) Triangles and circles; constructions, modern concepts. Prereq: 1 yr of college mathematics. F

3320 Non-Euclidean Geometry (3) Foundations of geometry. Elliptic and hyperbolic plane geometry. Prereq: 1 yr of college mathematics. W

3330 Transformational Geometry (3) Fundamental transformations in Euclidean geometry. Classification of isometries and similarities; symmetries of a polygon and inversions. Prereq: 1 yr of college mathematics. W

3510 Intermediate Analysis for Teachers (3) Primarily for students in secondary mathematics education. This course covers elementary calculus fundamentals with an advanced viewpoint with emphasis on proofs of basic theorems. Topics covered include limits of sequences and functions, continuous functions, derivatives, definite integral, and fundamental theorem of integral calculus. Does not satisfy requirements of major or minor in mathematics. Prereq: 1550-60 or 1860. Su


3715 Discrete Structures (3) (Same as Computer Science 3715.) E


3725 Advanced Discrete Structures (3) (Same as Computer Science 3725.)
plex function theory. Must be taken in sequence. Prereq: 2860. One 4000-level mathematics course recommended.


4540 Infinite Series and Functions of Several Variables (3) General theory, power series and Taylor's formula, uniform convergence. Partial differentiation, applications. Implicit and explicit functions of several variables. Lagrange multipliers. Prereq: 2860. Recommended: 4610 or 4710. E


4640 Calculus of Finite Differences (3) Real difference equations, iteration to problems in engineering and management. F, W, Sp.

4650-50-70 Introduction to Mathematical Statistics (3, 3, 3) Introduction to probability; discrete and continuous distributions; correlation, regression, and statistical independence; foundations of sampling theory; significance tests. Must be taken in sequence. Prereq: 2860. F. W. Sp.

4710 Vector Analysis (3) Fundamental operations, bases vectors, dot and cross products, directional derivatives, divergence and curl of vector fields, line and surface integrals, divergence theorem of Gauss, and Stokes's theorem. Does not satisfy requirements of major or minor in mathematics. Prereq: 2860 E. E

4750-60-70 Introductory Probability Theory (3, 3, 3) Introduction to probability; discrete and continuous distributions; correlation, regression, and statistical independence; foundations of sampling theory; significance tests. Must be taken in sequence. Prereq: 2860 E. E.
5540 Galois Theory (3) Fields and their extensions, separable and normal extensions, algebraic closure, groups of automorphisms, fundamental theorem of algebra, solution of equations by radicals. Prereq or coreq: 5520.

5560-70-80 Theory of Matrices in Numerical Analysis (3, 3, 3) Elementary matrix algebra; determinants; invertible matrices; systems of linear equations; eigenvalues; eigenvectors; characteristic polynomials; similarity; diagonalization; singular values; positive definiteness; spectral theory. Prereq or coreq: 5510-20-30.

5561-20-30 Mathematical Methods in Physics (3, 3, 3) (Same as Physics 5690.)


5710-20-30 Tensor Analysis (3, 3, 3) Absolute differential calculus in three-dimensional Euclidean space. Tensors, their algebra, coordinate and tensor applications to physics; extension to n-dimensional space. Prereq: Major in mathematics or physics. M, W, F.


5775 Combinatorial Algorithms (3) (Same as Computer Science 5775.)


5562-20-30 Modern Algebra (3, 3, 3) Intensive study of some major branch of algebraic theory. Subject matter will vary according to interests and preparation of students. Prereq: 5510-20-30.

5640 Numerical Methods in Physics (3) (Same as Physics 5640.)

5650-60-70 Theory of Semigroups (3, 3, 3) Congruences and homomorphisms; ideal theory; representations, decompositions, and extensions; free, regular, inverse, simple, and completely simple semigroups. Prereq: 5520.

5750 Theory of Groups (3) Structure of groups, free groups, nilpotence and solvability, extensions and products, permutation groups, abelian groups. Prereq: 5520.

5970-80 Mathematical Systems Theory (3, 3, 3) Analytic and geometric discrete and continuous dynamical systems, fundamentals of control theory, linear problems, linear perturbation theory, nonlinear analysis of bifurcations and stability aspects, applications to ecological systems, role of dynamical systems in ecological modeling, optimal control problems. Prereq: 4110, 4510 or consent of instructor. F, W, A

5990 Graduate Reading in Mathematics (1-3) Open to graduate students with consent of department head. Independent study with faculty guidance. May be repeated. Maximum 9 hrs.

5991 Seminar Analysis (1-3)

5992 Seminar Topology (1-3)

5993 Seminar Algebra (1-3)

5994 Seminar Foundations (1-3)

5995 Seminar Applied Mathematics (1-3) May be taken for S/N/C or letter grade.

NOTE: Registration for 6000-level courses may be repeated with consent of department.

Microbiology

MAJOR

DEGREES

M.S., Ph.D.

Professors:
A. Brown (Head), Ph.D. Chicago; R. W. Beck, Ph.D. Wisconsin; J. M. Becker, Ph.D. Illinois; T. C. Montie, Ph.D. Maryland; J. O. Murray (Emeritus), Ph.D. Michigan State; W. S. Rigsby, Ph.D. Yale; B. T. Reese, Ph.D. Georgia (Chapel); J. L. Smith, Ph.D. Kansas; C. J. Wust, Ph.D. Indiana.

Associate Professors:
D. A. Bitari, Ph.D., D. M. V. State; R. D. McQueen, Ph.D. University of Washington; F. D. Ishido.

Assistant Professor:
D. A. Bitari, Ph.D. Cornell.

Graduate Assistant:

Students planning to major in Microbiology are expected to present, as prerequisites, a minimum of one year of biology, one year of mathematics including calculus, two years of chemistry and one year of physics.

The student's dissertation committee determines whether a foreign language is required for the doctoral degree.

3180 Food Bacteriology (3) Standard methods for examination, cultivation, and identification of bacteria associated with food fermentation and food spoilage. Prereq: 2910 or 3700 and Chemistry 2230 or 3211.

3190 Food Bacteriology Laboratory (2) Laboratory methods for examination and identification of bacteria associated with food fermentation and food spoilage. Prereq: 2919 or 3519. Coreq: 3519.

3820 Yeast and Molds (3) Morphology, taxonomy, and physiology of yeasts, actinomycetes, and fungi of industrial importance. Prereq: 2910 or 3700, or consent of instructor. W

3829 Yeasts and Molds Laboratory (2) Laboratory methods for examination and cultivation of yeasts and molds. Prereq: 2919 or 3519. Coreq: 3820. W

4110 Physiology of Bacteria (3) Modern concepts of bacterial physiology and metabolism including cell structures and function. Prereq: 3700 and 12 hrs of organic chemistry. W

4119 Bacterial Physiology Laboratory (2) Prereq: 4110. Coreq: 4119. W

4130 Taxonomy of Bacteria (3) Bacterial classification. Prereq: 3700 and 3519. F

4140 Molecular Genetics (3) Transmission and expression of genetic information at the molecular level. Emphasis is on bacterial and viral systems, but unique features of eukaryotic genetic systems are included. Prereq: 3700 or consent of instructor. Sp

4149 Techniques in Microbial Genetics (2) Practical experience in basic techniques in experimentation in microbial genetics. Prereq: 4140. F

response to infection. Derangement of host-metabolism stimulated by microbial invasion, endotoxins, endotoxin and other factors related to virulence. Alteration of genetic and hormonal controls resulting from progressive infection. Prereq: 4320.

5750 The Oncogenic Viruses (3) Lectures and special laboratory exercises dealing with known tumor-inducing viruses. Prereq: 4430 or consent of instructor. 2 hrs and 1 lab.

5760 The Bacterial Viruses (3) Lectures and discussions dealing with bacterial viruses with emphasis on the biological and chemical characteristics of bacteriophage infection. Text supplemented by readings from literature. Prereq: 4420; Biochemistry 4110-20.

5810 Molecular Genetics Laboratory (3) Principles and methods of research in molecular genetics. Fundamental genetics concepts (mutation, complementation, recombination) at molecular level. Instructor.

5820 Microbiology of Foods (3) Lectures and seminars dealing with current advances and selected topics in food microbiology with emphasis on analytical methods, safety and preservation. Prereq: 4140 and Biochemistry 4110-20 or consent of instructor.

5850 Seminar in History of Microbiology (1) Microbiologists and their achievements from Pasteur to present. S/NC only.

5910 Seminar in General Microbiology (1, 1, 1) Reviews of current literature. May be repeated with consent of department. S/NC only.

6000 Doctoral Research and Dissertation (3-15) E

630 Seminar in Immunology (1) Readings and discussions based on current literature. May be repeated. S/NC only.

632 Seminar in Microbial Pathogenesis (1) Readings and discussions based on current literature. May be repeated. S/NC only.

633 Seminar in Microbial Physiology (1) Readings and discussions based on current literature. May be repeated. S/NC only.

634 Seminar in Microbial Genetics (1) Readings and discussions based on current literature. May be repeated. S/NC only.

635 Seminar in Virology (1) Readings and discussions based on current literature. May be repeated with consent of department. S/NC only.

636 Seminar in Filamentous Fungi (1) Readings and discussions based on current literature. May be repeated. Maximum 8 hrs. S/NC only.

672 Advanced Topics in Microbial Physiology (3) Prereq: 5720. May be repeated with consent of department.

675 Advanced Topics in Microbial Pathogenesis (3) Prereq: 5720. May be repeated with consent of department.

676 Advanced Topics in Virology (3) Prereq: 4420 or 4430. May be repeated with consent of department.

6810-20 Seminar Problem (1, 1, 1) Research problems and methods, critical analysis of experimental data and validity of conclusions. May be repeated with consent of department. S/NC only.

5720 Microbial Physiology (3) Lectures and seminars dealing with current advances in bacterial physiology, growth and structure. Prereq: 4110; Biochemistry 4110-20.

5730 Pathogenesis of Infectious Disease (3) Host
music research, (d) 9 hours in music theory, (e) 3 hours in recital, (f) 6 hours in music history/literature, and (g) 6 hours in music electives.

Strings: 45 hours distributed as follows: (a) 12 hours in applied music, (b) 6 hours in area literature and/or pedagogy, (c) 3 hours in research techniques, (d) 6 hours in ensemble, (e) 3 hours in theory, (f) 3 hours in recital, and (g) 12 hours in music electives.

Wind and Percussion Instruments: 45 hours distributed as follows: (a) 12 hours in applied music, (b) 6 hours in area literature, (c) 3 hours in music research, (d) 3 hours in advanced conducting, (e) 3 hours in music theory, (f) 6 hours in ensemble, (g) 3 hours in recital, and (h) 9-12 hours in music electives.

Composition: 45 hours distributed as follows: (a) 9 hours in applied composition, (b) 3 hours in music research, (c) 15 hours in music theory, (d) 6 hours in music history/literature, (e) 9 hours in thesis, and (f) 3 hours in electives.

Music Theory: 45 hours distributed as follows: (a) 18 hours in music theory, (b) 3 hours in music research, (c) 6 hours in music history/literature, (d) 9 hours in thesis, and (e) 9 hours in electives.

Orchestral Conducting: 45 hours distributed as follows: (a) 6 hours in conducting, (b) 6 hours in choral literature/techniques, (c) 3 hours in music research, (d) 9 hours in theory, (e) 6 hours in ensemble, (f) 3 hours in choral conducting performance or document, and (g) 12 hours in electives.

Suzuki String Techniques: 45 hours distributed as follows: (a) 12 hours in applied music, (b) 6 hours in Suzuki literature, (c) 6 hours in Suzuki studies, (d) 3 hours in music research, (e) 3 hours in music theory, (f) 6 hours in recital, (f) 6 hours in ensemble, and (g) 12 hours in electives.

THE MASTER OF ARTS PROGRAM

Music Theory: 45 hours distributed as follows: (a) 18 hours in theory, (b) 3 hours in music research, (c) 9 hours in music history/literature, (d) 9 hours in thesis, and (e) 6 hours in electives.

Musicology: 45 hours distributed as follows: (a) 21 hours in music history/literature, (b) 3 hours in music research, (c) 6 hours in theory, (d) 9 hours in thesis, and (e) 6 hours in electives.

A reading knowledge of French or German must be demonstrated by candidates for the Master of Arts degree.

Specific course requirements will be prescribed by the department for all degree programs and elective courses must have the approval of the student’s advisor.

The College of Liberal Arts
**4530 Trumpet (1-4)
**4535 Trombone (1-4)
**4540 Baritone (1-4)
**4545 Tuba (1-4)
**4550 Percussion (1-4)
**4555 Voice (1-4)
**4560 Violin (1-4)
**4565 Viola (1-4)
**4570 Cello (1-4)
**4575 String Bass (1-4)
**4580 Pianio (1-4)
**4585 Harpsichord (1-4)
**4590 Organ (1-4)
**4595 Guitar (1-4)

**4597 Composition with Electronic Media (1-3) Prereq: Consent of instructor.

• 4599 Composition (1-3) Prereq: Consent of instructor.

• 5010 Organ Literature Seminar (3) Topics vary. Prereq: Organ literature.

• 5020 Piano Literature Seminar (3) Topics vary. Prereq: Consent of instructor.

• 5045 Tuba (1-4)
• 5050 Oboe (1-4)
• 5055 Voice (1-4)
• 5060 Baritone (1-4)

• 5090 Special Topics in Performance (1-3) Prereq: Consent of department head.

• 5100 Independent Study in Music Theory (1-3) Prereq: Consent of department head.

• 5105 Seminar in Music Theory (3) Topics vary. Prereq: Consent of instructor.

• 5121 Analytical Techniques (3) Analytical techniques with emphasis on contemporary approaches. Tonal and neotonal music. Prereq: Consent of instructor.

• 5125 Practicum in Computers and Music Research (3) Programming languages, design and implementation of projects in musical analysis, composition and indexing. Prereq: Consent of instructor.

• 5150 Seminar in Music Theory (3) Topics vary. Prereq: Consent of instructor.

• 5210 Introduction to Music Research (3) Principles and techniques of research. Required of all candidates with concentrations in musicology or in music theory. Recommended for all music students who intend to enroll in a doctoral program.

• 5220 Music Bibliography (3) Bibliographic methods; illustrative projects in information retrieval and problem solving in music.

• 5270 Seminar in Musicology (3) Topics vary. Prereq: Consent of instructor.

• 5315 Band Literature (3) Band literature and origins of band emphasizing its important, expanded cultivation during past century in United States and Europe.

• 5350 Music in the Middle Ages (3) Emphasis on early Christian chant, medieval secular song, early theory, and the development of polyphony and musical notation.

• 5352 Music in the Renaissance (3) From 1400 to 1600. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genre.

• 5353 Music in the Baroque Period (3) From 1600 to 1750; rise of opera and oratorio, church and secular cantata, instrumental forms, performance practice.

• 5355 Music in the Classical Period (3) Preclassical music (Rococo) and music of Haydn, Mozart and early Beethoven. Includes background of other cultural and artistic activities.

5400 Musical Aesthetics (3) Nature of music and musical experience, sense perception and emotions, valuation in music, and role of artist in society. Aesthetic viewpoint of individuals and historical eras through selected writings.

• 5500 Flute (1-4)
• 5505 Oboe (1-4)
• 5510 Bassoon (1-4)
• 5515 Clarinet (1-4)
• 5520 Saxophone (1-4)
• 5525 Horn (1-4)
• 5530 Trumpet (1-4)
• 5535 Trombone (1-4)
• 5540 Baritone (1-4)
• 5545 Tuba (1-4)
• 5550 Percussion (1-4)
• 5555 Voice (1-4)
• 5560 Violin (1-4)
• 5565 Viola (1-4)
• 5570 Cello (1-4)
• 5575 String Bass (1-4)
• 5580 Piano (1-4)
• 5585 Harpsichord (1-4)
• 5590 Organ (1-4)
• 5595 Guitar (1-4)

5597 Composition with Electronic Media (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

5599 Composition (1-3) Prereq: Consent of instructor.

• 5600 Small Ensemble (1)
• 5602 Brass Choir (1)
• 5604 Jazz Ensemble (1)
• 5606 Trombone Choir (1)
• 5610 Percussion Ensemble (1)
• 5611 Marinella Choir (1)
• 5612 Baroque Ensemble (1)
• 5620 UT Singers (1)
• 5630 Chamber Singers (1)
• 5632 Collegium (1)
• 5634 Saxophone Choir (1)
• 5640 Opera Theatre (1)
• 5642 Opera Workshop (1)
• 5650 Concert Band (1)
• 5652 Campus Band (1)
• 5654 Varsity Band (1)
• 5655 Laboratory Band (1)
• 5657 Marching Band (1)
• 5670 Symphony Orchestra (1)
• 5680 Concert Choir (1)
• 5682 University Chorus (1)
• 5684 Campus Chorus (1)
• 5686 Men's Glee Club (1)
• 5687 Women's Chorale (1)

* May be repeated. **May be repeated. Maximum 6 hrs.

M.A., Ph.D.

DEGREES

Philosophy

MAJOR

Philosophy

M.A., Ph.D.

128 College of Liberal Arts
College of Liberal Arts

Professors: J. W. Davis (Head), Ph.D. Emory; R. E. Agulla, Ph.D. Northwestern; L. B. Gebel, Ph.D. Nebraskas; R. B. Edwards, Ph.D. Emory; M. H. Moore (Emeritus), Ph.D. Chicago; D. Van de Vele, Jr., Ph.D. Yale.

Associate Professors: J. O. Bennett, Ph.D. Tulane; G. G. Brehmert, Ph.D. Michigan; K. A. Emmett, Ph.D. Ohio State; C. V. Jones, Ph.D. Chicago; J. E. Nolf, Ph.D. Ohio State; M. L. Osborne, Ph.D. Tennessee; C. D. Olt, Ph.D. Texas (Austin); R. B. Edwards, Ph.D. Emory; D. Van de Vate, Jr., Ph.D. Yale.

Teaching Assistants: S. H. Cohen, Ph.D. Northwestern; H. L. Hamby, Ph.D. Georgia; R. Jones, Ph.D. Chicago; J. E. Nolf, Ph.D. Ohio State; M. L. Osborne, Ph.D. Tennessee; C. D. Olt, Ph.D. Texas (Austin); S. Reaven, Ph.D. California (Berkeley).

THE MASTER'S PROGRAM

See general requirements on page 19. Courses below 4000 may not be taken for graduate credit by philosophy majors except with special permission.

THE DOCTORAL PROGRAM

Specific requirements for doctoral students in Philosophy include a minimum of three academic years of graduate study involving at least 72 quarter hours credit in course work (normally 24 quarter courses or their equivalent), as well as the preparation of a thesis (or dissertation) of which not less than 45 shall be in courses numbered over 5000, and of which at least 9 shall be in a subject other than philosophy. The specific number and distribution of courses will be determined by the student's faculty committee.

Two foreign languages, normally French and German, are required. As an alternative to the two-language requirement, candidates for a Ph.D. may elect to demonstrate a substantially more advanced proficiency in reading knowledge of one language.

Requirements for this option may be obtained from the department office.

Registration in any course in the 5000 or 6000 series (except 5050 and 5910-20-30) may be repeated for credit with the consent of the department. That is, courses having the same number, but with different subject matter, may be taken with each separate subject description.

MEDICAL ETHICS

The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Details concerning the program can be obtained from the department.

RELIGIOUS STUDIES

The department has an M.A. program of graduate study with a concentration in philosophy of religion and other religious studies. Details concerning the program can be obtained either from the Departments of Philosophy or Religious Studies.

3111 Ancient Western Philosophy (4) F, W
3121 Medieval Philosophy (4) F, Sp
3131 Seventeenth- and Eighteenth-century Philosophy (4) F, Sp
3141 Nineteenth- and Early Twentieth-century Philosophy (4) F, Sp
3151 Contemporary Philosophy (4) Survey of recent movements in philosophy. F
3270 Russian Philosophical and Theological Theology (4) (same as Religious Studies 3270 and Russian 3270.)
3311-12 American Philosophy (4, 4) 3311—Colonial to late nineteenth century. 3312—Late nineteenth century to present. W; Sp
3320 Philosophy of Law (4) Nature, sources, function of law. A
3330 Philosophy of History (4) Speculative and critical aspects of the philosophy of history. A
3410 Philosophical ideas in Literature (4) Philosophical assumptions and implications in major literary works. F, W, Su
3420 Philosophy of Literature (4) Study of the nature, functions, values and epistemic principles of literary arts. F, W
3430 Concepts of Woman (4) Examination of some of the theoretical foundations of feminism and anti-feminism. F, W, Sp
3440 Social Ethics (4) Ethical theory as related to politics, economics, law, religion and the family. F
3510 Existentialism (4) E
3550 Marxism as Philosophy (4) W
3650 Philosophy and Religion in India (4) (Same as Religious Studies 3650.) F
3660 Buddhist Philosophy and Religion (4) (Same as Religious Studies 3660.) W
3671 Religion and Philosophy in China (4) (Same as Religious Studies 3671.)
3690 Philosophy of Religion (4) Analysis of basic issues in religion. (Same as Religious Studies 3690.) F, Sp, Su
3740-50 Conceptual History of Science (4, 4) (4) The Scientific Revolution: historical evolution of thought in astronomy, mechanics and philosophy of nature up to Newton. 3750—The development and decline of Newtonian science: historical evolution of thought on the nature of matter and of light, and on that of life. Prereq: 8 hrs of physics or consent of instructor. W, Sp
3770 Introduction to Philosophy of Science (4) Standard topics in philosophy of science: scientific method, nature of laws and theories, problems of induction, explanation, measurement. No background in logic presupposed. F
3810 Introductory Symbolic Logic (4) Techniques for formal analysis of deductive reasoning (propositional logic and quantification theory.) Sp
3910 Contemporary Aesthetics (4) Philosophical discussion of contemporary art. F, W, Sp
4000 Special Topics (4) A student- or instructor-initiated course to be offered at convenience of department, the title to be determined by mutual consent of students and instructor with approval of department. Prerequisites to be determined by department. F
4111-21 Modern Religious Philosophies (4, 4) (Same as Religious Studies 4111-21.)
4310 Intermediate Ethics (4) Topics in metaethics or ethics. Sp
4370 Theoretical issues in Medical Ethics (4) Prereq: 2310 or 3611 or consent of instructor. (Same as Religious Studies 4370.) Sp
4410 Plato (4) Prereq: 8 hrs philosophy or consent of instructor. A
4420 Aristotle (4) Prereq: 8 hrs philosophy or consent of instructor. A
4450 Continental Rationalism (4) Prereq: 8 hrs philosophy or consent of instructor. A
4460 British Empiricism (4) Prereq: 8 hrs philosophy or consent of instructor. A
4470 Kant (4) Prereq: 8 hrs philosophy or consent of instructor. A
4480 Advanced Topics in Existentialism and Phenomenology (4) Prereq: 8 hrs philosophy or consent of instructor.
4511 Advanced Topics in Logic (4) Prereq: Consent of instructor. May be repeated.
4510 Philosophical Analysis (4) Prereq: 8 hrs philosophy or consent of instructor.
4620 Philosophy of Mind (4) Problems of mind and body in relation to consciousness and personal identity. Prereq: 8 hrs philosophy or consent of instructor.
4630 Philosophy of Language (4) Prereq: 8 hrs philosophy or consent of instructor.
4710 Philosophy of Natural Science (4) Consideration of standard topics pertinent to natural science including reduction of theories and teleological explanation. Familiarity with symbolic logic is recommended. Prereq: 3770 or 2 yrs natural science.
4720 Philosophy of Social Science (4) Examination of methods of inquiry and modes of explanation in social sciences. Prereq: 3770 or 2 yrs social science.
4810 Metaphysics (4) Prereq: 8 hrs philosophy or consent of instructor.
5000 Thesis (1-15) E
5050 Symbolic Logic (4)
5080 Philosophy of Logic (4) Nature of logic; epistemological, metaphysical and axiological assumptions and implications of various theories of logic. Prereq: 4510 or equivalent.
5101 Foreign Study (1-12) See page 99. E
5102 Off-campus Study (1-12) See page 99. E
5103 Independent Study (1-12) See page 99. E
5250 Studies in the History of American Philosophy (4) Intensive, critical work on major philosopher or school.
5355 Orientation to Medical Ethics (4) Survey of ethical theories in application to issues in medical ethics. (Same as Religious Studies in 5355.) F
5365 Applied Ethical Theory (4) Single author, tradition, or topic in ethical theory with special attention to application to issues in health, business, technology, ecology, and other practical fields. (Same as Religious Studies 5365.)
5370 Topics in Medical Ethics (4) Prereq: 4370-71 or consent of Medical Ethics Committee.
5375 Clinical Practicum Orientation (4) Medial terminology, history of medical ethics; preparation for UT Center for the Health Science Clinical Practicum. Sp
5410 Philosophy of History (4) Theories of history and historical processes.
5430 Philosophy and Literature (4) Mutual influence of philosophy and literature, possibility of a philosophy of literature, philosophy of criticism.
5450 The Problem of the Self (4) Current studies in sociology, social psychology, and philosophy to amend and elucidate traditional philosophical treatments of problem of self.
5460 Philosophy of Mind (4) Relation of mental to physical and of role of words in discourse for mental activities such as thinking and feeling.
5550-60 Philosophy of Science (4, 4) Nature of subject matter and method of sciences. 5560—Natural sciences. 5560—Social Sciences.
A student who enrolls in the Graduate School with the intention of attaining an advanced degree in Physics shall, in general, have completed an undergraduate major in physics or its equivalent. Physics 3210-20-30, 3710-20-30, 3710-20-30, 4210-20, 4230 or 4240 constitute the minimum courses prerequisite to graduate study.

A student who intends to present Physics as a graduate minor shall, in general, have completed a Physics or its equivalent. Physics 3210-20, 4210-20 constitute the minimum course work prerequisite to graduate study.

Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy are offered in a number of specialized fields including chemical physics, elementary particle physics, atomic and low temperature physics, health physics, molecular spectroscopy, nuclear physics, plasma physics, solid state physics, theoretical physics, ultrasonics, heavy ion atomic physics, biophysics, and liquid state physics.

Departmental graduate programs providing special opportunities for academic research work in areas pertinent to atmospheric and space flight are available at the Space Institute, Tennessee.

All first-year graduate students are required to take a qualifying examination in undergraduate physics during the fall quarter registration period.

THE MASTER'S PROGRAM

The Physics Department has a two Master's degree program, a master's thesis and non-thesis.

The thesis program is primarily designed for students intending to go into industrial or governmental laboratories as physicists. The course requirements include 36 quarter hours in such courses as Physics 4510-20-30, 4610-20-30, 5110-20-30, 5210-20-30, 5310-20-30, 5610-20-30 and appropriate courses in related fields. Each candidate must present an acceptable thesis, equivalent to 9 hours of credit, and pass an oral examination on course material and thesis.

The non-thesis program is primarily designed for students intending to teach in colleges or universities on the elementary or intermediate levels, or for students specifically intending to work toward a Ph.D. Students seeking an M.S. in Physics by this method are the satisfactory completion of 45 hours of course work numbered above 5000 (e.g., 5110-20-30, 5210-20 or consent of instructor. Sp, Su

The thesis topic will be chosen with reference to one of the fields in which research facilities can be made available either at the University laboratory or at the Oak Ridge National Laboratory, Oak Ridge, Tennessee.

A program leading to the Ph.D. in chemical physics is conducted jointly with the Chemistry Department, which offers a similar degree. Physics departmental requirements for the degree in chemical physics include the successful completion of the following courses: Physics 4510, 4610-20-30, 5210-20-30, 5310-20-30, 5410-20-30, 5510-20-30, 5610-20-30, 6110-20-30, and either 8310 or 5720; Chemistry 4100, 5430, and any two quarters from 5350-50, 6730 or 6810-20.

A reading knowledge of one foreign language in which there exists a significant body of literature is required.

All first-year graduate students are required to take a qualifying examination in undergraduate physics during the fall quarter registration period.

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Graduate programs leading to the degrees of Master of Science and Doctor of Philosophy are offered in a number of specialized fields including chemical physics, elementary particle physics, atomic and low temperature physics, health physics, molecular spectroscopy, nuclear physics, plasma physics, solid state physics, theoretical physics, ultrasonics, heavy ion atomic physics, biophysics, and liquid state physics.

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4610-20 Electronics (3, 3) Electronic components and circuits of interest to physicists. Prereq: 2310-20 or 2210-20. Labs: 3, 3, F, S, Su.

3630 Nuclear Electronics Laboratory (3) Elementary concepts of nuclear instruments are presented as they are used in physics. A Ptp of the equipment they are designed to test. Prereq: 3210-20, 3220. 3 labs.

4004 Foundations of Physics (3) Selected topics from history and philosophy of classical and modern physics. Prereq: 1 yr general physics and consent of instructor. Required of MACT candidates. Sp


4140 Elementary Nuclear Physics (3) General properties of the nucleus; nucleon-nucleon interactions, nuclear forces, nuclear models, nuclear reactions, nuclear disintegrations and beta-decay, nuclear spin and magnetic moments. Prereq: 3010 or 4120. Sp.

4160 Physical Acoustics (4) Considerations fundamental to detected inherent in the vibrations and waves of all acoustic; propagation of acoustic waves in the infrasonic, audible, the ultrasonic, and the hypersonic ranges of frequencies. Prereq: 3210-20, 3230, 3 hrs and 1 lab. Sp

4210-20 Electricity and Magnetism (3, 3, 3) Intermediate level electrostatics; steady and alternating currents; laws of electromagnetism; Maxwell's equations; radiation of electromagnetic waves; refraction and refraction; electromagnetic fields of moving charges. Must be taken in sequence. Prereq: 2320 or 2220 and Mathematics 2830, F, W, or S.

4230-40 Modern Optics (4, 4) 4230—Geometrical Optics: Reflection and transmission of light at a dielectric interface; paraxial theory of interfaces, lenses, and mirrors; thick lenses, lens systems, ray tracing; polarization; imagery; laser light. 4240—Physical Optics: Mathematics of wave motion, superposition of waves; interference; Fraunhofer and Fresnel diffraction; Fourier optics; coherence. Prereq: 4210 or consent of instructor. 3 hrs and 3 labs. W.

4510-10 Atomic Physics Laboratory (3, 3) Experiments in: fundamental particle properties, photoelectricity, conduction of electricity through gases, atomic and molecular spectroscopy, x-rays. Prereq: 3210-20 or consent of instructor. 3 labs. E, F.

4540-50 Experimental Nuclear and Radiation Physics (4, 4) Interaction of charged particles and electromagnetic radiation with matter; theory and characteristics of various detectors; statistics of counting, nuclear properties. Experiments illustrate recent techniques for investigating the nucleus and nuclear radiation. Prereq: 2310. 1 hr and 6 hrs lab. W, Su.

4580 Principles of Nondestructive Testing (3) Detection and characterization of discontinuities in materials by nondestructive physical measurements. Ultrasonic, electromagnetic, holographic and penetrating radiation techniques are discussed. Prereq: 2310-20 or consent of instructor. (Same as Engineering Science 4580). W


4710-20 Introduction to Health Physics (3, 3, 3) Radiolocality, interaction of electromagnetic radiation with matter, radiation quantities and units, point kernel and extended sources, x-rays and gamma rays, neutron activation, interaction of charged particles with matter, nuclear energy levels, measurements and calculations, counting statistics, shielding, dosimetry, waste disposal, criticality prevention, radiation biological effects. Prereq: 3750. F, W, or S.

5000 Thesis (1-15) E

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

5080 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students in good standing. Prereq: Consent of department and research director. May be repeated with consent of department. S/NC only. E


5210-20-30 Advanced Modern Physics (3, 3, 3) Basic principles of wave mechanics; one-electron atom; vector model; atomic and molecular spectroscopy; atomic properties of transition elements; nuclear spin, magnetic moments, etc.; scattering phenomena; nuclear models and forces; high-energy physics; superconductivity. Prereq: 4210-20 or equivalent. 3 labs. F, W, Sp.


5630 Numerical Methods in Physics (3) Numerical methods applied to problems in physics; application of linear and non-linear methods pointed toward use of automatic computing machinery; analysis of errors. Prereq: 5810-20-30 or consent of instructor. Prereq or coreq: 5410-20 or 5410-20-30.

5720 Physics of Polyatomic Molecules (3) Introduction to electronic structure of molecules and physical processes of luminescence of these molecules; theoretical and experimental aspects of intermolecular and intramolecular electron excitation and radiation in molecules. Prereq: 4210-20 or consent of instructor. Prereq: 5210-20 and consent of instructor. Sp

5910-20-30 Special Problems (3, 3, 3) Specialized analysis of theoretical or experimental work on problems not covered in other courses. Prereq: 3 sem of consent. 27 hrs. E

6000 Doctoral Research and Dissertation (1-35) E

6120-20-30 Nuclear Physics (3, 3, 3) Experimental nuclear physics, special properties of nuclei, two body scattering problems; scattering theories, nuclear forces; theory of light nuclei; nuclear spectroscopy; special nuclear models; theory of nuclear reactions; theory of nuclear reactions; F, W, or Sp.

6130 Electromagnetic Theory of Light (3) Classical electromagnetic theory including theories of the breake, dispersion and absorption; scattering of light and x-rays; dielectric and magnetic properties of gases and solids. Optical properties of electromagnetic waves in isotropic media including reflection, refraction and polarization and also theory of diffraction. Prereq: 5410-20-30. Su.

6320 Special Relativity (3) Lorentz transformation; Einstein postulates; relativistic systems; relativistic kinematics. Prereq: 5110-20-30, 5410-20-30, 6310. F

6330 General Relativity (3) Tensor calculus; general theory of relativity: gravitational field equations. Prereq: 5320. W.

6420 Advanced Topics in Classical Theory (3) To meet special needs of students. Possible fields; advanced dynamics and hydrodynamics, electromagnetic theory, thermodynamics, theory of nonequilibrium processes. Prereq: 5310-20-30, 5410-20-30, 6310-20-30. May be repeated with consent of department.

6430 Advanced Topics in Quantum Theory (3) To meet special needs of students. Possible topics; angular-momentum theory, beta-ray theory, theory of atomic spectra, molecular structure and valence theory, theory of radiation, electric and magnetic susceptibilities, high energy processes, scattering and collision processes, fields of theory. Prereq: 6110-20-30. May be repeated with consent of department.

6500-10 Electrical Conduction in Gases and Plasma Physics (3, 3) Electrical conduction in gases at high and low pressures. Characteristics of spark and glow discharge. Collective phenomena in a plasma; plasma oscillation; magnetohydrodynamics; instability; applications of interest in astrophysics; geophysics and thermonuclear research. Prereq: 3170-20-30 and either 5410-20-30 or Electrical Engineering 5310-20-30. (Same as Electrical Engineering 6500-10). F, W

6610 Interaction of Radiation with Gases (3) Interaction of electromagnetic radiation with charged and neutral particles, oscillators, attenuation, interaction of charged particles with atoms and molecules; ionization, excitation, dissociation and ionization, collision, interaction, transport and capture; electron swarm and electron beam experiments. Prereq or coreq: 6110-20-30.
THE MASTER'S PROGRAM

See general requirements on page 19. MASTER'S IN PUBLIC ADMINISTRATION

Specific requirements for graduation include:

1. The completion of 54 quarter hours of approved graduate courses.
2. At least fifty percent of the credit hours must be in approved courses numbered 5000 and above.
3. Demonstration of command of the material covered in course work through a written comprehensive examination which may be followed by an oral examination.

The 54 quarter hours of graduate courses comprise 30 quarter hours of core courses which focus upon general perspectives, analytical skills, and management skills, a recommended internship arranged with a cooperating public agency (9 quarter hours), and 15 quarter hours in an elective specialized track developed by the student with the approval of the coordinator of the M.P.A. program. The specialized track will often contain a mix of courses from political science and one or more outside fields; examples include general government, public health administration, fiscal administration, social services administration, knowledge of criminal justice, urban administration, environmental and natural resources administration. Inquiries concerning all programs should be directed to the Department of Political Science, Knoxville, Tennessee 37916.
ic policy formulation through judicial decision making. Recommended for econ 2510-20. Sp; W
4580 Congress (4) Nature, functions, and processes of U.S. Congress. Sp
4575 Special Topics in United States Government and Politics (4) May be repeated with consent of department. W or Sp
4610 Budgetary Process (4) Fiscal planning, budget and expenditure processes in government, their pol- icy and administrative implications. W or Sp
4620 Public Personnel Administration (3) Development of the merit system in government, career sys- tems, public personnel management functions, or- ganization for personnel management. F or W
4665-66 Policy Making in Democracies (4, 4) Com- parative approach to theory and process of making public policies. F or Sp; W
4675 Special Topics in Comparative Government and Politics (4) May be repeated with consent of department. Maximum 8 hrs.
4701-02 International Organization (4, 4) 4701—The League of Nations and the United Nations. 4702— Functional and regional organizations. W or Sp
4711 International Law (4)
4727 Politics of Inter-American Relations (4) Analysis of selected theoretical and policy issues concerning international political relations in the Americas with emphasis upon imperialism, intervention, and political thinkers, schools, historical periods. F; W, Sp
4746 Political Parties and Elections (4) Analysis of party systems and electoral process. F, W
4750 Political Campaigns (4) All aspects of campaign process. F, W
4815 Contemporary Soviet Marxism-Leninism (4) Soviet applications of Marxist-Leninist theory.
4875 Special Topics in Political Thought (4) May be repeated with consent of department. Maximum 8 hrs.
4940 Politics and the Environment (4) Examination of formulation and implementation of public policies relating to physical environment with emphasis upon water and air pollution control. Sp
4975 Prospective in Political Science (4) Selected research for seniors; primarily for majors. May be repeated with consent of department. Maximum 8 hrs.
5000 Thesis (1-15) E
5002-Non-Thesis Graduation Completion (3-15) Required, for the non-thesis student not otherwise registered in the graduate curriculum when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree. May be repeated. S/NCR only. E
5101 Foreign Study (1-12) See page 99. E
5102 Off-campus Study (1-12) See page 99. E
5103 Independent Study (1-12) See page 99. E
5110-20 Seminar in Political Theory (3, 3) Selected political thinkers, schools, historical periods. F, W, Sp
5140 Politics, Administration and Community In Nentermopolitan Areas (3) Analysis of problems and processes associated with community development. Sp
5150 Internship in Political Science (3-6) Open to students participating in approved internship pro- grams. May be repeated with consent of instructor. Maximum 9 hrs. S/NCR only. E
5210-20-30 Seminar in World Politics (3, 3, 3) Research in world problems and organization. F; W; Sp
5211 Directed Readings in Political Science (3) May be repeated with consent of instructor and student's advisor. Maximum 9 hrs. May be taken for letter grade or S/NCR. E
5250 Seminar in African Politics (3) Selected topics in African politics. 5270 Seminar in the Politics of Development (3) Selected topics dealing with political problems of less developed countries. 5310-20 Seminar in Comparative Government (3, 3) Selected topics in modern governments. 5340-50 Seminar in Latin American Government (3, 3) 5370-80 Seminar in Soviet Politics and Government (3, 3) W
5410-20 Seminar in Public Law (3, 3) Special problems in constitutional and administrative law. F
5440-50 Theory and Analysis of U.S. Foreign Policy Processes (4, 4) Theoretical approaches to decision making in foreign policy area and analysis of policy-making process. W
5510-20 Seminar in International Organization (3, 3) 5510—Introduction to international organizations; political integration at international level. 5520-30 Seminar in Global Politics (3, 3) Special emphasis upon water and air pollution control. Sp
5540 Seminar in Comparative Public Administra- tion (3) Approaches to and methods used in com- parative analysis. 5550 Seminar in Administration in Developing Countries (3)
5600 Public Administration (3) Public administration theory and functions, approaches to public management, contemporary problems in public administration. F
5605 Research and Methodology in Public Admin- istration (3) Basic assumptions and techniques of research in public administration; measurement, analysis, and reporting of data. W
5610-20 Seminar in Organization Theory (3, 3) App- raisal of major theories of organization and their applicability to public sector. F
5611-21-31 Seminar in State and Local Government (3, 3, 3)
5630 Seminar in Technology and Public Policy (3) Technological change and policy process, govern- ment interactions with scientific community, politi- cal characteristics of scientific enterprise.
5635-45 Operations Research for Public Adminis- trators (3, 3) Operations research methodology; ap- plications and limitations in public sector. F
5640-50 Seminar in Public Administration (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor.
5670-80 Seminar in Policy Analysis (3, 3) Role of administrators in policy analysis and decision mak- ing with special attention to historical and current issues. Sp
5710 Seminar in the Politics of Administration (3) Examination of public administration in context of American political system with emphasis upon policy making and political roles of public adminis- trators and agencies. W
5730 Seminar in Public Budgeting and Fiscal Man- agement (3) Budgetary process, fiscal manage- ment, and finance in American government. Sp
5740 Seminar in Organizational Analysis (3) Or- ganization theory applications in public manage- ment; field analysis of public organizations.
5750-55 Seminar in Public Administration (3, 3) Selected problems. F, W
5765-75 Law and the Administrative Process (3) Constitutional position; decisional processes, regu- lation and management; limitations on govern- mental action; questions of structure, role, and ad- ministrative choice. W
5770 Practicum in Public Administration (3) Sp
5785-95 Seminar in Staff Functions (3, 3) Functions of administrative staff personnel serving political executives, agencies, departments, and advisory and community groups in public sec- tor. Selected topics include budgeting, personnel, evaluation, and training.
5790 Seminar in Public Personnel Management (3) Functions and organizations of personnel adminis- tration in public service. Sp
5810 The American Political Process (4) Principal patterns of political behavior linking citizens and political institutions. Sp
5820 The American Political Process (4) Selected problems in American politics. Sp
5831-32 The Systematic Study of Politics (3, 3) Scope, methods and procedures of analysis in politi- cal science. F, W
5840 Ethics, Values, and Morality in Public Adminis- tration (3) Moral-ethical-value dilemmas confronting administrators in American political system.
5850 Seminar in Comparative State Politics (3) In- tensive readings in comparative state politics focusing on environment of state politics, institutions and policy making.
5910-20 Quantitative Political Analysis (3, 3) Methods and techniques in quantitative political analysis. F, W
5930 Topics in Quantitative Political Analysis (3) Selected topics in quantitative methods.
6000 Doctoral Research and Dissertation. (3-15) E
6210 Advanced Studies in International Politics (3)
6310 Advanced Studies in Political Theory (4) Re- search in selected topics. F
6410 Advanced Studies in International Organiza- tion (3) Research in selected topics.
6440 Advanced Studies in Comparative Politics (3) Research into selected topics. Sp
6510-20 Advanced Studies in American Constitu- tional Law (3, 3) Systematic investigation of federal relationships, civil liberties, courts in political set- tings, judicial institutions, personnel, and public policy content.
6610-20 Advanced Studies in Public Administration (3, 3) Research into selected topics. W; Sp
6710 Directed Research in Political Science (3) May be repeated with consent of instructor and student's advisor. Maximum 9 hrs. May be taken for letter grade or S/NCR.
6810-20 Advanced Studies in the Political Process (3, 3) Open to advanced graduate students upon approval of instructor. F, W

Psychology

MAJOR

DEGREES

Psychology

Professors: W. H. Calhoun (Head), Ph. D. California (Berkeley); G. M. Burghardt, Ph. D. Chicago; J. F. Byrne,* Ph. D. Wisconsin; J. C. C. Galloway,* Ph. D. Kansas; W. J. Handel, Ph. D. Johns Hopkins, L. Handler, Ph. D. Missouri State; R. P. Loring, Ph. D. Iowa State; R. P. Lorion, Ph. D. Orlando, Florida; J. F. Luber, Ph. D. Chicago; K. R. Newton, Ph. D. Tennessee; H. R. Pollio,* Ph. D. Michigan; N. L. Rasch,* Ph. D. Pennsylvania; F. Samojima, Ph. D. Keio (Japan); R. R. Shadrer, Ph. D. Tennessee; W. S. Verplanck, Ph. D. Brown, R. G. Waither, Ph. D. Washington; J. A. Wibeler, Ph. D. Syracuse.


*Part-time.

**Alumni Distinguished Professor.
Assistant Professors: N. W. Dye,* Ph.D. Tennessee; S. Friedlander, Ph.D. Georgia; R. A. Starke, Ph.D. Indiana; J. A. Jones, Ph.D. Nebraska; K. R. Lawler, Ph.D. North Carolina; K. R. Lounsberry,* Ph.D. Michigan; S. A. Wood-Pentz, Ph.D. Syracuse.

The Psychological Department emphasizes doctoral degree programs with specialization in developmental, community, social, educational, experimental, cognitive, physiological, and comparative psychology, psycholinguistics, psychometrics, and learning. Some students complete a Master's degree as part of their doctoral program.

For detailed information on graduate programs and admissions requirements write: Graduate Secretary, Department of Psychology, University of Tennessee, Knoxville, Tennessee 37916.

THE PSYCHOLOGICAL CLINIC

The Psychological Clinic supports graduate training in clinical psychology. Psychological diagnosis and psychotherapy are offered on an outpatient basis, with medical consultants, to the general public as well as to University students, on referral by a physician.

3720 Ethology and Sociobiology (3) Evolutionary approach to behavior with special reference to control issues and relations to psychosocial, sociological, and social sciences, and arts.

4107 Experience in Individualized Instruction (1-6) Prereq: Consent of instructor. May be repeated. Maximum of 12 hrs. S/NC only.

4108 Topics in Social Psychology (4) Intensive analysis of selected research topics. Prereq: 3120 or Sociology 3130. (Same as Sociology 4120.) S/NC only.

4230 Sensory Processes and Perception (4) Survey of sensory and perceptual processes with emphasis on audition and vision. Prereq: 3150. Recommended: 2520. F

4239 Laboratory in Sensory Processes and Perception (2) Prereq or coreq: 4230. F, W, Sp

4460 Organizational-Industrial Psychology (3) Cannot be taken for credit by students who have credit for Management 3460. E

4510 Personality Theories (4) Prereq: 3650 or consent of instructor. F, Su

4520 Personality and Social Systems (4) Prereq: 2540. F

4610 Group Processes (3) Study and experience of theory and techniques of group process and facilitation. Those participating in 4610 are expected to complete 4630 and 4630. Prereq: 3618-26 and consent of instructor. F

4630-30 Seminar in Group Processes (3, 3) Didactic and laboratory experience for those qualified for further training as group facilitators. Prereq: 4610 and consent of instructor. W, Sp

4640 Psychological Tests and Measures (4) Theory and construction of individual and group measures; survey of various methods of assessment of intelligence, personality, special abilities, and educational achievement. Prereq: 3150. F, Su

4650 Symbolic Processes (4) Logic of signs and symbols; directed and associative thinking; memory, problem solving, and concept formation; nature, use, and development of language. Prereq: 3618-26 or consent of instructor. F

4660 The Psychology of Language (4) Theories and descriptions of phonology, syntax, and semantics as applied to psychology and related disciplines. Recommended: 4630 and linguistics background. F

4670 Cognitive Development (4) Theory and research on development of language and thinking in children and adolescents. Prereq: 3210 or 3950. F

4710 Physiological Psychology (4) Nervous system and physiological correlates of behavior. Prereq: 1 yr of biology or zoology and 2520. W

4719 Physiological Psychology Laboratory (4) Laboratory studies of nervous system and physiological correlates of behavior. Coreq: 4710. W

4720 Comparative Animal Behavior (4) Methods and principles. (Same as Zoology 4720.) F

4729 Comparative Animal Behavior Laboratory (4) Laboratory and field studies. Coreq: 4720. (Same as Zoology 4729.) F

4750 Evolution and Ontology of Social Behavior (4) Genetic, evolutionary, ecological, and developmental processes as they apply to social organization and dynamics of vertebrates. Prereq. Consent of instructor.

4830 History and Systems of Psychology (4) Prereq: 9 hrs of upper division psychology.

4850 Learning Theories (4) Historical and theoretical development of learning models. Prereq: 3210.

4860 Programmed Learning (3) (Same as Curriculum and Instruction 4860.)

4870 Contemporary Research in Behavior of Women (4) Study of interaction of cultural and biological factors in determining the behavior of women, with emphasis on physiological mechanisms involved. Sp

4880 Afro-American Psychology (4) Review and analysis of psychological literature on Afro-Americans. Prereq. Consent of instructor. (Same as Black Studies 4880.)

5000 Thesis (1-15) E

5002 Non-thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. Prereq: 3210. May be repeated. S/NC only.

5017 Colloquium in Ethology (1) May be repeated. Maximum 8 hrs. (Same as Zoology 5017.) S/NC only.

5019 Research Practicum (1-3) Required of all first-year students in experimental, physiological, and comparative psychology. May be repeated. Maximum 9 hrs. S/NC only.

5050 Methods of Research in Applied Psychology (3) Techniques and principles for designing and conducting psychological research in natural settings.

5070 Seminar in College Teaching (2) Concepts, methods, and materials in introduction of psychology at college level. Emphasis on research. Required of all SNC only.

5079 Practicum in College Teaching (2) Supervised participation in college teaching. S/NC only.

5100 Developmental Psychology (3) Prereq: 3550 or Educational Psychology 2430. (Same as Educational Psychology 5100.) F, Sp, Su

5105 Developmental Assessment (3) Techniques for assessing development in infants and children. Does not include practicum. Prereq: 5100 or equivalent and consent of instructor.

5110 Clinical Aspects of Human Sexuality (3) Nature of sexuality; societals perspectives, personal identity, attraction and isolation including psychosocial and sexual identity and models for decisions. Intended for graduate students in clinical psychology, social work, and community and mental health professions. Prereq. Consent of instructor.

5111-12-13 Seminar in Current Issues in School Psychology (1, 1, 1) Historical, legal, ethical and methodological issues in practice of school psychology. Multiple instructors. (Same as Educational Psychology 5111-12-13.) S/NC only. F, W, Sp

5140-50-60 Psychoeducational Assessment (3, 3, 3) Nurturance, psychoeducational, and sociometric assessment methods in school learning environments. Must be taken in sequence. Prereq: Admission to School Psychology Program and consent of instructor. (Same as Educational Psychology 5140-50-60.) F, W, Sp


5170-80-90 Proseminar in Industrial and Organizational Psychology (3, 3, 3) (Same as Management 5170-80-90.) F; W; Sp

5200 Topics in Developmental Psychology (3) Prereq: 3100 or equivalent and consent of instructor. May be repeated. Maximum 6 hrs.

5210 Readings in Psychology (1) S/NC only. E

5220 Readings in Psychology (2) S/NC only. E

5230 Readings in Psychology (3) S/NC only. E

5240 Readings in Psychology (4) S/NC only. E

5250 Readings in Psychology (5) S/NC only. E

5260 Special Problems in Psychology (1) S/NC only. E

5270 Special Problems in Psychology (2) S/NC only. E

5280 Special Problems in Psychology (3) S/NC only. E

5290 Special Problems in Psychology (4) S/NC only. E

5300 Special Problems in Psychology (5) S/NC only. E

5319 Field Work in School Psychology: Level I (2) Supervised-on-the-job training in school psychology. Prereq: 5140-50-60 or equivalent. May be repeated. Maximum 6 hrs. (Same as Educational Psychology 5319.) S/NC only. F, W, Sp

5325 Behavioral Interventions (3) Principles and techniques for planning, implementing, and evaluating interventions derived from social learning theory. Focuses on interventions by people in community (teachers, supervisors, etc.). Includes token economies and strategies for self-control.

5340 Group Dynamics (3) (Same as Educational Psychology 5340.)

5350-60-70 Seminar in Psychology (3, 3, 3) May be repeated. Maximum 18 hrs.

5400 Psychophysiatics and Scaling Methods (3) Prereq: One course in statistics.

5420-30-40 Advanced Psychological Statistics (3, 3, 3) Must be taken in sequence. W; Sp; Su; F

5450 Human Problems in Administration (3) (Same as Management 5320.)

5460 Continuing Education in Mental Health (1-4) Topics of interest to persons in mental health and allied fields. Workshop, seminar, or lecture; topic and format to be announced. Prereq: Graduate standing or consent of instructor. May be repeated. Maximum 9 hrs.

5500 Fundamentals of Psychometrics (4) Basic ideas and orientation in psychometrics. All graduate students who plan to take one or more courses in psychometrics required to take course. Prereq or coreq: 4640.

5610 Instrumentation for Psychological Research (3)

5620 Theory of Mental Measurement (3) Reliability, validity, scaling and equating, norms, combining tests into batteries. Prereq: 1 qtr of graduate-level statistics and 5500 or consent of instructor.

5530 Issues in Applied Psychological Measurement (3) Applications of measurement in community and organizational research. Prereq: Statistics 5050-70 or equivalent and consent of instructor.

5540 Probability Models in Psychology (4) Introduction to use of probability models in theory of binary test items, differential psychology, comparison of different populations, factor analysis, psychometric models, individual choice behavior, and testing of psychological hypotheses in human and animal behavior. Reliability theory. Prereq: 1 qtr calculus or consent of instructor.
5550 Advanced Social Psychology (3) Interaction between individual and group, theories of group behavior. Prereq: 3120. May be used for credit in sociology.

5550 Seminar in Social Psychology (3) Prereq: 5550. May be used for credit in sociology. May be repeated. Maximum 8 hrs.

5580 Theories of Personality (3)

5581-82 Clinical Psychology I: Human Development and Personality (2, 2, 2) First quarter core of doctoral program in clinical psychology. Students take 3 2-hr courses concurrently, each course covering content area from one of three major contemporary points of view. F

5589 Psychological Techniques Laboratory (2) Basic techniques of psychological assessment. Restricted to doctoral students in clinical psychology.

5591-92-93 Clinical Psychology I: Patterns of Adaptation (2, 2, 2) Second quarter core of doctoral program in clinical psychology. Students take 3 2-hr courses concurrently, each covering content area from one of three major contemporary points of view. W

5601-02-03 Clinical Psychology II: Behavioral Development in children (3, 3, 3) First quarter core of doctoral program in clinical psychology. Students take 3 2-hr courses concurrently, each covering content area from one of three major contemporary points of view. Sp

5610-30 Psychology of Learning (3, 3, 3) Prereq: 3210 or Educational Psychology 3730. F, W

5650 Ethics in Professional Psychology (2) Review of ethical concerns in professional psychology. Multiple instructors. 3 hrs. per week. Sp

5670 Forensic Psychology (2) Psychologist's role in relation to law, including questions concerning licensure requirements, legal restrictions, and testimony as expert witness. Offered in alternate years. Prereq: M.A. in psychology or equivalent.

5680 Neurological and Psychological Aspects of Aging (3) Neuroanatomy and neuropsychological changes as they relate to aging. Prereq: Consent of instructor. F

5702 Community Psychology (3) Psychological aspects of research, evaluation, intervention, and planning for community and community-based systems for primary and secondary prevention, planning of social systems, and relevance of federal policy. Prereq: Consent of instructor.

5713 Learning Modules for Techniques in Professional Psychology (1-4) Set of learning packages; each develops skill in assessment, technology, child health, or pathology. Prereq: Consent of instructor. May be repeated. Maximum 16 hrs. (Same as Educational Psychology 9319). SNC only. F, W, Sp

5750 Ethological Psychology (3) Evolutionary and physiological basis of comparative psychology and implications for human behavior. Prereq: Introductory biology and graduate standing.

5760 General Vertebrate Neuroanatomy (3) Lecture and laboratory dealing with structure and function of central and peripheral nervous system. Prereq: 4710, 4719, or consent of instructor. (Same as Zoology 5760.)

5769 Advanced Techniques in Physiological Psychology (3) Methods used in animal and human laboratory procedures central to research in physiological psychology. Prereq: 4710, 4719, and consent of instructor. May be repeated with consent of instructor.

5790 Seminar in Psycholinguistic Concepts in Speech Pathology (3) (Same as Speech Pathology 5790.)

5840 Student Appraisal (3) (Same as Educational Psychology 5840.)


5859-69 Practicum in Psychological Appraisals (2, 2, 2) Ordinarily to be taken concurrently with 5550.

5890 Counseling Theories and Techniques (3) (Same as Educational Psychology 5890.)

5900-60 Theory and Practice of Consultation (3, 3) Issues in consultation, models of consulting process, and evaluation of consulting techniques. Must be taken in sequence. Coreq: 5959-60 and consent of instructor. (Same as Educational Psychology 5959-60.) W, Sp

5959-69 Practicum in Consultation (2, 2, 2) Coreq: 5900-60. Must be taken in sequence. (Same as Educational Psychology 5959-69.) SNC only. W, Sp

6000 Doctoral Research and Dissertation (3-15) E

6050 Seminar on Methods of Social Research (3) (Same as Sociology 6050.)

6100 Seminar in Community Psychology (3) Evaluation, research, intervention, and systems for delivery of services in communities. Prereq: 5702 and consent of instructor.

6150 Seminar in Program Evaluation (3) Techniques for designing and conducting research to evaluate effectiveness of programs. Prereq: Statistics 5050-60-70 or equivalent and consent of instructor.

6210-20 History, Systems, and Theories in Psychology (3, 3, 3) Prereq: M.A. in psychology or equivalent. Must be taken in sequence.

6250-60-70 Seminar in Industrial and Organizational Psychology (3, 3, 3) (Same as Management 6250-60-70).

6280-90 Factor Analysis (3, 3) Factor analysis; component introduction to latent structure analysis. Prereq: 4640 and 5500.

6310 Seminar in Motivation and Emotion (3)

6319 Field Work in School Psychology: Level II (2) Supervised field work in school psychology. Limited to students fully admitted to doctoral program in School Psychology assigned to approved field settings. Prereq: 5950-60. May be repeated. Maximum 6 hrs. (Same as Educational Psychology 9319). SNC only. F, W, Sp

6320 Seminar in Research Methods (3)

6330 Seminar in Learning (3)

6340 Seminar in Developmental Psychology (3)

6350 Seminar in Thinking (3)

6360 Seminar in Sensation and Perception (3)

6370 Seminar in Theoretical Psychology (3)

6380 Seminar in Industrial and Organizational Psychology (3) (Same as Management 6380.)


6390 Seminar in Psychotherapy (2) Treatment of current case, focusing upon psychotherapeutics, psychopathology, and therapeutic techniques employed. Prereq: M.A. in psychology or equivalent.

6395 Seminar in Assessment (3) Seminar for advanced graduate students in clinical psychology, to deal with current research on methods of evaluating the status of individuals seeking clinical aid.

6400 Seminar in Changing Concepts in Clinical Psychology (3) New developments in field in relation to their impact on experimentation and systems of thought. Prereq: M.A. in psychology or equivalent.

6405 Seminar in Psychopathology (3) Prereq: Consent of instructor.


6411-12-13-14 Psychotherapy: Elective Concentration Learning Laboratory (2, 2, 2, 2) Typically four psychotherapy concentration areas offered each quarter. Clinical students in core psychotherapy sequence must elect at least one of these in each quarter of sequence. May be repeated. Limited to clinical psychology graduate students enrolled in core psychotherapy sequence or consent of instructor. *6419-29-39 Psychotherapy Practicum (1-3, 1-3, 1-3) Coreq: 6410-20-30. May be repeated. Maximum 16 hrs.

6450-60 Advanced Psychometrics (3, 3) Construction and standardization of psychological tests, questionnaires, and rating scales, theory of errors or measurement, principles of scaling, equating, and norm development. Prereq: 4650, 5440, and 5500. May be repeated. Maximum 9 hrs.

6490 Continuing Education in Professional Mental Health (1-4) Topics of interest to persons in mental health and allied fields. Workshop, seminar, or lecture; topical and format to be announced. Prereq: Professional degree in field related to mental health, or consent of instructor. May be repeated. Maximum 9 hrs.

6451-2-3-4 Field Placement in Clinical Psychology Levels 1, 2, 3, 4 (1-6, 1-8, 1-8, 1-8) Supervised clinical experience. Required of and limited to students fully admitted to Ph.D. program in Clinical Psychology. May be repeated. Maximum 8 hrs per course. SNC only. W, Sp, F

6500 Seminar in Psychometrics (3) Seminar for advanced graduate students in psychometrics or quantitative psychology, to deal with advanced theories, methodologies, and their applications. Prereq: 4640, 5500 or equivalent, and consent of instructor. May be repeated. Maximum 9 hrs.

6550 Seminar in Advanced Social Psychology (3) Prereq: Consent of Instructor.

6575 Seminar in Mental Health Administration (3) Theory and problems in organization and management of mental health administration.

6650 Assessment of Human Service Organizations (3) Review of theories and methods for diagnosing community-based human service settings. Prereq: 5850. (Same as Educational Psychology 6650.)

6660 Organizational Development in Human Service Settings (3) Review of theoretical and practical approaches to organizational development in human service settings. Didactic material and exercises. Prereq: 6650. Recommended coreq: 6660. (Same as Educational Psychology 6660.)

6669 Practicum in Organizational Development in Human Service Settings (2) Recommended coreq: 6660. Prereq: Consent of instructor. (Same as Educational Psychology 6669.)

6710 Seminar in Physiological Psychology (3)

6720 Seminar in Comparative and Ethological Psychology (3)

6730 Methods of Ethological and Naturalistic Research (3) Current laboratory and field techniques. Prereq: 5760-70, or consent of instructor. Maximum 3 hrs.

6780 Advanced Psycholinguistics (3) Language from psychological and associated points of view; methodological and theoretical problems. Prereq: Consent of instructor.

6900 Field Work in Industrial and Organizational Psychology (1-15) (Same as Management 6900.)

*Note: Psychology 5210-5300, 6310-400, 6419-29-39, 6710-20-30, and/or 6950 may be repeated for credit with the approval of the department.

Radiation Biology (Interdepartmental)

MAJOR DEGREES

Radiation Biology M.S., Ph.D.

Daniel Billen, Director

A graduate major in the field of Radiation Biology is offered through the Institute of Radiation Biology. This is a program crossing both departmental and institutional lines. Included on the Institute staff are several scientists from the Departments of
Biochemistry, Botany, Chemistry, Microbiology, Physics, Zoology; the Memorial Research Center and the Comparative Animal Research Laboratory of the University of Tennessee; the Biology and Environmental Sciences Divisions of the Oak Ridge National Laboratory; and the Medical Division of Oak Ridge Associated Universities.

Formal courses in this program are offered mainly on the Knoxville campus. Thesis research may be carried on either at the University or at one of the Oak Ridge laboratories. Problems selected for thesis research shall involve the interaction of radiations or long-lived fission products and radiometric chemicals with biological systems, at the molecular, cellular, organismal, or ecological level of complexity. Areas of radiation specialization currently include radiobiology, environmental, microbial, botanical, and biochemical and biophysical radiobiology.

ADMISSION REQUIREMENTS

The minimum requirements for admission to the Institute are: (1) a Bachelor's degree from an accredited college or university; (2) a major in either biological science, or chemistry or physics; (3) college mathematics: potential candidates for the Master's program, 9 quarter hours; potential candidates for the doctoral program, differential and integral calculus, (4) for both the M.S. and Ph.D. programs, Graduate Record Examination scores.

THE MASTER'S PROGRAM

Course requirements include: (1) Zoology 5610, (2) Zoology 5620 or 5780, (3) Zoology 5350 or Plant and Soil Science 3610, (4) Chemistry 3810, (5) Biochemistry 4110-20 or 5510-29-30. At least one-half of the student's program must be at the 5000 level. A thesis is required of all students.

THE DOCTORAL PROGRAM

(1) Courses: In addition to those required for the Master's degree, Chemistry 4910-20-30; Physics 3710-20-30 (Chemistry 3910 may be substituted for Physics 3730); Radiation Biology 5620; 5780. Additional course requirements are determined by the student's faculty committee. The student's special field of interest and plans for a career determine these requirements. The more important courses from which selection may be made are advanced courses in biochemistry, botany, chemistry, electrical engineering, mathematics, microbiology, physics, and zoology. Courses are available in the University of Tennessee Graduate School of Biomedical Sciences at Oak Ridge. (2) The comprehensive examination will consist of oral and written portions in radiation biology and in allied fields in which the candidate has received training. (3) The student's dissertation committee determines whether a foreign language is required for the doctoral degree. (4) The final examination will be an oral examination covering the candidate's dissertation and such other fields as the candidate's faculty committee may specify.

Regular attendance at the weekly Radiation Biology Seminar or an appropriate Departmental Seminar is expected of all students.

5000 Thesis (1-15) E

5300 Graduate Research Participation (3-9) May be repeated. Maximum 12 hrs. E

5610-20 Foundations of Radiation Biology (4, 4) (Same as Zoology 5610-20)

5780 Radiation Physiology (4) (Same as Zoology 5780)

6000 Doctoral Research and Dissertation (3-15) E

6910 Seminar in Radiation Biology (2) (Same as Zoology 6910)

Religious Studies


Associate Professors: W. L. Humphreys, Ph.D. Union; D. E. Linge, Ph.D. Vanderbilt.

Assistant Professors: R. R. Earl, Ph.D. Vanderbilt; J. L. Fitzgerald, Ph.D. Chicago; J. Kim, Ph.D. Chicago.

An M.A. in Philosophy with a concentration in religious studies is available for graduate work in these special fields. (Details of this program are available in the office of either department.) Graduate courses in religious studies further provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

3060-70-80 History of Western Religious Thought and Institutions (3, 3, 3) 3060—First Century to Fifth Century; 3070—Sixth Century to Fifteenth Century. 3080—Sixteenth Century to 1900. (Same as History 3060-70-80) A

2310 Early Greek Mythology (3) (Same as Classics 3210.) F

2320 Early Greek Mythology in the Classical Period (3) (Same as Classics 3220.) W

3230 Roman Mythology (3) (Same as Classics 3230.)

3270 Russian Philosophical and Theological Thought (4) (Same as Philosophy 3270 and Russian 3270.)

3411-12 The Reformation (3, 3) (Same as History 3411-12.)

3440 Religion of Primitive Peoples (3) (Same as Anthropology 3440).

3650 Philosophy and Religion in India (4) (Same as Philosophy 3650.) F

3660 Buddhist Philosophy and Religion (4) (Same as Philosophy 3660.)

3671 Religion and Philosophy in China (4) (Same as Philosophy 3671.)

3690 Philosophy of Religion (4) (Same as Philosophy 3690.)

4111-21 Modern Religious Philosophies (4, 4) Examination of the religious implications of major thinkers and movements. 4111—Nicolas of Cusa to Hume. 4121—Kant and the nineteenth century. Pre-req: 9 hrs of philosophy other than logic. (Same as Philosophy 4111-21.)

4210 Topics in Ancient Israelite and Ancient Near Eastern Religions (4) Prereq: 3110-20 or consent of instructor. May be repeated. Maximum 8 hrs.

4310 Jesus and Paul Compared (4) Jesus' teaching and activity in the context of first-century Palestinian Judaism; analysis of what the Apostle Paul made of the tradition of and about Jesus. Recommended prereq: 2610 or 2611.

4370 Theoretical Issues in Medical Ethics (4) (Same as Philosophy 4370.)

4410 American Religious Thought (4) Selected figures, movements and problems in American religious thought from colonial period to present.
THE MASTER OF ARTS PROGRAM

The student may select either Plan A or B: Plan A
1. Completion of a minimum of 36 quarter hours of which 24 must be taken in courses numbered above 5000, including 5011 (French or Spanish, as appropriate).
3. A written examination covering the course work and selected items from a master reading list.
4. A final oral examination covering the thesis.

Plan B
1. Completion of 45 quarter credits of which 33 must be in courses beyond 5000, including 5011 (French or Spanish, as appropriate).
2. Three term papers that have been accepted as satisfactory by the Advisory Committee.
3. A written examination covering the course work and selected items from a master reading list.

THE DOCTORAL PROGRAM

Residence and Course Work:
Completion of at least three consecutive quarters of full-time residence, a minimum of 81 credit hours in course work beyond the Bachelor's degree or its equivalent, and a dissertation (36 credit hours).
No less than 54 quarter hours should be taken in courses pertaining to the student's major field; of these a minimum of 18 hours are to be taken in courses above 5000, a maximum of 12 hours may be taken in courses of the 4000 level and the rest in courses above 5000. All students must complete the series in methods of research (5151-61-71) for a total of 9 credits. The minor shall consist of at least 18 hours of which at least 12 hours must be numbered above 5000 and the rest above 4000, and should represent a meaningful complement to the student's area of concentration. In addition 9 hours of courses above 4000 in a related discipline are required. In special cases the latter requirement may be waived in favor of additional course work in the major field.

Language Requirements:
Students are expected to demonstrate written and oral fluency in Spanish as well as knowledge of two other foreign languages. One of these must be French, the second one should be chosen from such languages as German, Italian, Portuguese, Arabic or Hebrew in accordance with the student's field of concentration. Proficiency in Latin shall be required of all students specializing in an area related to philology or the medieval period.

Examinations:
A comprehensive examination, both written and oral, covering the major and minor field. No candidate may be accepted as final candidate for the degree. This examination is to be held at the time deemed most appropriate by the student's major advisor and committee. The candidate is expected to defend the dissertation in a final oral examination.

For additional information on the program, consult pages 20-22.

Arabic
3510-20 Intermediate Modern Standard (4, 4, A) A
3610 Islamic Literature in English Translation (4)

Survey from origins to modern period of major Islamic literature, including Arabic, Persian, Turkish. Readings include the Arabian Nights, the Rubaiyat of Omar Khayyam and Gibran's The Prophet.

5070-80-90 Iberian Arabic Literature and Culture (3, 3, 3) (Same as Spanish 5070-80-90.) A
5101 Foreign Study (1-12) See page 99. E
5102 Off-campus Study (1-12) See page 99. E
5103 Independent Study (1-12) See page 99. E

French
3010-20-30 Elements of French for Upper Division and Graduate Students (3, 3, 3) Elements of language, elementary and advanced readings. Open to graduate students preparing for language examinations, and upper division students desiring reading knowledge in the language. Undergraduate credit only. No credit for those having had Elementary French. No auditors. F; W; Sp; Su
4001-02 Introduction to Contemporary and Simultaneous French Translation (3, 3, 3) 4001—Oral translation into English; 4002—Conservative translation to and from English; 4003—Simultaneous translation to and from English. Training of students with intermediate or advanced knowledge of French for consecutive and simultaneous oral translation from French into English, and vice versa on variety of practical subjects such as business, economics, politics and social science. Also, gain main in language lab with additional classroom supervision by instructor. Prereq: 3440 or equivalent. Must be taken in sequence.
4010 Masterpieces of French Literature in English Translation (3) No foreign language credit. A
4250 Masterpieces of French Drama in English Translation (3) No foreign language credit. A
4110-20-30 French Literature of the Seventeenth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A
4150 Théâtral French (1-3) Performance in one or more French plays. Prereq: Intermediate French or equivalent and consent of instructor. May be repeated with consent of department. A
4160-70-80 Advanced Conversation (2, 2, 2) Intensive training in prepared and spontaneous conversations. Subjects range from travel and current events to literature and aspects of national culture. Prereq: Completion of 9 hrs of courses on 3000 level. F; W; Sp;
4210 Phonetics (3) Prereq: 2130, 2520, or equivalent. F
4230-30 Advanced Grammar (3, 3) Prereq: 2130, 2520, or equivalent. W; Sp
4250 Introduction to Descriptive Linguistics (3) Phonetics and phonology, morphology and syntax. Types of languages, linguistic groups, dialects and dialect geography. Application of descriptive linguistics-field linguistics, dialectal study; its practical use in learning languages and In language teaching. Introduction to transformational grammar. Prereq: 9 hrs of upper division English or 9 hrs of upper division courses in a modern or ancient language (exclusive of German and French 3010-20-30, courses in literature, in translation, and general courses in Latin and Greek requiring no knowledge of these languages), or consent of department. (Same as German, Russian, Spanish and Linguistics 4250.) A
4260 Introduction to Historical and Comparative Linguistics (3) (Same as German, Russian, Spanish and Linguistics 4260.) W
4270 Introduction to Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into the major Romance languages. (Same as Spanish and Linguistics 4270.) Sp
4310-20-30 French Literature of the Eighteenth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A
4350-60-70 Medieval French Literature (3, 3, 3) Medieval works in modern French texts. Prereq: Intermediate French or equivalent. A
4410-20-30 French Civilization (3, 3, 3) Prereq: Intermediate French or equivalent. A
4530-20 French Literature of the Nineteenth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A
4640-50-60 French Literature of the Sixteenth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A
4710-20-30 French Literature of the Twentieth Century (3, 3, 3) Prereq: Intermediate French or equivalent. A
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during any quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
5011 Techniques in Literary Analysis (3) Required for either Plan A or Plan B of M.A. program. Intensive course in explication de texte. F
5101 Foreign Study (1-12) See page 99. E
5102 Off-campus Study (1-12) See page 99. E
5103 Independent Study (1-12) See page 99. E
5110-20 Old French (3, 3, 3) Medieval French language and literature. A
5121 College Teaching of Romance Languages (3) Seminars, demonstrations, and practical applications of techniques and procedures for teaching and evaluating basic student future courses, and beginning literature. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantsships except those whose previous training or experience warrants their being excused by department. F
5151-61-71 Bibliography and Methods of Research (1, 1, 1) (Same as Italian and Spanish 5151-61-71.) S/NC only. A
5210-20-30 French Literature of the Sixteenth Century (3, 3, 3) A
5241 French Theatre of the 18th and 19th Centuries (3) Development of new dramatic forms and evolution of traditional forms in serious and comic theatre of eighteenth and nineteenth century France.
5310-20-30 French Directed Readings (3, 3, 3) E
5350-60-70 The Philosophes (3, 3, 3) Textual analysis of the works of Voltaire, Diderot, Rousseau, and other eighteenth-century writers. A
5410-20-30 The French Novel (3, 3, 3) A
5450-60 Lyric Poetry of the Nineteenth Century (3, 3, 3) French and German influences on French Romanticism and generation of the poets of "le mal du siècle." 5460—Victor Hugo; the Parnassians. A
5470 Baudelaire and the Symbolists (3) Les Fleurs du mal and Petits poèmes en prose with emphasis on theories of color and "correspondances" and their influence on Symbolist school. A
5610-20-30 Trends in Contemporary French Literature (3, 3, 3) A
5650-60 Advanced Syntax and Stylistics (3, 3) Readings and written imitations of modern literary styles in form of compositions, sketches, and original stories. A
5670 Problems in Romance Linguistics (3) Topics vary. May be repeated with consent of department. Prereq: 4270 or equivalent. (Same as Spanish 5670.) A
5710-20-30 Seminar in French Literature (3, 3, 3) Topics vary. May be repeated with consent of department. Su
5910 Literary Criticism: The Foundations of Romantic Criticism (3) (Same as Spanish 5910.) A

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Italian

5210-20-30 Civilization and Culture (3, 3, 3) Prereq: Intermediate Italian or equivalent. A

5310-20-30 Italian Literature in English Translation (3, 3, 3-4) 3310—Sicilian School, the Florentine School, Dante, Petrarch, Boccaccio, Machiavelli, Ariosto. 3320—Ronsard from the Baroque through the eighteenth century, commedia dell'arte, Vico, Leopardi. 3330—Twentieth century. Caravaggio, Pirandello, Quasimodo, D'Annunzio, Croce, Moravia. No change in credit hours after add deadline. Option of 4 hrs credit must present appropriate amount of extra work above that required for 3 hrs. A

3510-20 Aspects of Italian Literature (4, 4) Prereq: Intermediate Italian or equivalent. Recommended for literature majors. F, W

4010-20 Italian Drama in English Translation (3-4, 3-4, 3-4) 4010—La commedia dell'arte and major works of Machiavelli, Mantastasio, Affolter, Goldini. 4020—Twentieth-century theatre: operatic drama, the Grottesco, Pirandello, De Filippo, Frail. No change in credit hours after add deadline. Option of 4 hrs credit must present appropriate amount of extra work above that required for 3 hrs. A

4050-50-70 Dante and Medieval Culture (3, 3, 3) Readings and lectures in English for students majoring or minoring in other departments. Readings, reports, and term papers in Italian for students majoring or minoring in Italian. (Same as Comparative Literature 4050-50-70.) A

4220 Petrarch (3) Prereq: 3130, 3520 or equivalent. A

4230 Boccaccio (3) Prereq: 3130, 3520 or equivalent. A

4430 History of Italian Language (3) Prereq: 3130, 3520 or equivalent. A

4410-20-30 Literature of the Rinascimento (3, 3, 3) From Pucio to Tasso, the Quattrocentro and the Cinquecento. Prereq: 3130, 3520 or equivalent. A

4530 The Modern Novel (3) Prereq: Intermediate Italian or equivalent. A

4540 The Modern Theatre (3) Prereq: Intermediate Italian or equivalent. A

4610 Contemporary Theatre (3) Prereq: Intermediate Italian or equivalent. A

4620 Contemporary Poetry (3) Prereq: Intermediate Italian or equivalent. A

4630 Contemporary Prose (3) Prereq: Intermediate Italian or equivalent. A

4760 Italian Folksore (3) Folk arts, music, traditions, rituals and lore of Italy from Middle Ages to present. (Same as German 4760.) A

5011 Techniques in Literary Analysis (2) Intensive course in explication de texte. A

5101 Foreign Study (1-12) See page 99, E

5102 Off-campus Study (1-12) See page 99, E

5103 Independent Study (1-12) See page 99, E

Portuguese

3510-20 Aspects of Portuguese Literature (4, 4) Prereq: Intermediate Portuguese or equivalent. Recommended for students in other major areas. F, W

4310-30-30 Directed Readings in Brazilian and Portuguese Literature (3, 3, 3) May be repeated with consent of instructor. F, W, Sp

Spanish

4630 Masterpieces of Spanish Literature in English Translation (3-6) A

4650-60-70 Hispano-American Literature and Culture (3, 3, 3) A

4110-20-30 Spanish Literature of the Golden Age (3, 3, 3) A

4120-30-30 The picaresque novel; Cervantes; the Comedia. A

4160-70-80 Advanced Conversation (2, 2, 2) Intensive training in prepared and spontaneous conversations. Subjects range from travel and current events to the influence of the national culture. Prereq: Completion of 8 hrs of courses on 3000 level. F, W, Sp

4210 Phonetics (3) Prereq: 2130, 2520, or equivalent. F

4220-30 Advanced Grammar (3, 3) Prereq: 2130, 2520, or equivalent. W, Sp

4250 Introduction to Descriptive Linguistics (3) (Same as French, German, Russian, Linguistics 4250.) A

4260 Introduction to Historical and Comparative Linguistics (3) (Same as French, German, Russian, and Linguistics 4260.) W

4270 Introduction to Romance Linguistics (3) (Same as French and Linguistics 4270.) Sp

4410 Spanish Civilization (3) Prereq: Intermediate Spanish or equivalent. F

4420-30 Latin American Civilization (3, 3) Prereq: Intermediate Spanish or equivalent. W, Sp

4450-70 Studies in Modern Spanish Style (3, 3) Pre-req: 3410-20-30 or consent of instructor. A

4510 Special Topics in Nineteenth Century Spanish Literature (3) A

4520 The Modern Novel in Spanish America (3, 3) May be repeated with consent of department. Maximum 9 hrs. A

4600 Spanish Lyric Poetry (3) A

4610-70-80 Hispano-Arabic Literature and Culture (3, 3, 3) May be repeated. A

5011 Techniques in Literary Analysis (2) Intensive course in explication de texte. A

5101 Foreign Study (1-12) See page 99, E

5102 Off-campus Study (1-12) See page 99, E

5103 Independent Study (1-12) See page 99, E

5151-61-71 Bibliography and Methods of Research (1, 1, 1) (Same as French and Spanish 5151-61-71.) S/NC only. A

56102030 Seminar in Spanish or Latin American culture. May be repeated with departmental consent. Maximum 6 hrs. A

5650-60 The Golden Age Theatre (3, 3) A

5710-20-30 Seminar in Latin American Literature (3, 3, 3) May be repeated. A

5810-20-30 Seminar in Spanish Literature (3, 3, 3) May be repeated with departmental consent. Maximum 9 hrs. A

5910 Literary Criticism: The Foundations of Romanic Studies (3-6) A

5911 Techniques in Literary Analysis (3) Required for either Plan A or Plan B of M.A. program. An intensive course in explication de texte. A

5970-80-90 Hispanic-Arabic Literature and Culture (3, 3, 3) A

5970-90-100—General culture history, philosophy, sociology, and the picaresque novel; the history of the generation of '98. A

5990-100-110—Modern and contemporary Spanish and Latin American literature. A

6000 Doctoral Research and Dissertation (3-15) E

6510-70-80 Hispano-Arabic Literature and Culture (3, 3, 3) May be repeated with departmental consent. Maximum 9 hrs. A

6550-60 The Modern Age Theatre (3, 3) A

6610 Spanish American Prose to 1900 (3) Novel, short stories. A

6611-21 Spanish American Lyric Poetry (3, 3) A

6620-30 The Modern Novel in Spanish America (3, 3) A

6631 Spanish American Essay (3) A

6632 The Spanish American Short Story (3) A

6650-60 Advanced Syntax and Stylistics (3, 3) A

6670 Problems in Romance Linguistics (3) A

6680-90-100—Modern and contemporary Spanish and Latin American literature. A

6690-100-110—Modern and contemporary Spanish and Latin American literature. A

6690-100-110—Modern and contemporary Spanish and Latin American literature. A
4120 Topics in Social Psychology (4) (Same as Psychology 4120.)

4130 Sociology of Punishment and Corrections (4) Traces development of correctional movement, develops a critical sociological perspective on contemporary correctional programs, and provides overview of evaluative research in corrections.

4150 Theory of Attitudes and Values (4) Organization, functions and measurement of attitudes and values, approaches to attitude change, and relationship to attitudes, values and behavior.

4131 Criminology (4)

4330 Urban Ecology (4) Examination of public, private, collective, and individual space. Classical school of ecology, its neoclassical revisers, social area analysis, and cognitive symbolic ecology emphasized.

4410 Educational Sociology (3) (Same as Curriculum and Instruction 4410.)

4530 Community Organization (4) Structure; function; linkages; change and development and important community studies are reviewed and discussed. Emphasis on sociological analysis, not on the implementation of change.

4540 Social and Religious Change (4) Critical review of historical and contemporary theories and methods employed in study of social change. Attention given to both macro and micro group change. (Same as Religious Studies 4540.) A

4560 Formal Organization (4) Analysis of bureaucratization process, division of labor, delegation of authority,, and communication under a system of rationality.

4820 American Minority Groups (4) Minority groups and social structure in American society; analysis of intergroup relations with attention given to both past and present relationships of selected groups to broader society.

4930 Social Movements (4) Development, organization, and functions of social movements; attention is given to the ideology, leadership and organization of political, religious and other types of social movements.

4940 Sociology of Religion (4) Interrelationship of society, culture, and religion. (Same as Religious Studies 4940.) A

4960 Tradition, Change and Modernity in Asia (4) (Same as Religious Studies 4960.)

5000 Thesis (1-15) E

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

5010 Professional Seminar (1) Limited to sociology graduate teaching assistants or graduate assistants. May be repeated. Maximum 4 hrs. S/NC only. W, Sp

5040 Methodological Issues in Social Research (4)

5050 Seminar in Political Sociology (3) Political systems from societal, organizational, and group perspectives.

5060-70 Special Social Investigation (3, 3) Directed research projects. E

5125 Seminar in Environmental Sociology (4)

5200 Seminar in Collective Behavior and Social Movements (3)

5210 Social Theory (3) F

5220 Social Control (3)

5230 Seminar in Sociology of Medicine (3)

5251 Historical Demography (3) Family reconstitution, aggregate analysis, strategies for examining documents, valuable information on population. Research findings on historical patterns of change in fertility, mortality, migration and different types of family structure.

5310 Seminar in Methods of Sociological Research (3) Major methodological issues in sociology; scaling techniques; reliability, validity, sampling, and qualitative methods.

5320-30 Social Statistics (3, 3) General survey of parametric and nonparametric procedures in analysis of sociological data; assumptions underlying procedures; advantages, disadvantages, and special applications. Must be taken in sequence. F, W

5420-30 Social Theory (3, 3) W, Sp

5520 Crime, Law, and Social Control (3)

5530 Seminar in Community (3)

5550 Seminar on Community Power (3) Analysis of theories and methods used in studying social power in communities.

5560-70 Field Research in Deviance (3, 3)

5580 Sociology of Mental Disorders (3) Relationship between formal sociological models and substantive theories of mental illness. Historical development, definition, measurement, and empirical implications of the sociological theory of mental illness. Epidemiology of mental disorders. Review of major studies.

5590 Social Differentiation and Stratification (3) Various sources of differentiation in society, their relation to conflict in society, and their relationship to social structure.

5610 Seminar in Occupations (3) Occupations and their relation to individual and society; technology and occupations; unequal rewards and occupations; social organization and occupations.

5620 Seminar in Occupations (3) Continuation from material in Sociology 5610; interface between occupations and settings in which they are performed.

5630 Seminar in Occupations (3) Research participation, directed projects on subjects developed in Sociology 5620. Prereq: 5610 or 5620.

5640 Theories of Social Psychology (3) Current and classical historical perspective in social psychology. May be used for credit in psychology.

5700 Social Organization (3) Structure and function of human groups, with special attention to voluntary associations and administrative organizations.

5720 Small Group Theory and Research (3) Critical assessment, through reading and actual research, of contemporary theoretical orientations to study of small groups. Research designed to test selected theoretical problems. May be repeated.

5730 Seminar in Research Problems in Inter-group Relations (3) Research techniques and problems as encountered in race and intergroup relations are explored, actual field research projects are performed.

5810 Seminar in Race and Culture (3) Critical examination of theoretical and conceptual approaches in study of intergroup relations.

5910 Urban and Regional Sociology (3)

5920 Seminar in Social Attitudes (3)

5940 Delinquency and the Social Structure (3) Critical examination of contemporary theories of delinquency, research findings related to them, and their implications for formal strategies of control and rehabilitation.

5960 Demographic Techniques (3) Life, table, standard rates, and survey techniques of population analysis.

5970 The Sociology of Development and Modernization (3) Comparative approach to institutional and organizational correlates of modernization. Relations between urbanization, industrialization, and modernization.

6000 Doctoral Research and Dissertation (3-15) E

6040 Experimental Research (3)

6050 Seminar on Methods of Social Research (3) Experimental research projects. (Same as Psychology 6050.)

6070 Field Research (3)

6080 Reading in Social Psychology (3) Directed
600-100 Survey Design and Analysis (3, 3) Application of general methodological principles to particular operating context of survey. Systematic exploration of survey problems through student participation in design and analysis of survey (2 qtrs).

6130 Seminar in Mass Behavior and Related Topics (3)

6140 Advanced Readings in Sociological Theory (4) S/N only. E

6150 Advanced Readings in Sociological Methods (4) S/N only. E

6160 Advanced Special Social Investigation (4) E

6170 Cross-cultural Aspects of Human Fertility (3) Historical, topical, regional, and methodological approaches to human fertility and demographic problems. Consideration of relations obtained between socioeconomic and demographic change in various parts of world; fertility rates and national power, controversies on control of vital rates of growth.

6180 Theory and Method of Human Ecology (3) Theoretical perspective and research techniques of human ecology applied to selected research sites.

6190 Advanced Special Social Investigation (4) E

6200 Topics in Socialization (3) Process to learn concepts of general methodological principles of societal behavior of society. Examination of main currents in socialization theory and research. May be repeated with different instructors. Maximum 6 hrs.

6240 Theory and Research in Human Migration (3)

6510 Advanced Issues in Criminological Theory (3) Emphasis on problems related to theory construction and measurement.

6520 Sociology of Deviance (3) Advanced studies in deviant behavior. Theories and findings regarding cause and procedures and programs for social control. Prereq: 4310 and 5520.

6530 Sociology of Law (3) Analysis of social and cultural factors influencing emergence and maintenance of law as social institution and affecting relations between law and deviant behavior; appraisal of theoretical and methodological issues encountered in studying law. A

6540 Readings in Criminology and Deviance (3) Directed readings and selected topics on criminology and deviance.

6550 Advanced Studies in Community (3) Analysis of theories of community, theories of community change, and techniques used in community research.

6610 Seminar in Formal Organization (3) Major formal organizational theories: bureaucratic; functions of theoretical models of organizations; major organizational variables; organizational authority patterns; communication in formal organizations. Prereq: 3610-20.

6620 Seminar in Formal Organization (3) Organizations, organizational change and effect of technology; social consequences of automation; unionization and organization; organizations and community interrelatedness. Prereq: Consent of instructor.

6630 Seminar in Formal Organization (3) Comparative organizational analysis; case studies, selected readings; Personality and organization. Prereq: Consent of instructor.

6710 Seminar in Class and Status (3) Classic and recent studies of class and status. Methods used in research and current position of theory.

6810 Advanced Studies in Social Psychology (3) Social interaction and personality; genesis and functioning of self; interplay of social structures and individual actions; theories of social psychology related to these problems and recent research are discussed. May be repeated. Prereq: 3130 or 5640 or Psychology 5560.

6840-50 Social Change (3, 3) Major theories, methods, and research.

6940 Advanced Studies in Urban Sociology (3) Field work projects and community studies and employed in specific areas. Prereq: 3410-20.

6950 Seminar in Population Theory (3) Malthus, Marx, optimum population, and selected variables. A

Spanish
See Romance Languages

Speech and Hearing Sciences
See Audiology and Speech Pathology

Speech and Theatre

MAJOR

DEGREE

Speech and Theatre

M.A.

M.F.A.

Professors:

R. G. Allen, D.F.A.; T. E. Cote, Ph.D.

Florida State; R. M. Colton; J. F. Fields (Emeritus); M. A. Ohio State; N. W. Hanawalt; Ph.D.

Pittsburgh; P. L. Soper (Emeritus) Ph.D.

Cornell; G. A. Yeomans, Ph.D. Louisiana State.

Associate Professors:

J. F. Buckley, Ph.D. Northwestern;

N. C. Cook, M.A. Alabama; R. C. Field, M.A.

Miami (Ohio); R. W. Glenn, Ph.D. Northwestern;

J. A. Harris, Ed.D. Tennessee; D. J. Julian, Ph.D.

Tennessee; W. L. Lester (Head),

Ed.D. Tennessee; R. R. Mashburn, M.A.

Tennessee.

Assistant Professors:

R. S. Ambler, Ph.D. Ohio State; M. L. Ambrester,

Ph.D. Ohio (Athens); M. Custer, M.F.A.

Wisconsin; B. V. Daniels, Ph.D. Cornell;

J. DeCour, M.F.A. Tulane, M. E. Hampton,

Ph.D. International College (Los Angeles);

D. K. Sorensen, Ph.D. Louisiana State.

The Department of Speech and Theatre offers the Master of Arts degree in Speech and Theatre with area concentrations in speech communication and theatre and the Master of Fine Arts in Theatre with area concentrations in acting and directing, playwriting and design and technical theatre.

In their prospective concentrations at the Master's level, i.e., speech or theatre, applicants must have completed undergraduate degrees approximately equivalent in requirements to those specified for degrees conferred by The University of Tennessee, Knoxville.

The Graduate Record Examination is required of all applicants. All M.F.A. applicants must submit two letters of recommendation. Auditions before appropriate faculty are required of M.F.A. acting/directing applicants. Applicants for admission to the M.F.A. design/technical theatre and playwriting programs must submit samples of their work.

For detailed information about the graduate program, contact the Director of Graduate Studies, Department of Speech and Theatre.

MASTERS OF ARTS DEGREE CURRICULUM

The departmental requirement for the M.A. degree in Speech and Theatre is 45 quarter hours (inclusive of hours taken toward a minor), at least 23 hours of which must be earned in courses numbered 5000 or above. Only 9 hours of thesis credit (Speech and Theatre 5000) may be included in the 45-hour minimum for the degree. Speech and Theatre 5110 is required of all M.A. students. Area concentration requirements are as follows:

Speech Communication:

(1) Enrollment in Speech 4999 during each quarter of full-time graduate study.

(2) 12 hours in rhetorical and communication theory.

(3) 9 hours in public and interpersonal communication.

(4) 3 hours (not inclusive of Speech and Theatre 5110 and Speech 4999) in methods and materials in speech communication.

Theatre:

(1) 15 hours in theatrical history and criticism.

(2) At least 9 hours (and no more than 12 hours) in performance and production courses may be included in the 45-hour minimum for the degree.

(3) No more than 6 hours in projects courses.

MASTER OF FINE ARTS DEGREE CURRICULUM

At least 60 quarter hours, 30 of which must be at the 5000 level or above, are required for the Master of Fine Arts degree in Theatre. A number of hours each student will carry per quarter will vary with the student's concentration. The distribution of courses within the department may necessitate some students' accumulating more than 80 hours in order to earn the degree, but no student should require more than two years to finish the program. Ten to twelve hours of theatre history during the first year of residence are mandatory for all students unless appropriate undergraduate course work is evidenced. Theatre 5011-12-13 is required of all except acting students. Students will be admitted to the directing concentration only by petition after the first year of the acting/directing program is completed.

Speech

4222 Advanced Argumentation and Debate (4) Prereq: 2931 or consent of instructor.

4461 Quantitative Research Methods in Speech Communication (4) Designing experiments; planning field studies; using statistical analysis.

4951 Rhetorical Theory and Criticism (4) Survey of Western rhetorical theory, contemporary approaches to criticism of public address. Recommended: 1211.

4560 Rhetoric of the Women's Rights Movement (4) Historical and critical study of public addresses in campaign for women's rights from the 1830s to present. F

4571 British Oratory (4) Historical and critical study of British public address. Sp, A

4591 Persuasive Uses of Imaginative Literature (4) Topics in social and political uses of novels, plays, and poems. W

4811 Advanced Phonetics (4) Phonetic aspects of contemporary dialects of the English language. Prereq: Consent of instructor. Sp, A

4930 Studies in American Public Address (4) May be repeated. Maximum 12 hrs.

4999 Colloquium in Speech Communication (1) May be repeated. E

5140 Communications Theory (3) Analysis of contemporary theoretical and methodological communication, emphasizing similarities and differences of communication processes in interpersonal, organizational, and mass communications systems. F

5210 Topics in Group and Interpersonal Communication (3) May be repeated. Maximum 9 hrs. Sp
5220 Quantitative Projects in Speech Communications (3) May be repeated. Maximum 9 hrs. F
5440 Organizational Communication (3) May be repeated. Maximum 9 hrs. F
5550-60-70 Studies in Persuasion (3, 3, 3) W
5750-60-70 Studies in Rhetoric (3, 3, 3) F
5911 Directing the Forensic Program (4) Philosophy and methods of directing cocurricular and extracurricular forensics activities in high schools and colleges: competitive and noncompetitive approaches to directing debate, oral interpretation and public speaking events. (Same as Curriculum and Instruction 5911). Sp

Speech and Theatre
4170-60-90 Film History and Theory (3, 3, 3) Analysis of cinematic forms and styles. 4170—Narration. 4180—Exposition and persuasion. 4190—Experimental forms; films and other media.
4640 Group Performances of Literature (4) Oral interpretation of selected techniques of choral reading, readers theatre and chamber drama. F, W
5000 Thesis (1-15) E
5002 Non-Thesis Graduation Completion (3-15) Required for the non-thesis student not otherwise registered during the quarter when such a student uses university facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. SINC only. E
5110 Introduction to Graduate Research in Speech and Theatre (3) F
5120 Directed Reading and Research (3) May be repeated. Maximum 9 hrs. E
5160 Theory and Technique in Oral Interpretation (4) Literary, psychological, communicative, and aesthetic approaches to interpretation, adaptation, and oral presentation of literature. May be repeated. Maximum 8 hrs. W, Sp

Theatre
3121-22 Advanced Acting (4, 4) Historical styles of acting. 3121—Renaissance. 3122—Seventeenth and eighteenth centuries. Prereq: Consent of instructor.
3151 Theatre Practicum: Performance (1-4) Supervised work on departmental productions. Available for credit only to theatre majors or with consent of department. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E
3152 Theatre Practicum: Production (1-4) Supervised work on departmental productions. Available for credit only to theatre majors or with consent of department. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. E
3153 Summer Repertory Productions (4) Supervised work on summer repertory productions. Available only to members of summer company by consent of instructor. Su
3214-15 Technical Theatre (4, 4) Special techniques in scenery and property construction; stage management; problems in basic technical theatre practice. Prereq: 2211-21, or consent of instructor. Must be taken in sequence. Prereq: 3211-22 and consent of instructor. Must be taken in sequence. F, W
3451-52 Play Directing (4, 4) Problems of play interpretation; directing period plays, preparation of a play for public performance. Prereq: 3451-52 and consent of instructor. Must be taken in sequence. F, W
3451-52 Advanced Theatre Costume Design (4, 4) Advanced problems in costume design and construction; pattern drafting; draping. Prereq: 3511 or 3512. Sp
3751-52 Dramatic Theory and Criticism (3, 3) 3751—Theatre aesthetics. 3752—Dramatic theory. W, Sp
4951-52 Playwriting (4, 4) Prereq: Consent of instructor. F, W
5011-12-13 Projects in Lieu of Thesis (3, 3, 3) Available to Theatre majors only. F
5250 Seminar in Playwriting (3) Sp
5310 Studies in European Theatre History (3) May be repeated. Maximum 9 hrs. F, W
5320 Studies in American Theatre History (3) May be repeated. Maximum 9 hrs. F, W
5620 Projects in Lighting Design (3) May be repeated. Maximum 9 hrs. E
5630 Projects in Play Directing (3) May be repeated. Maximum 9 hrs. E
5640 Projects in Scene Design (3) May be repeated. Maximum 9 hrs. E
5650 Projects in Costume Design (3) Problems of play interpretation and theatrical costume design. Prereq: 2211-21, or consent of instructor. Must be taken in sequence. Prereq: 3211-22 and consent of instructor. W
5670-71-72-73-74-75 Master Class In Acting (5, 5, 5, 5, 5, 5) Available to Theatre M.F.A. students only.
5860-81-82 Design and Technical Theatre Seminar (1-6, 1-6, 1-6) Available to Theatre M.F.A. students only. May be repeated. Maximum 6 hrs.

5890 Studies in Theatrical Production (3) May be repeated. Maximum 9 hrs. Sp
5912 Play Production in Secondary Schools (4) Principles and methods for directing high school dramatic programs. (Same as Curriculum and Instruction 5912). Su
5950-50-70 Studies in Dramatic Theory and Criticism (3, 3, 3) F, W; Sp

Speech Pathology
See Audiology and Speech Pathology

University Studies
(Non-Departmental)

University Studies deal with important contemporary topics which are sufficiently comprehensive to require the study and attention of students and faculty from more than one college. They are open to all qualified members of the university community.

4100 Energy Needs and Our Environment (3) Problems of present and projected energy resources and demands; economic, behavioral, legal and environmental opportunities and constraints; regional impacts of energy production and consumption. Topical focus will change from quarter to quarter. May be repeated. Must be taken in sequence. May not be taken for graduate credit by Ecology majors.

Zoology

MAJOR In Zoology

DEGREES M.S., Ph.D.

Professors:
J. H. Abel (Head), Ph.D. Brown; R. M. Bagby, Ph.D. Illinois; D. L. Bunting, Ph.D. Oklahoma State; J. G. Carlson* (Emeritus), Ph.D. Pennsylvania; A. C. Cole, Jr. (Emeritus), Ph.D. Ohio; J. C. Daniel, Jr., Ph.D. Colorado; D. A. Ethington, Ph.D. Minnesota; R. C. Fraser, Ph.D. Minnesota; B. Hochman, Ph.D. California (Berkeley); J. C. Howell (Emeritus), Ph.D. Cornell; K. W. Jeon, Ph.D. London (England); A. W. Jones (Emeritus), Ph.D. Iowa; J. N. Liles, Ph.D. D. R. Kennedy, Ph.D. Iowa; J. N. Liles, Ph.D. Iowa; J. L. Roth, Ph.D. Chicago; C. A. Shivers, Ph.D. Michigan State; J. T. Tanner (Emeritus), Ph.D. Cornell, S. J. Tipton (Emeritus), Ph.D. Duke; G. Welsh, Ph.D. Florida; G. L. Whiston, Ph.D. Iowa.

Associate Professors:
J. R. Buncham, Ph.D. Iowa; A. C. Echternach, Ph.D. Kansas; A. A. E. Binnis, Ph.D. Washington State; D. J. Fox, Ph.D. Johns Hopkins; M. A. Handel, Ph.D. Kansas State; A. M. Jungreis, Ph.D. Minnesota; J. A. MacCabe, Ph.D. California (Davis); M. L. Pan, Ph.D. Pennsylvania; S. E. Riechert, Ph.D. Wisconsin; G. A. Vaughan, Ph.D. Duke; M. W. White, Ph.D. Indiana.

Assistant Professors:
T. T. Chen, Ph.D. Florida; L. D. Etkin, Ph.D. Indiana; N. Greenberg, Ph.D. Pennsylvania; G. F. McCracken, Ph.D. Cornell.

The Department of Zoology offers the Master of Science and Doctor of Philosophy degrees with concentrations in aquatic biology and ecology, cell biology and radiation biology, physiology, genetics, and evolutionary and developmental biology.

Requirements for admission: Applicants for graduate study are expected to have a background no less extensive than that required of undergraduate majors in this department. This includes a knowledge of the basic principles of cell biology, genetics, and
ecology. Other requirements for admission are: (1) general zoology or general biology, 12 quarter or 8 semester hours; (2) upper division zoology, 18 quarter or 12 semester hours; (3) chemistry, two years including 12 quarter or 8 semester hours of general inorganic; (4) mathematics, 9 quarter or 6 semester hours including differential and integral calculus; (5) physics, 12 quarter or 8 semester hours; (6) Graduate Record Examination scores (Verbal, Quantitative and Advanced Biology); and (7) a grade point average of 3.0 out of a possible 4.0. Otherwise superior students, deficient in one or more of the above requirements, may be admitted at the discretion of the Graduate Affairs Committee.

A course in biostatistics is required of all students.

All aspirants for advanced degrees in Zoology must exhibit competency in six areas of zoology as determined by a qualifying examination. Students must take this examination during the fall quarter of the first year and may repeat this examination the following fall quarter if unsatisfactory scores are received. Competency must be exhibited within this two-year period for a student to continue in the program.

Preparation for thesis or dissertation: During the first year a written examination and a special research problem in each of two faculty members' laboratories will determine the student's preparation for thesis or dissertation study.

THE DOCTORAL PROGRAM

Special requirements in Zoology are as follows: (1) course requirements shall be determined by the candidate's faculty committee; (2) the comprehensive examination will be an oral and written examination in zoology and in allied fields in which the candidate has had training; (3) the candidate for the Ph.D. degree must possess a reading knowledge of at least one foreign language in which there exists a sizeable amount of literature relevant to the major field of study. The student has the option of demonstrating a reading knowledge of this foreign language by (a) passing the official reading exam given by the language department or (b) earning at least a B in 3030 language courses. This requirement for the first language must be fulfilled before the student can take the comprehensive examination.

The student's faculty committee may require the student any level of training or proficiency in a second foreign language but may not require that the student take the official language examination in the second language.

3050 Comparative Vertebrate Embryology (5) Developmental morphology of selected vertebrates. 2 hrs and 3 labs. F, Sp

3060 Comparative Vertebrate Anatomy (5) Physiology and anatomy of organ systems. Dogfish, shark and cat primarily used in laboratory. 3 hrs and 2 labs.


3110 General Entomology (5) Introduction to insects; basic structure, development, behavior; classification of insect orders and representative families; interpretation and use of keys. Prereq: Biology 3130 or consent of instructor. 3 hrs and 2 labs. F

3150 Invertebrate Zoology (5) Biology of invertebrates, emphasizing functional, evolutionary, and behavior. Prereq: Biology 3130, 3 hrs and 2 labs. W

3220 Physiology of Reproduction (3) (Same as Animal Science 3220), F, Sp

3230 History (4) Study of animal tissues. Prereq: Biology 3120. 2 hrs and 2 labs. F, Sp

3410 Biostats (3) Relationship between biological discoveries and human values. Open discussion of selected dilemmas arising from new knowledge about medicine, behavior, resources, and technology. Sp

4007, 4100-4107 Minicourse in Zoology (2 hrs each) Selected, advanced topics in zoology, concentrated in time and subject matter. Consult departmental listing for actual topics offered. Prereq: As posted. May be repeated. E

4050 Developmental Biology (4) Experimental morphology, fertilization, cellular interactions, hormonal effects and related topics with examples drawn primarily from invertebrates and vertebrates. Prereq: 3050, 2 hrs and 3 labs. F

4120 Undergraduate Research Participation (2) Experience in active research projects under supervision of staff members. Prereq: Consent of instructor. E

4140 Practicum in Zoology (1-3) Participation in practical application of zoology in community institutions, government organizations and industry. Approximately 5 hrs involvement per week. Prereq: Biology 3110, 3120, 3130 and senior standing. F, W, Sp

4190 Mammalogy (4) Classification, evolution, distribution, reproduction, populations, and behavior. 2 hrs and 2 lab or field periods. F

4200 Ichthyology (5) Classification, collection and identification, distribution, life histories, and economic importance of fishes. Prereq: Biology 3130 or consent of instructor. 2 hrs and 2 lab or field periods. F

4210 Cell Physiology (5) Development of modern concepts in cell physiology from point of view of information and control which examines kinetics and integration of cellular activities. Prereq: Cell biology, or any physiology, and organic chemistry. Recommended prereq: Biochemistry, 3 hrs and 1 lab. Sp

4240 Animal Ecology (4) Environmental factors determining distribution and numbers of animals in trispecific relations; problems and methods. Prereq: Biology 3130, 2 hrs and 2 labs. F

4250 Comparative Animal Physiology I (3) Environmental physiology. Survey of physiological mechanisms which enable animals to survive in diverse physical environments. Prereq: Biology 3120-30 and 2 yrs chemistry. W

4259 Comparative Animal Physiology Laboratory I (1 Coreq: 4250. W

4260 Comparative Animal Physiology II (3) Sensory, effect or and integrative physiology. Prereq: 3060. Sp

4269 Comparative Animal Physiology Laboratory II (1) Coreq: 4260. Sp

4270 Immunology (3) (Same as Microbiology 4270).

4280 Comparative Endocrinology (5) Comparative analysis of the physiology and morphology of endocrine glands in vertebrates and invertebrates. Their role and interaction in maintenance of the organism and species. Prereq: 3060 or equivalent. W

4290 Herpetology (4) Classification, distribution, life histories, coloration and identification of amphibians and reptiles, primarily of local species. 2 hrs and 2 labs or field periods. Sp

4300 Ornithology (4) Morphology, physiology, behavior, reproduction, populations, evolution, field identification, 2 hrs and 2 labs or field periods.

4320 Microtechnique (4) Prereq: 3320 recommended. 2 hrs and 2 labs.

4330 General Cytology (4) Study of cellular organization at the light and electron microscope levels and their functioning of these organisms. Prereq: Biology 3120. Sp

4359 General Genetic Laboratory (2) Mainly Drosophila experiments designed to illustrate basic principles of inheritance. Prereq: Biology 3110. W

4380 Organic Evolution (3) Modern concepts of animal evolution. Prereq: Biology 3110. F

4390 Human Genetics (3) Principles and problems of inheritance in humans. Prereq: Biology 2110.

4410 General Parasitology (4) Morphology, taxonomy and ecology of parasitic worms and protozoa, with emphasis on host-parasite relationships. 3 hrs and 1 lab. Prereq: Biology 3130 or consent of instructor.

4430 Medical Entomology (4) Distinctive morphological features, life histories, and control of arthropods that parasitize human or serve as vectors of human pathogens. Recommended prerequisite: Entomology and Plant Pathology 3210 or Biology 3130.

4450 Protozoology (4) Morphology, taxonomy, and physiology of protozoa in relation to fundamental biological concepts. 2 hrs and 2 labs. Recommended prerequisite: Biology 3120.

4660 Introduction to Aquatic Ecology (4) Physio-chemical nature of inland waters. Biotic communities are described, interrelationships explored. Prereq: Chemistry 1110-20-30, Biology 3130. 2 hrs and 2 labs. F

4700 Arachnology (4) Biology of spiders, mites, scorpions, and relatives. Prereq: 3110, or 3150. 2 hrs and 2 labs.

4720 Comparative Animal Behavior (4) Methods and principles. (Same as Psychology 4720).

4729 Comparative Animal Behavior Laboratory (4) Laboratory and field studies. Coreq: 4720. (Same as Psychology 4725).

4810-20-30 Insect Morphology and Taxonomy (4, 4, 4) 4810—Internal morphology of both generalized and specialized forms. 4820—Taxonomy of major orders. 4830—Taxonomy of minor orders and immature forms. Prereq for 4820-30: 3110 or consent of instructor. 2 hrs and 2 labs. F, Sp; A

4940 Physiology of Exercise (4) Functions of body in muscular work; physiological aspects of fatigue, training, and physical fitness. Prereq: 2920-30 or 3060. 3 hrs and 1 lab. F, Sp

5000 Thesis (1-15) E

5017 Colloquium in Ethology (1) (Same as Psychology 5017)

5075 Zooplankton Ecology (4) Secondary productivity in aquatic systems. Prereq: 4660 or equivalent. Su

5680 Graduate Research Participation (3) Advanced research techniques studied under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students in good standing. Prereq: Consent of department and research director. May be repeated with consent of department. S/N only. E

5110-20-30 Special Problems (2, 2, 2) E

5150 Zoological Bibliography (1) Methods of locating and using zoological literature, bibliographies, and abstracts, and of preparing bibliographies and scientific papers.

5180 Fresh Water Invertebrate Zoology (4) Ecology and taxonomy of fresh water invertebrates exclusive of insects. Laboratory and field study. Prereq: 3150.

5210 Plant Parasitic Nematodes (4) (Same as Entomology and Plant Pathology 5210).


5270 Advanced Neurophysiology (5) Cellular and molecular aspects of phenomena as
sociated with conduction of excitation and muscu-
lar contraction. Prereq: 4250. 3 hrs and 2 labs.

5280 Insect Physiology (4) Functions and interre-
lations of systems relative to metabolism, growth,
coordination, movement, and reproduction. Prereq:
4810, 1 yr general chemistry or consent of instructor.
2 hrs and 2 labs. W, A

5290 Quaternary Problems (4) (Same as Geology
5290 and Botany 5290.)

5310-20 Seminar in the Teaching of College Zo-
ology (2, 2) Current concepts and principles in teach-
ing of zoology; modern techniques and instrumen-
tation; supervised application of teaching principles
and methods. Must be taken in sequence. Prereq:
Consent of instructor. S/JNC only.

5320 Biometry (3) Statistical methods used in
analysis of quantitative biological data. Prereq: 1 qtr
statistics or consent of instructor. F

5360 Isotopic Methods and Techniques: Lecture
(2) Theory of isotopic decay, measurement of
isotopic decay by liquid scintillation counting, and
double isotope counting; applications using Cerenkov
radiation, radioimmunossay, synthesis of metabolic
intermediates, experimental design and data analysis.
Coreq: 5389. Prereq: Upper division laboratory course in either physiology, biochemistry, microbiology, or consent of in-
tuctor. F

5389 Isotopic Methods and Techniques: Labora-
tory (4) Use of liquid scintillation counter, optimi-
ization of counting parameters for single and double
isotope counting, quenching and correction, mea-
urement of Cerenkov radiation, procedures for meas-
uring blood volume, soluble uptake into cells, radio-
immunossay of steroid hormones, hormone synthesis,
synthesis of metabolic intermediates and other top-
ics. Coreq: 5380. Prereq: Graduate standing and
one upper division laboratory course in either biochemistry, physiology, microbiology or consent of instructor. Chemistry 3810 highly rec-
ommended. F

5410 Advanced Parasitology (4) Life cycles, tech-
niques of collection, preservation, and identification of parasitic worms and protozoa. Prereq: Consent of in-
tuctor.

5430 Advanced Medical Entomology (3) Prereq:
4430.

5510-20 Advanced Animal Physiology (5, 5) Primar-
ily mammalian physiology; 5510—membrane neuron, central nervous system, muscle, cardiovascular
system, and control mechanisms; 5520—respiratory, renal, gastrointestinal, and reproductive
physiology, acid-base mechanisms, and metabolism. Should be taken in sequence if both courses are taken. Prereq: General undergraduate
anatomy and physiology and Biochemistry 4110 or equivalent or consent of instructor. Biochemistry 4120 also recommended. (Same as Animal Science
5510-20.) 4 hrs and 1 lab. W, A

5550 Advanced Ornithology (4) Classification, dis-
tribution, and anatomy of birds. Prereq: 4300.

5570 Animal Populations (3) Characteristics and
methods of study of animal populations.

5610-20 Foundations of Radiation Biology (4, 4)
Physical, chemical, and biological mechanisms in-
volved in actions of different kinds of radiations on
living cell and its components. Recommended pre-
req: 1 yr biological science, general physics; biochemistry, calculus. (Same as Radiation Biology
5610-20.) 3 hrs and 1 lab.

5630 Methods of Experimentation with Laboratory
Mammals (3) Designed to give competence in han-
dling research mammals. Techniques of anesthesia,
drug administration, radiography and surgery. Pre-
req: 4550, or 4410, or consent of instructor.

5660 Physiology of Development (3) Chemical as-
pects of growth, morphogenesis, and cyto-
differentiation. Recommended prereq: Biochem-
istry 4110-20. F

5670 Cellular Immunology (4) Laboratory course with emphasis on immunological phenomena at ce-

cular level. Preparation and use of immunofluores-
cent reagents, macrophage migration inhibition,
skin allograft reactions, diffusion chamber cultures,
The major campus of the College of Medicine is located in Memphis, Tennessee. The College, however, is a statewide organization with other units in Chattanooga, Jackson, and Knoxville.

In addition to Department of Medical Biology faculty listed here, the Knoxville Unit has other College of Medicine faculty and students in undergraduate and graduate medical education.

The College of Medicine traces its origin to the establishment of the Medical Department of the University of Nashville in 1851. Later, through a merger of four medical schools, it became The University of Tennessee College of Medicine and moved to Memphis in 1911.

Department of Medical Biology/Memorial Research Center

Professors:
R. D. Lange (Chairperson and Director), M.D. Washington; C. C. Congdon (Vice Chairperson and Associate Director), M.D. Michigan; W. H. Parkas, Ph.D. Duke; S. Krauss, M.D. Pennsylvania; B. B. Lozzio, M.D. Buenos Aires (Argentina); C. B. Lozzio, M.D. Buenos Aires (Argentina); T. P. McDonald, Ph.D. Tennessee; A. Solomon, M.D. Duke; P. W. Wigler, Ph.D. California (Berkeley).

Associate Professors:

Assistant Professors:
E. W. Fuson, Ph.D. Tennessee; W. T. Hanna, M.D. Ain-Shams (Egypt); A. T. Ichiiki, Ph.D. California (Los Angeles); K. D. Lin, M.D. National Taiwan (Taiwan); F. J. Miller, A.B. Alabama.

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

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

Courses
4210 Introduction to the Study of Cancer (3) Lectures, classroom discussion, and case reports surveying the major topics of oncology. Prereq: Biology 3110-20 or consent of instructor.
4310 Introduction to Hematology (4) Pathophysiology of blood and blood forming systems. Lectures, class discussions and demonstrations. Prereq: Upper division biology background to include histology and/or general anatomy.
4430 Clinical Genetics (3) Human genetic disorders, case presentations. Prereq: General biology and general genetics background or consent of instructor.
5080 Graduate Research Participation (3) Advanced research techniques studied while conducting individual biomedical research projects under supervision of faculty. Prereq: Consent of instructor. Open to fall graduate students. May be repeated with consent. Maximum 9 hrs. S/NC only.
5220 Special Topics in Cancer (1-3) Special topics in oncology. Prereq: 4210 and consent of instructor. May be repeated. Maximum 9 hrs.
5320 Special Topics in Hematology (1-3) Special topics in clinical hematology. Prereq: 4310 and consent of instructor. May be repeated. Maximum 9 hrs.
5410 Molecular Basis for Metabolic Disease (5) Metabolic disorders of humans and animals. Emphasis on molecular mechanisms in inborn errors of metabolism, toxic reactions, and deficiency states. Clinical and pathologic correlations. Prereq: Biochemistry 4110-20 or equivalent.
5420 Special Topics in Metabolic Disease (1-3) Biochemical and physiological basis of selected diseases of humans and animals. Clinical-pathological correlations. Prereq: 5410 and consent of instructor. May be repeated. Maximum 9 hrs.
5430 Metabolism of Drugs (2) Drug mechanisms of action: membrane transport, enzyme reactions, drug receptors, ionization, structure and metabolic pathways. For students interested in biochemical pharmacology. Prereq: Biochemistry 4110-20.
The College of Nursing offers a five-quarter program of study leading to the Master of Science in Nursing degree. The general purpose of the program is to prepare at the graduate level nurses who are qualified to function as practitioners, clinicians, educators, and administrators in all segments of the health care delivery system.

Upon successful completion of the program, graduates will be able to:
1. Provide advanced high quality, comprehensive nursing care to individuals and groups in a variety of settings;
2. Collaborate with other health professionals in systematic implementation and evaluation of health care delivery to large groups in agency and community settings;
3. Utilize appropriate advanced teaching, administrative and clinical practice skills in the discharge of one's professional responsibilities;
4. Utilize appropriate research findings in the implementation and evaluation of nursing care;
5. Participate in clinical research activities by means of data collection, tabulation, and analysis, and by generating research topics for referral to nurse researchers.

GENERAL REQUIREMENTS FOR ADMISSION
1. Meet requirements for admission to the Graduate School.
2. Hold a Bachelor's degree in Nursing. If the Bachelor's degree is not in Nursing, the applicant must demonstrate successful completion of the equivalent of an upper division major in Nursing.
3. If the number of qualified applicants exceeds the number that can be accommodated, preference will be given to applicants:
   a. whose undergraduate GPA is 3.0 or higher;
   b. who have had at least two years of full-time clinical practice experience following completion of a baccalaureate nursing program;
   c. who are Tennessee residents;
   d. who are currently employed in underserved health service areas and who can demonstrate their commitment to return to those areas following completion of the program;
   e. who are currently employed as nurse educators in programs preparing registered nurses;
   f. who are currently employed as directors of nursing service.
4. Ordinarily one year of full-time clinical practice experience should be completed prior to applying for admission to the program.

DEGREE REQUIREMENTS
1. Students must complete 60 quarter hours of graduate level course work with a cumulative GPA of 3.0 or better.
2. The 60 credit hours must include the following components:
   - Core requirement: 23 hrs
   - Clinical concentration option: 20 hrs
   - Functional concentration option: 11 hrs
   - Electives: 6 hrs.
   Total: 60 hrs
3. A Master's thesis is not required, but those students who wish to complete a thesis as a part of their program may substitute the thesis for the 9 elective hours.
4. Those students who do not choose the thesis option must successfully complete a comprehensive final examination.
5. Students may choose either primary care nursing, secondary/tertiary care nursing or community mental health nursing as their clinical concentration option. Students selecting the primary care nursing option must complete 5450, 5460, 5550. Students selecting the secondary/tertiary care nursing option must complete 5120-30 (or 5140-50) and 5310. Students selecting the community health nursing option must complete 5410, 5480, 5490, 5500 and 5510.
6. The core requirement that must be completed by all students regardless of clinical option includes the following courses: 5010, 5020, 5030, 5070, 5210, 5680 and a graduate level statistics course that must be approved in advance by the student's faculty advisor.
7. Students may select a functional concentration option in teaching, management or advanced clinical practice. Students selecting the teaching option must complete 6 hours of graduate level courses in education and 5630. Students selecting the management option must complete 6 hours of graduate level courses in administration and 5730. Students selecting the advanced clinical practice functional option must complete 5560 and 5660 if their clinical option is primary care, 5320 and 5340 if their clinical option is secondary care or 5520 and 5540 if their clinical option is community mental health. All courses taken in other colleges must be approved in advance by the student's faculty advisor.

REQUIREMENTS FOR SECOND MASTER'S DEGREE
1. Students must complete 60 hours at the graduate level (with a cumulative GPA of 3.0) unless they already have Master's or doctoral degrees. For the latter up to 15 hours may be applied to the second Master's degree, with approval of the student's committee, Dean of the College, Dean for Graduate Studies and/or Vice Chancellor for Graduate Studies and Research. Any hours so applied would be from courses in the first degree program that are directly relevant to the second. Hours from the first program to be applied to the second shall have been earned within the time limits (six years) established for the second.
2. The 45 to 60 hours must include the following components:
4240 Nursing in Acute Care Settings (5) Theory and clinical practice related to care of hospitalized children and adults. Emphasis on those processes which, when altered, affect physiological theories and principles related to illness requirements. May be repeated. S/NC only. E

5000 Thesis (1-15) E

5500 Primary Care Nursing Field Work I (6) Clinical practicum in a community setting providing opportunities to apply mental health nursing knowledge in planned interactions with individuals and groups at primary, secondary and/or tertiary care levels. Community and mental health systems assessment. Prereq: 5680. F

5510 Community Mental Health Nursing Field Work I (6) Clinical practicum for graduate student choosing functional concentration of advanced clinical practice. Objectives identified by student with specific learning and practice needs. Prereq: 5510 and 5530. F

5540 Community Mental Health Nursing Seminar (4) Identification of issues and problems involved in delivery of community mental health nursing care; further analysis and exploration of theories and concepts included in 5520 as they affect role of nurse as secondary/tertiary clinical specialist. Coreq: 5520. Coreq: 5520. Prereq: 5530. F

5550 Primary Care Nursing Field Work II (8) Clinical practicum in a community setting providing opportunities to apply newly acquired knowledge and developing clinical skills necessary to function as a nurse practitioner. Prereq: 5500. 5240, 5260. Su

5560 Primary Care Nursing Seminar II (4) Issues and problems involved in delivery of primary nursing care. Further analysis and exploration of theories and concepts included in 5660 as they affect role of nurse as primary care provider roles. Prereq: 5560 or 5680. Coreq: 5560. F

5580 Advanced Nursing Practicum Seminar (3) Theories of leadership, motivation, power, conflict, authority, change and decision making and their application to advanced clinical nursing practice; evaluation and analysis of role of nurse as health care provider
and client—family advocate. Prereq or coreq: 5310 or 5550 or 5510.

5730 Management Strategies and Practicum (5) Analysis and application of managerial and supervisory theories and strategies; field placement in nursing service facility with supervised practice in nursing service administration. Prereq: 6 hrs approved management courses or consent of instructor. 2 hrs and 3 labs. Sp

5770 Special Topics (3) In-depth study of selected nursing topics, problems, or issues not covered in other courses. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.
Graduate School of Biomedical Sciences

W. E. Barnett, Director
R. J. Preston, Associate Director

MAJOR
Biomedical Sciences

DEGREES
M.S., Ph.D.

The University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, located within the Biology Division of Oak Ridge National Laboratory, offers programs leading to the Master of Science and Doctor of Philosophy degrees. The National Laboratory, one of three installations operated at Oak Ridge by Union Carbide Corporation for the Department of Energy, is a well-known center of basic research. The school utilizes the staff and facilities of this laboratory, and thus brings directly into the mainstream of full-time graduate study in the life sciences the talent and experience of that staff, as well as the most advanced research methods and technology.

The program of study, which incorporates a high faculty-to-student ratio, is based on intensive graduate courses supplemented by tutorial instruction, participation in a wide variety of seminars, and a heavy emphasis on communication skills, research training and independent study. The program encourages students to pursue graduate studies to the limits of their abilities.

The School is not departmentalized, and, apart from certain basic requirements, each student's curriculum is planned to meet individual needs, with the aim of giving: (1) strength in the basic sciences; (2) perception of the biomedical sciences as a whole; and (3) experience and training in a chosen specialty.

The research areas available for Master's thesis and Ph.D. dissertation work are biochemistry, biophysics, carcinogenesis, genetics, and cellular, development, and mammalian biology. Included are such subjects as immunology, protein and enzyme chemistry, nucleic acid chemistry, cytology, radiation and environmental biology, virology, developmental biology, experimental pathology, microbial and mammalian genetics, mutagenesis, and problems of aging.

ADMISSION REQUIREMENTS
A Bachelor's degree or its equivalent is required. Students with M.S., D.V.M., or M.D. degrees are also encouraged to apply. Completed applications, Graduate Record Examination scores and letters of reference should be sent to the address below. The student will need previous training in biology, calculus, physics, and organic and physical chemistry. However, a course in physical chemistry is offered by the School in order to meet this requirement. It is recommended that deficiencies in meeting entrance requirements be eliminated prior to entrance.

Requests for application forms, information on admission, financial support, and housing should be sent to:
Director, University of Tennessee-Oak Ridge Graduate School of Biomedical Sciences, Biology Division, ORNL, Box Y, Oak Ridge, Tennessee 37830.

THE DOCTORAL PROGRAM
Requirements for the Ph.D. degree are:
1. Satisfactory (B grade or better) completion of the following core courses or their equivalent: Biochemistry (5110-20); Biophysics (5140); Genetics (5160); Molecular Genetics (5170); Cell Biology (5180-90); Mammalian Physiology (5200); and Statistics for Biologists (5740).
2. Three quarters of Biomedical Sciences Laboratory (5310-20-30-40).
3. Participation in at least one of the seminars during each quarter of residence after the first year is strongly recommended.
4. Satisfactory completion of formal advanced courses in the areas of the student's interests. The number and nature of the required advanced courses will vary depending upon the student's background and area of specialization.
5. Pass both written and oral comprehensive examinations.
6. A dissertation reporting the results of original and significant scientific research. A minimum of 36 quarter hours of course 6000 is required.
7. A final oral examination on the dissertation.
8. A formal seminar presentation of the dissertation research.

SPECIAL MASTER OF SCIENCE DEGREE PROGRAM
The graduate faculty has designed a Master of Science program in Biomedical Sciences primarily to fill the need for such a degree within the Oak Ridge National Laboratories; however a limited number of students from other institutions may be accepted if qualified and as space is available.

Requirements for the M.S. degree are:
1. Graduate credit or a proficiency in the following core courses: Biochemistry (5110-20); Cell Biology (5180); Cell Biology II (5190); plus any three of the following four courses: Biophysics (5140); Genetics (5160); Molecular Genetics (5170); and Mammalian Physiology (5200). Additional credits may be obtained (6 to 15 credit hours) with electives.
2. Forty-five credit hours of approved graduate courses including a minimum of 9 quarter hours for thesis (maximum 18 quarter hours of credit for course 5000).
3. For admission to candidacy: Completion of any required prerequisite courses and one quarter of graduate course work with a B average. Admission to candidacy forms must be filed at least one full quarter prior to receipt of degree.
4. A Master's Committee of three approved faculty members upon admission to candidacy.
5. A thesis reporting results of original and significant scientific research.
6. Pass a final oral (or oral and written) examination as determined by the student's committee.

Full-Time Faculty
Associate Professor: F. H. Gaertner, Ph.D. Purdue.
Assistant Professor: N. W. Revis, Ph.D. Glasgow (Scotland).
Graduate School of Biomedical Sciences

Courses

The courses below are not necessarily taught every year.

5000 Thesis (1-15)

5070-80 Physical Chemistry (3, 3) Thermodynamics, phase equilibria; chemical equilibria, electrochemical force, surface chemistry, electrolyte solutions, kinetics, conductance, viscosity, diffusion.

5110-20 Biochemistry (3, 3) Chemistry of carbohydrates, lipids, proteins, nucleic acids, and coenzymes; enzymatic mechanisms, interactions of biological mediators and photosynthesis; biosynthesis of amino acids, purines, pyrimidines, lipids, and macromolecules. Coreq: 5070.

5140 Biophysics (3) Energy levels and excited states of large molecules; optical instrumentation; adaptations to system perturbations; properties of macromolecular solutions; light scattering; inter- and intramolecular forces; physical principles of microscopy. Coreq: 5070-80.

5150 General Genetics (3) Mendelian genetics, mitosis, and meiosis. Transmission genetics, mapping, and linkage.


5170 Molecular Genetics (3) Molecular biology of genetic processes. Gene regulation; coding; protein synthesis; suppression of missense and nonsense mutations; mutagen mechanisms; complementation; recombinational genetics. Coreq: 5150-60.

5180 Cell Biology I (3) Structure and composition of major nuclear and cytoplasmic organelles of eukaryotic cells. Pertinent instruments and techniques; chromosomes and chromosomesome structure; nuclear RNA metabolism; nucleoli and ribosome biogenesis; survey of specialized cells. Structure, transcription and translation in bacteria. Coreq: 5110.

5190 Cell Biology II (3) Comparative biochemical approach to cell structure and function. Membrane systems and metabolism; development and function of mitochondria, chloroplasts, peroxosomes and other organelles as related to metabolism and regulation of intermediary metabolism; cell cycle. Coreq: 5110, 5180. Coreq: 5120.

5200 Mammalian Physiology (4) Mammalian organ systems and their functions. Nervous, muscular, endocrine, digestive, respiratory, circulatory, reproductive, and excretory systems; interrelationships of these systems and fundamental importance of interactions in contemporary biological research. Prereq: 5190.

5230 Biochemical Concepts in Medical Sciences (3) Biochemical mechanisms involved in physiological conditions and pathological processes of human body. Human function of organs system, biochemical pharmacology; hormone actions; neurobiochemistry. Current biochemical advances in basic and clinical medicine. Prereq: 5220, 5110-20.

5230-20-30-40 Special Biomedical Sciences Laboratory (3, 3, 3, 3) To acquaint students with both approaches and technologies in various areas of modern biology. Students spend a quarter in each of three or four laboratories conducting research in different areas of biomedical science. Required of all first-year students.

5350-40 Biomedical Sciences Seminar (1, 1) Critical analyses of current journal publications in selected area of modern biology. Written evaluation of papers and weekly oral presentations by each student. Required of all first-year students.

5370 Biomedical Sciences Seminar (1) Basic principles of laboratory techniques, data presentation, and thesis proposals, abstracts, review articles, progress reports. Required of all first-year students.

5430-60-90 Graduate Research Participation (3, 6, 9) Special advanced research project covering area not related to dissertation research. Topics chosen with consent of instructor. May be repeated.

5510-30-40 Special Topics in Biomedical Sciences (1, 1, 1) Research projects, conferences, guest lectures, and laboratory courses. Additional courses developed on subject of mutual interest to individual students and staff members. May be repeated.


5740 Statistics for Biologists (3) Application and interpretation of statistical methods in data analysis. Random variations; normal, binomial, and Poisson distributions, statistical presentation of data, estimating means and variance; confidence intervals; tests of significance for comparing samples; analysis of variance; chi-square tests; correlation and association; linear regression. Prereq: Introductory statistics or consent of instructor.

5840 Biogenic Reaction Mechanisms (3) Nature of chemical bond, nucleophilic and electrophilic reactions, molecular rearrangements, oxidation-reduction, conformation, quantitative and kinetic studies of chemical reactions. Addition of electrophiles to double bonds is limited to those Cheungs with application in biochemistry. Prereq: 5120 or equivalent, and 5190.

5940 Classic Experiments in Genetics (3) Original papers presented critically and lasting concepts in genetics. Prereq: 5170.

6000 Doctoral Research and Dissertation (3-15)

6210 Protein Chemistry and Enzyme Mechanisms (3) Theoretical and practical aspects of protein chemistry; biochemistry, and physical modification of proteins, chemical modification of proteins, and structure-function relationships. Latter emphasizes enzymes, includes approximation of substrates, covalent catalysis, general acid-base catalysis, and strain and distortion of substrates. Prereq: 5190.

6220 Enzyme Regulation and Kinetics (3) Kinetics of catalysis, inhibition by product, substrate and deadend inhibitors; stimulation and inhibition of allosteric enzymes, the control of feedback regulation; role of the subunits in enzyme regulation; multifunctional enzymes. Prereq: 5120.

6240 Chemistry and Metabolism of Lipids (3) Nomenclature, chromatographic isolation, chemical composition, physical properties, and enzymology of lipids. Hormonal action of prostaglandins and role of lipids in membranes, enzymic expression, and nervous tissue. Lipid biochemistry of mammals; comparative aspects, particularly lipid pathways in bacteria and yeast. Prereq: 5120-20.

6251 Molecular Biology in RNA (3) RNA synthesis and metabolism in prokaryotes, eucaryotes, and their viruses. Prereq: 5120 or consent of instructor.

6252 Molecular Biology of DNA (3) DNA replication, repair, and recombination. Recent advances in mechanisms at molecular level using biochemical and genetic techniques. Prereq: 5110-20 or consent of instructor.

6270 Viral Carcinogenesis (3) History of viral oncolgy and descriptive catalog of tumor viruses. Biology and genetics of animal viros. Virus-induced cancers; replication cycle; transformation; genetics; natural history; RNA tumor viruses; endogenous and exogenous viruses; induction; transformation; natural history.

6280 Chemical and Physical Carcinogenesis (3) History and epidemiological considerations. Nature
and metabolism of chemical carcinogens. Radiation and site-specific carcinogenesis.

6290 Cancer Biology and Biochemistry (3) Pathology and nomenclature of cancer. Tumor immunology and immunotherapy. Biochemistry of tumor cells; enzymology, metabolism; membranes; DNA repair; regulation; strategies in chemotherapy.

6300 Mutagenesis (3) Basic mechanisms in chemical and radiation mutagenesis and dosimetry in variety of systems including bacteria, fungi, Drosophila, and mice.

6400 Membrane Biology (3) Transport kinetics, membrane biogenesis and turnover, endocytosis and exocytosis, receptor regulation, hormone-membrane biogenesis interactions. Prereq: 5110-20 and 5180-90 or consent of instructor.

6410 Techniques in Cell Biology (3) Application to specific research problems, kind of data they yield, and cautions in data interpretation. Laboratory demonstrations may be arranged where appropriate. Prereq: 5180-90 or consent of instructor.

6450 Immunology (3) Structured lectures in modern immunology and emphasis on concepts and mechanisms at the cellular level. Topics: T-B cell interaction, soluble mediators, tolerance, surveillance, transportation genetics, immunoglobulin structure. Selected laboratory exercises. Prereq: 5180-90 or consent of instructor.

6510-20-30-40 Advanced Topics in Biomedical Sciences (3, 3, 3, 3) Current and future research developments. Topics listed under Special Topics Courses, can be taken either as tutorials or as literature survey courses requiring substantial student participation. May be repeated.

6600 Mammalian Genetics (3) Orderly presentation of known genetics variants affecting each organ system of experimental mammals, especially laboratory mouse. Prereq: 5160.

6610 Mammalian Biochemical Genetics (3) Combined biochemical and genetic approaches to problems of immunology, globin synthesis, and control of enzyme synthesis. Prereq: 5110-20 and 5160 or consent of instructor.

6650 Microbial Genetics (3) Basic phenomena in microbial genetics: transduction, transformation, conjugation, and mutation. Genetics of bacteriophage. Prereq: 5160 or consent of instructor.

6750 Regulation of Intermediary Metabolism (3) Pathways involved in intermediary metabolism. Steady-state processes, "nonequilibrium" reactions; first enzymes, feedback inhibition, isozymes, multienzyme systems and compartmentation, covalent modification, positive and negative control, catabolite, repression, autocontrol, stringent control, attenuation, hormonal control, other selected topics. Prereq: 5110-20 or consent of instructor.
Graduate School of Library and Information Science

Ann E. Prentice, Director

MAJOR DEGREE
Library Science M.S.L.S.

The Graduate School of Library and Information Science provides a library education program leading to the preparation of librarians for work in all types of libraries. The programs of study of this School include the graduate curriculum leading to the degree of Master of Science in Library Science.

MASTER OF SCIENCE IN LIBRARY SCIENCE

The goal of the program is to prepare graduates to function effectively in libraries and information centers. The program is designed to:

1. Enable students to examine critically the role and function of libraries and information centers in our society, and to define and redefine that role as the needs of society demand;
2. Enable students to understand and use the concepts and procedures related to the selection, acquisition, organization, and dissemination of knowledge;
3. Enable students to understand and apply the principles of management to the library and information center;
4. Enable students to assume individual and collective responsibility for the well-being and development of their profession and of professional service;
5. Enable students to make informed assessments and decisions regarding various career opportunities in libraries and information centers.

PROGRAMS OF INSTRUCTION

The program leading to the degree of Master of Science in Library Science involves a total of 51 quarter hours of graduate courses, 21 hours of which form a core curriculum required of all students. Either a thesis or a non-thesis program is available, with 9 hours allowed for thesis credit. At least 36 hours must be taken in the Graduate School of Library and Information Science, allowing up to 15 hours outside the School. Upon completion of the program, all students are given an examination. For students who elect the thesis option, the examination will be a defense of the thesis. Students who elect the non-thesis option will be given a written comprehensive examination.

Programs are designed for persons interested in school libraries, public libraries, academic libraries, special libraries and information centers as well as a variety of library and information related activities.

The SREB Academic Common Market applies to applicants from Arkansas, Georgia, West Virginia, and Virginia.

ADMISSION REQUIREMENTS

The minimum grade point average for admission to the Graduate School is 2.5. Candidates who have at least a 3.0 average in the junior and senior years will receive first consideration. Applicants are required to take the aptitude test of the Graduate Record Examination. The test should be taken at least one quarter in advance of application for admission to the Graduate School.

Foreign applicants are required to take the Test of English as a Foreign Language.

APPLICATION PROCEDURE

Admission to the programs in the Graduate School of Library and Information Science should be made in advance of the quarter for which admission is requested. Applicants should submit the "Application for Admission" form (printed as the first page of the Graduate School Catalog) and an application fee. An official transcript and three recommendations (obtained from the Graduate School of Library and Information Science) should be returned to the Director of the School.

FINANCIAL ASSISTANCE OPPORTUNITIES

Employment with the University of Tennessee Libraries may provide a work-study opportunity for selected students who wish to obtain experience in academic librarianship while pursuing the degree. Such students usually work at least 20 hours each week and thus extend the period required for the degree up to two years.

Similar opportunities exist with some other libraries in the Knoxville area.

A limited number of graduate assistantships are available through the School for the degree. Assistantships of this type carry a waiver of tuition and fees as well as a stipend, and require that recipients work 10 hours per week in the School.

Information on financial assistance is available from the Director of the Graduate School of Library and Information Science.

Faculty

Professors:
E. E. Mauldin, M.S.L.S. Illinois; G. R. Purcell, Ph.D. Case Western Reserve.

Associate Professors:

Assistant Professors:
J. M. Pemberton, Ph.D. Tennessee; G. M. Sinkankas, Ph.D. Pittsburgh; M. S. Stephenson, M.L.S. North Texas State.

Courses

4140 Libraries and Librarianship (3) Librarianship as an occupation: its organization, responsibilities, problems and prospects.

4150 School Library Administration (3) Objectives, functions, and place of school library; relationship to local and state services; cooperative planning for quarters and materials: evaluation. (Same as Curriculum and Instruction 4150.)

4270 Organization of Library Collections (6) Acquisitions, cataloging and maintenance of library collections.

4330 Introduction to Reference Materials (3) Basic information sources and services for all libraries.

4750 Utilization of Instructional Media (3) (Same as Curriculum and Instruction 4750 and Vocational-Technical Education 4750.)

5000 Thesis (1-15) E

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

5110-20-30 Problems in Library Science (3, 3, 3) May be repeated with consent of school.

5140 Research Methods in Library Science (3) Research methods applicable to librarianship. Process and conduct of research; analysis of published research.

5200 Subject Reference and Bibliography (3) General patterns of bibliographical organization and basic information sources in subject fields including non-English materials; experiences in bibliographic methods and search techniques. Prereq: 4330.

5210 Sources and Services for the Social Sciences (3) English and non-English literature and bibliographical sources in education, economics, political science, history, geography, anthropology, psychology, and sociology; organization of collections for optimum use. Prereq: 5200.

5220 Sources and Services for the Natural Sciences (3) English and non-English literature and bibliographical sources in mathematics, physics, astronomy, chemistry, geology, biology and medicine; organization of collections for optimum use. Prereq: 5200.

5230 Sources and Services for the Humanities (3) English and non-English literature and bibliographical sources in literature and language, fine arts, music, philosophy and religion; organization of collections for optimum use. Prereq: 5200.

5240 Organization of Library Collections (3) Construction and maintenance of library catalog as retrieval instrument; indexing and subject analysis theory, comparative classification with emphasis on Library of Congress system, and problems in reclassification. Prereq: 4270.


5260 Government Publications II (3) Acquisition, organization and utilization of publications of foreign governments and international organizations such as United Nations, UNESCO, and others.

5270 Legal Bibliography (3) Introduction to literature of Anglo-American jurisprudence. Use of reports, statutes, administrative regulations and decisions, treaties, periodicals, and indexes as bibliographic tools.

5300 Library Management (3) Management and organization concepts applicable to libraries and librarians.

5310 Multitype Systems and Networks (3) Organization, structure, governance, planning, evaluation, and services in state, regional, national, and international networking of information.

5330 Academic Libraries (3) Persistent and current problems. Topics vary depending upon needs and interests of group.

5350 School Libraries (3) Persistent and current problems. Topics vary depending upon needs and interests of group. Prereq: 4150 or consent of instructor.

5360 Special Libraries and Information Centers (3) Development and present status, scope and objectives, administration and organizational problems, acquisition, organization, and use of information.

5370 The Library in the Community (3) Public library as social agency; role in education and communication systems of community.

5380 Seminar in Library and Information Science (3) Advanced study of varying topics. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

5400 Library Facilities (3) Problems inherent in planning and construction of library quarters. Interrelationship of staff, materials, and user space requirements.


5510 Multimedia Resources of Libraries (3) Selection, acquisition, processing, storing, and servicing nonbook materials, with special attention to films, recordings, microforms, photo-copying.

5520 History of Books and Printing (3) Development of alphabet and writing; early writing materials; book in manuscript; history and technique of printing; book illustration and binding; standards of modern fine printing.

5530 Contemporary Publishing (3) Creation, production, marketing, and distribution of materials acquired by libraries, with special attention to various types of publishers.

5540 Special Collections—Archives and Rare Books (3) Problems involved in acquisition, organization, housing, preservation and utilization of rare books and archival materials.

5550 Records Management for Information Professionals (3) Functional elements and objectives of records management within organizations, emphasizing control of creation, distribution, retention, storage, retrieval; protection, and disposition regardless of medium. Prereq: 4330, 4270, or consent of instructor.

5600 Reading Guidance for Children and Young People (3) Organization to meet needs, interests, abilities of different age and socioeconomic groups. Prereq: 5640 or consent of instructor.

5610 Mass Communications and the Library (3) Mass media of communication in terms of their relation to modern library service, considered as forces that influence what people read, see, and hear.

5620 Traditional Literature and Oral Narration (3) Fundamental principles of art storytelling; techniques of adaptation and presentation for various age groups; instruction and practice in oral techniques.

5630 Critical History of Children's Literature I (3) Development of literature for children noting influence of changing social and cultural factors; attention to emerging genres through primary sources. Fifteenth century to 1920.

5640 Critical History of Children's Literature II (3) Development of literature for children noting influence of changing social and cultural factors; attention to emerging genres through primary sources. 1920 to present.

5691 Advanced Production of Audiovisual Software (3) (Same as Curriculum and Instruction 5691.)

5700 Automation of Library Processes (3) Analysis of application of data processing methods to basic library operations such as bibliographic control, technical processes, circulation control, and management functions.

5710 Introduction to Information Science (3) Content and method of information science; application of research findings to general library practice.

5720 Information Systems Analysis and Design (3) Elements in design and operation of information retrieval systems, including acquisition, indexing, vocabularies, information representation, file organization, search procedures, and system evaluation.

5730 Information Retrieval Systems Laboratory (3) Comparative capabilities of various types of information retrieval systems; analyzing performance of systems to arrive at generalizations with respect to theory, design and operation of information retrieval systems.

5999 Practicum (6 or 9 or 12) Opportunity to translate library theory into practice under guidance of qualified librarians. Prereq: Completion of 21-hr core curriculum plus approval of director.
Graduate School of Planning

D. A. Johnson, Director

MAJOR
Planning

DEGREE
M.S.P.

The Graduate School of Planning offers a two-year graduate course leading to a degree of Master of Science in Planning with concentrations in land use, transportation, environmental, regional, administrative, health, and historic preservation planning.

The purpose of study is the education of professional planners, competent to handle positions of increasing technical and administrative responsibility. Graduates are candidates for professional service in regional, city, county, and metropolitan area planning agencies; in local, state, and federal agencies concerned with physical, economic and administrative planning; in private businesses and organizations dealing with urban problems; and in private consulting practices.

The curriculum is organized on a basis of six quarters, or 72 credit hours, and provides the student with core courses in planning theory, methods and techniques, and also takes advantage of offerings at the University of Tennessee in related fields such as government, economics, geography, civil engineering, and sociology.

The course of study ordinarily requires two years with an optional work internship during the summer between the two years. Planning courses as well as related courses will be offered during the summer period. This is to serve the needs of those planners now in the field who wish to acquire their professional degree but who can spare only the minimum amount of time from their jobs because of financial or family considerations.

Entering students follow a program of courses which provides education in the basic elements of planning. These include studies in theory, history, analytical methods, and legislation, as well as related courses in government, geography, sociology, and economics. Students are permitted to pursue particular interests through the choice of electives approved by the Graduate School.

Planning: Practice in research and analysis on a particular planning problem or topic is obtained through the preparation of a thesis or major study option.

Core planning courses are taught by the faculty of the Graduate School of Planning. Related courses are taught by other specialists drawn from the University faculty. In addition, the services of experienced professional planners in TVA and other public and private organizations are called upon to broaden the scope of the students understanding. A variety of outside speakers and seminar leaders provide insight into particular problems of significance to planners.

ADMISSION PROCEDURES

All applicants should submit two letters of recommendation with their applications. Both letters should be from teachers familiar with the applicant's undergraduate or, where applicable, graduate academic record. In the event the applicant has had planning experience, a third letter is required from a supervisor or other person familiar with the planning work of the applicant. All applicants who wish to be considered for financial assistance from the University or the Graduate School of Planning should also submit recent Graduate Record Examination scores for the Aptitude (verbal, quantitative and analytical) portion of that test. All applicants are also requested to submit a statement of career goals.

The M.S.P. degree is approved for SREB Academic Common Market participation in Arkansas, Georgia, Kentucky, and West Virginia.

All inquiries concerning admission should be addressed to: Director, Graduate School of Planning, The University of Tennessee, Knoxville, Tennessee 37916.

DEGREE REQUIREMENTS

Each student will be required to complete a minimum of 72 hours credit.

The following courses are the required core curriculum for the M.S.P. degree: 5040, 5045, 5100, 5110, 5130, 5180, 5230, 5270, 5280, 5340, 5435, 5440, 5465, 5500, Sociology 5320 or Statistics 5211. Waivers can be made by the faculty where competence is demonstrated. Each student will be required to demonstrate competence in individual research. This may take either of two forms.

Plan I—Complete a thesis for 9 hours credit.

Plan II—Complete a major study with acceptable documentation. In order to be eligible for the major study the student must have earned a grade of B+ or higher in Research Methods II, have a 3.5 cumulative grade point at the time of approval of the major study proposal, and have completed at least 24 hours of graduate study. The student meeting these criteria may present a proposal for a major study which will include at least 9 hours of elective course work in an area of concentration. The proposal shall justify the area of study, the approach to the study, and the method of final documentation. Approval of the documentation, which must include written documentation, is a prerequisite for graduation.

Students in the Graduate School of Planning are given a comprehensive written examination after approximately four quarters of course work. In addition to testing the knowledge of the student, the information thus obtained is taken into account in advising students concerning the study program they should undertake during the balance of their academic program to remove any indicated deficiencies.

Each student will be encouraged, but not required, to complete a work internship equivalent to at least two and one-half months of full-time work in a planning agency at approximately the mid-point in course work.

Faculty

Professors:

Associate Professor:
G. E. Bowen, M.A. George Washington.

Assistant Professors:
E. Cole, M.S.P. Tennessee; P. Fisher, Ph.D. Florida State; M. Kersey, B.L.A. Georgia; A. Loeb, Ph.D. Missouri; J. G. Stoett, M.U.P. Hunter.
Courses

5100 Survey of Planning (3) History of city development and of planning with special attention to the U.S. experience in urban and other levels of planning. State of the art, the process, the comprehensive plan, implementation devices. Planning issues in society. Not for credit for M.S.P. degree. F

5000 Thesis (1-15) E

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

5005 The Planning Process (3) Identification and examination of generic aspects of planning process and planning techniques applied in variety of settings. Not for credit for M.S.P. degree. F, Su

5040 Communications for Planners I (1) Introduction to basic communications, interpersonal and oral communications, graphic presentations, audio-visual equipment. F, Su

5045 Communications for Planners II (1) Graphic communications in planning. Maps and computer graphics, models and presentation graphics. Prereq: 5040. W

5050 Communication for Planners III (1) Audio-visual equipment, programmed communications, and photography used in planning. Prereq: 5045. Sp

5100 Theory of Planning (3) Analysis of nature and objectives of planning process; role of planner and planning function in public decision-making. Prereq: 5110. W

5110 Introduction to Planning (3) History of planning, familiarization with operations of contemporary planning, concept of systems, current trends and issues. Relationship between planning and society in which it occurs. Designed for GSP students. F, Su

5130 Planning Research Methods I (2) Research techniques in subject areas associated with city and regional planning. Research tools, data collection and analysis as basis for planning and decision-making. F, Su

5135 Planning Research Methods II (3) Application of rigorous investigation techniques in solving planning problems, including statistical analysis and mathematical models. Urban and regional information systems as resource and tool in problem identification and solution. Prereq: 5130. W-Sp

5145 Library Research for Planning (1) Survey of publications of interest to planners, including resources and research techniques. Use of facilities and collections of UTK library. F, W

5160 Planning for Historic Preservation (3) (Same as Environmental Engineering 5160.)

5170 Planning for Historic Preservation (3) Planning for preservation, restoration and conservation of historic buildings, areas and sites as related to comprehensive planning process. National, state, and local government role in preservation, designation of sites, legislative needs, financing and administrative organization.

5180 Planning Analysis and Forecasting (3) Methods of quantitative analysis and modeling in urban and regional studies. Population, employment, and economic base studies with emphasis on forecasting techniques. Prereq: 5130. W

5230 Urban and Site Design (3) Principles of design of residential subdivisions and some components of physical community such as shopping centers, institutional complexes, central business districts. Problems of reviewing alternative designs against each other or written regulations. Extensive laboratory experience. E

5235 Urban and Site Design II (3-6) Prereq: 5230.

5270 Planning and Transportation (3) (Same as Civil Engineering 5270.) W

5390 Planning Methods (5) Tooling up studies; methods for preparation of landuse and public facility elements of comprehensive development plans, including visual aspects. Prereq: 5180. Sp

5300 Regional Planning (3) Making planning process operative in intergovernmental context. Theories of regions and analysis of metropolitan planning, area planning, regional planning by states, single-purpose agency planning, and TVA. Prereq: 5100.

5310 State Planning (3) Evolution of planning function in state government, with emphasis on institutional environment in which planning occurs. Context and scope of state planning, and relationships with other branches and levels of government. Prereq: 5100.

5340 Implementation (3) Policy formulation, information systems, taxation, capital improvement programming, and other aspects of plan implementation. Programming public actions to affect development. Prereq: 5440. Su, F

5360 New Towns (2) Historical development of planned new towns and implications for national urbanization policy in United States; process by which new towns are created, from establishment of objectives to administration of development process and provision of public services; organizational alternatives for new town planning, development and management in context of past experience and future objectives. Prereq: 5110 and consent of instructor.

5380 Housing (3) Nature and demand for housing in U.S. and abroad with emphasis on U.S. experience. Private market processes and public influences. Problems of change in housing supply, impact of new technology, and governmental programs to improve supply and quality of housing. Coreq: 5110 or consent of instructor.

5390 Futures (3) Alternative futures and their implications for future living patterns and community planning. Techniques of futures research.

5410-20-30 Special Topics in Planning (1-3, 1-5, 1-3) Lecture, group discussion, and individual research and study on specialized topics in planning not covered in depth in other courses. May be repeated. Prereq: Consent of instructor. E

5435 Planning and Government (3) Governmental context within which planning occurs. Policy making as public process. Planning structures, powers, and policies. F

5440 Planning and Land Use Controls (4) Legal basis for planning and guiding community development. Exercise of police power and eminent domain. Development and administration of zoning, subdivision controls, and related devices. Prereq: 5435. Sp

5455 Urban Revitalization (3) Goals, principles and strategies for restoring and revitalizing cities. Review and analysis of historic, current, and proposed public and private programs aimed at urban revitalization. Physical building and restoration activities as related to financial and administrative requirements. Relationship between construction oriented activities and economic and social development programs is emphasized. Prereq: 5110 or consent of instructor.

5460 Planning Administration (2) Planning agency management, program development, and agency finance. Prereq: 5435.

5465 Planning and Property Development (3) Process of urban physical growth and change with emphasis on functioning of private sector real estate development and its relationship to planning. Partnership roles of public and private sectors in urban development and redevelopment. Prereq: 5440.

5500 Synthesis (9) Problem-oriented experience to integrate knowledge from previous courses. Interrelationships stressed; student required to use judgment in evaluation and creation of plans and policies addressed to real world situations. Extensive laboratory experience. Prereq: Required planning courses or consent of faculty. F, W

5670 Social Planning (2-3) Theory, philosophy and implications of programs for planned social change. Consideration of major social planning issues in diverse fields of service; aging, corrections, education, health, social services. Prereq: Consent of instructor. (Same as Social Work 5670.)
The University of Tennessee School of Social Work is a fully accredited two-year graduate professional school, with a program (thesis or non-thesis option) leading to the degree of Master of Science in Social Work. The full two-year curriculum is offered in all three branch locations.

**Graduate School of Social Work**

Ben P. Granger, Dean
Betty J. Cleckley, Associate Dean
Ronald K. Green, Director, Continuing Social Work Education
David P. Fauri, Director, Nashville Branch
Roger M. Nooe, Director, Knoxville Branch
Kate Mullins, Director, Memphis Branch

**MAJOR**

Social Work

**DEGREE**

M.S.S.W.

**The School of Social Work** has as its primary objective the education and training of persons for leadership in the social welfare profession and the social work practice community. Leadership roles include positions in social welfare administration, social planning and policy development, and positions as treatment team leaders, supervisors, consultants, and expert practitioners.

Central to professional leadership are a commitment to the values and goals of the profession and a developed capacity for self-awareness and self-discipline. The experience of a graduate professional education builds commitment, and the School's program guides students into independent, analytical thought and prepares them to use their skills and knowledge to effective purpose.

The School of Social Work recognizes and enjoys the challenge of cultural pluralism in society and encourages applications for admission from minority group members. Through the planned inclusion of significant and pertinent racial and ethnic content in the curriculum, the School provides students with the educational background needed to take creative roles in the social work profession's efforts toward the elimination of racism and such other social ills as poverty, crime, neglect, and social injustice.

A special bulletin describing the facilities, admission, fees, and degree requirements is obtainable from The School of Social Work, 2014 Lake Avenue, Knoxville, Tennessee 37916.

**AREAS OF PROFESSIONAL PRACTICE**

Specializations within the School's curriculum prepare students for social work careers in such practice fields as criminal and juvenile justice systems; family and child welfare services in public and voluntary agencies; group services in neighborhood and community centers; health services; mental retardation; public welfare services; mental health services; manpower training programs; governmental and voluntary human services planning agencies; rehabilitation services; school social work; and social gerontology.

**THE PROFESSIONAL CURRICULUM**

The School of Social Work's curriculum is designed to provide the student with the basic components of professional competence through a progression of course work and supervised practice experience. Students may elect a thesis or non-thesis option. The two-year, six-quarter program includes a core curriculum, a specialization in one of two areas—social work treatment or social welfare administration and planning—and concurrent field practice.

**The Core Curriculum**

The core curriculum is offered during the first two quarters of the first year and is required of all students. It is a 30-quarter-hour sequence of five basic courses. As the initial phase of the School's educational program, the core curriculum contributes to the process of socialization and professional identification, and presents students with a comprehensive and broad knowledge base from which to operate in the future as practitioners and administrators.

**Credit Hours**

**Fall Quarter, First Year**

5070 Social Work Research I .................. 3

**Spring Quarter, First Year**

5110 Social Welfare Policy and Services I ................. 3
5210 Human Behavior and Social Environment I ............ 3
5410 Social Work Practice I .................. 3
5910 Field Practice .................. 3

**Total Quarter Hours** .................. 15

**Winter Quarter, First Year**

5080 Social Work Research II .................. 2
5120 Social Welfare Policy and Services II ................. 3
5220 Human Behavior and Social Environment II ............ 3
5420 Social Work Practice II .................. 3
5920 Field Practice .................. 4

**Total Quarter Hours** .................. 15

**Spring Quarter, First Year**

5390 Field Practice .................. 4
Specialization Courses and Electives ................. 10

**Total Quarter Hours** .................. 14

**Fall Quarter, Second Year**

Specialization Courses and Electives ................. 12

**Winter Quarter, Second Year**

5940 Field Practice .................. 8
Specialization Courses or Electives ................. 2 or 3

**Total Quarter Hours** ................. 10 or 11

**Spring Quarter, Second Year**

5950 Field Practice .................. 8
5961 Integrative Seminar .................. 2
One Elective .................. 2 or 3

**Total Quarter Hours** .................. 12 or 13

**AREAS OF SPECIALIZATION**

Social Work Treatment

Social work treatment deals with those individual, family, and group methods utilized to enhance the social functioning of individuals and effectively ameliorate problems of social dysfunction. The specialization attempts to develop a thorough

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knowledge of the theory and methodology basic to varied individual, family, and group methods applicable in the treatment of diverse client problems.

Social Welfare Administration and Planning

Social welfare administration and planning deals with the design, implementation, and continued operation of effective programs for client service. Specifically, the method deals with assessment of client characteristics, development of environmental resources, design of effective organizational structures, management, staff development, program evaluation, social planning, neighborhood and community development, financing, and coordination of services.

Field Practice

Field practice is a critical component of the student's first- and second-year program. Because the School of Social Work cooperates with a wide range of social agencies, it is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agency and the field instructor to assure that the student has a quality field practice experience which meets the objectives of the core curriculum and the specialization.

The first-year curriculum is on a concurrent class and field plan, with students engaged in classroom study two or three days per week and in field practice the remainder of the week. First-year agency placements are selected to provide the student with practice experiences related to the core curriculum content and beginning specialization. Within the placement, each student's experiences are planned and designed according to the educational needs.

In the second year, students are engaged full time in classroom courses during the fall quarter. The winter and spring quarter plan are scheduled University breaks and may result in the student's area of specialization, individual career interests, and educational needs. The second-year curriculum is on a concurrent class and field plan, with students engaged in classroom study two or three days per week and at least one concurrent classroom course each quarter. Second-year placements are selected according to the student's ability to perform at a satisfactory level. Full time in classroom courses during the fall quarter. Applications for first-year student's first- and second-year program.

ADMISSION REQUIREMENTS

Admission to the professional curriculum is based on the following requirements:

1. A Bachelor's degree from an accredited college or university with some preparation in the social sciences. A minimum of 36 credit hours required for a degree shall be 79 hours including a maximum of 36 S/NC hours.
2. A grade point average of 2.5 on a 4.0 scale, with those falling below the average to be admitted on a case-by-case basis.
3. Personal qualifications acceptable for entrance into the professional practice of social work.
4. Preference is given to applicants with a B average in undergraduate work and substantial preparation in the social sciences. Applications should be filed no later than March 1 for the year in which admission is desired.

THE ADMISSIONS PROCESS

Individuals who wish to be considered for admission should obtain the required application materials from the Office of Admissions, UT School of Social Work, 2014 Lake Avenue, Knoxville, TN 37916, telephone (615) 974-3175. Beginning students are admitted only in the fall quarter. The Admissions Office begins processing applications after October 1 for the following fall quarter. Applications for first-year admission should be filed as early as possible. A minimum of 36 credit hours is allowed for consideration of the application.

Students intending to apply for financial aid are encouraged to apply for admission to the School as early as possible. By doing so, students should be able to meet financial aid application deadlines, many of which are April 1 for September funding.

To apply for admission, applicants should forward the completed University School Application and payment of a nonrefundable $10 application fee to the Graduate School Office, The University of Tennessee, Knoxville. Two official transcripts of all undergraduate, graduate, and extension work (except work taken at The University of Tennessee, Knoxville) should be sent to the Graduate School Office immediately after filing the Graduate School Application. Admission and three reference forms should be returned to the Admissions Office of the School of Social Work.

If a personal interview is required by the School, the applicant will be contacted by a representative of the School and arrangements will be made concerning a time and place. Applicants who wish to may also request a personal interview with a faculty member.

ACCELERATED PROGRAM

The University of Tennessee School of Social Work has a special accelerated program which enables eligible candidates to complete the M.S.S.W. degree in four quarters. This Accelerated Program is approved by the Council on Social Work Education. Students who qualify for the Accelerated Program must:

1. Have maintained a 3.0 or above grade point average (on a 4.0 scale) in undergraduate work.
2. Have an undergraduate major in social work which included a supervised field practice component, or have two years of full-time practice in the field of social work.
3. Pass a qualifying examination administered by the School of Social Work faculty in early spring.

The accelerated programs begin either in the Memphis Branch in March or in the Nashville Branch in June with an intensive ten-week term from which students proceed in the fall into the regular second-year curriculum. Application for admission to the accelerated program is through the regular admission process. Applications should be filed not later than December 31 for the Memphis program and not later than January 31 for the Nashville program.

PART-TIME STUDENTS

Courses in the regular curriculum of the School are open to persons who meet the admission requirements for full-time study and who are planning to complete the work for the degree within the next two or three years. Application should be made to the School in the regular way, but the applicant should inform the Director of Admissions of the wish to begin part-time study on a planned basis.

TRANSFER CREDITS

Courses completed in another accredited school of social work, if usually accepted for the University of Tennessee School of Social Work degree requirement providing the applicants meet the admission requirements of the Graduate School and The University of Tennessee School of Social Work, and if previous courses are equivalent to required or elective courses offered here. The University of Tennessee School of Social Work allows a maximum of 45 credit hours of graduate course work taken at another accredited institution to be transferred into the student's Master's program. Such work must have been taken for graduate resident credit and passed with a grade of B or better. In addition, it must be part of an otherwise
satisfactory graduate program (B average) and be approved by the branch director and the dean. This course work must be completed within the six-year period prior to the receipt of the degree. In addition, S/N credit earned for the field practicum is also acceptable.

Graduate students majoring in fields other than social work are admitted to certain social work courses with the approval of the School of Social Work and the student’s major professor.

Faculty


Courses

5000 Thesis (1-15) E

5002 Non-Thesis Graduate Completion (3-15) Required for the non-thesis student not otherwise registered as a graduate student. May not be used toward degree requirements. Prereq: Completion of core or consent of instructor. S/N only. E

5070 Social Work Research I (2) Research methodology as applied to research in social welfare. Prereq: Completion of core or consent of instructor. S/N only. E

5080 Social Work Research II (2) Continuation of Social Work Research I. W

5081 Research in Social Work (2-3) Advanced research course. Includes sociopolitical and organizational context of evaluative research, research design and methodology appropriate to evaluative research, and utilization of research findings. Prereq: Completion of core or consent of instructor. S

5082 Practicum in Social Work Research (3-9) Supervised practice in application of research methods and tools to social welfare program. Prereq: by faculty, students, or social welfare agency or organization. Prereq: 5070-80 and consent of faculty member conducting investigation. S/N only. S

5083 Directed Readings in Research (2-4) May be repeated for approval of instructor. Maximum 4 hrs. F, W, Sp

5090 Special Problems in Social Work (2-3) Individual study or research on problems of special significance to student’s program, under supervision of major professor. May be repeated. F, W, Sp

5110 Social Welfare Policy and Services (3) Interests of social work profession in development of contemporary social policy at local, state, national, and international levels of organization. Contribution of social work professionals can make to formal policy-making, and the macrosocial change is effected, and through which aggregate social welfare services are proposed, authorized, financed, and delivered. Policy may be used to focus on beginning skill development. F

5120 Social Welfare Policy and Services II (3) Examination of theories of complex organizations applied to social welfare program settings. Transformation of collective social welfare resources into divisible and indivisible social welfare benefits through organized institutional action of professional nature. W

5130 Social Policy Analysis (3-3) "Policy science" techniques are considered for appropriateness in assessing social, political, and economic implications of social policy proposals. Prereq: Completion of core or consent of instructor. Sp

5181 Social Welfare Seminar (2-3) Problem area or field of practice seminar focusing on substantive knowledge about social problem or condition and interrelationships among problems definition, social policy analysis, and field practice. Fields such as health, mental health, child and family welfare, mental retardation, education, correctional force development, income maintenance, and aging. Prereq: Completion of core or consent of instructor. May be repeated. Maximum 9 hrs. Sp

5210-20 Human Behavior and Social Environment I and II (3, 3) Examination of theories pertaining to individual, family, and small group within context of functions, roles, and processes. Behavior of these systems conceptualized along functional-dysfunctional and normal-deviant continuum. Organization, development, and maintenance, adaptive and defensive mechanisms. Open system approach used to understand interrelationship of biological, psychological, and social variables with emphasis on implications of culture and ethnicity. F, W

5290 Special Accelerated Program in Social Work (15) Ten-week program provides advanced students with intensive academic and field practice experience that qualifies them to enter second year of graduate study upon successful completion of this term. S/N only.

5310 Human Behavior and Social Environment (3-3) Deepens and extends student’s knowledge or range of adaptive behavior; considers behavior from optimum social functioning through pathology. Prereq: Second-year status. May be repeated.

5311 Imaginative Perspectives on the Human Condition (2) Social work students study social work practice with poor and attributes of service delivery systems which make that practice possible. Prereq: Completion of core or consent of instructor. F

5312 Psychopathology and Social Deviance (2-3) Theories of and recent research in etiology of physical dysfunction and social variance. Categorical approach to psychopathology examined and differentiated from other approaches to human behavior. Prereq: Completion of core or consent of instructor. F

5313 Deviant Behavior of Children and Youth (2-3) Deviant behavior and conduct disorders in children and youth, etiology, symptomatology, and range of social services and treatment techniques. Prereq: Completion of core or consent of instructor. F

5314 Comparative Theories of Personality (2-3) Those personality theories that are most relevant for social work practice with individuals, groups, or families. Prereq: Completion of core or consent of instructor. Touched at branches only. Available at UT as Psychology 5314. F

5315 Human Sexual Problems (2-3) Desensitization and resensitization of personal and social attitudes toward sexual behavior; clinical problems and approaches to make social workers better able to deal with clients with sexual problems. Prereq: Completion of core or consent of instructor. F

5316 Mental Health and Employment (2-3) Work as major life task and value, attitudes toward work, patterns of employment and unemployment, economic technologies on individual and community, independence of individual and organization, meaning of work in assessment of social work. Prereq: Completion of core or consent of instructor. W

5410 Social Work Practice I (3) Basic theory, values and beginning skills development generic to social work interventions. Alone or in combination with other levels. Combines classroom skills and laboratory experiences. F

5420 Social Work Practice II (3) Assessment, planning, methodology and skills development fundamental to social work employment. Combines class and laboratory experiences and skills. F

5440 Family Therapy in Social Work Practice (2-3) Application of practice theory to assist in acquisition of skills in treatment of family as unit. Prereq: Completion of core or consent of instructor. W

5441 Transactional Analysis (2-3) Philosophy, theory, and therapeutic technique of transactional analysis. Lectures, discussion, and experiential methods facilitate acquisition of knowledge and skills to use transactional analysis as treatment modality. Prereq: Completion of core or consent of instructor. W

5442 Short-term Treatment (2-3) Theory and practice of short-term treatment focusing on nature of methods, characteristics of clients responsive to this approach, and desirable goals for group purposes. Prereq: Completion of core or consent of instructor. W

5443 Seminar on Behavior Therapy (2-3) Behavior modification methodology applied to clinical assessment and treatment of personal and psychological disorders that interfere with the ability of individuals to achieve their personal potential and establish their goals. Prereq: Completion of core or consent of instructor. W

5444 Social Work Practice with the Poor (2-3) Problems, issues, and dilemmas of practice in social services with poor and attributes of delivery systems which make that practice possible. Prereq: Completion of core or consent of instructor. W

5460 Social Work Treatment with Individuals and Families (3) Social work literature, social casework as method of social work practice and as form of interpersonal treatment. Prereq: Completion of core or consent of instructor. W

5470 Contemporary Treatment Modalities: Individual and Family (2-3) Well-established and developing treatment modalities in terms of essential concepts. Prereq: One of the above courses. Prereq: Completion of core or consent of instructor. F

5480 Special Topics in Social Work Treatment (2-3) Special topics in the field of social work treatment. Prereq: Completion of core or consent of instructor. May be repeated. Maximum 9 hrs. W, Sp

5500 Social Work Practice in Groups (3) Development of knowledge and skill in use of group methods in social work practice; organization and forming of group, structuring of group tasks and processes, understanding and enhancing group functioning, enabling problem-solving effectiveness, facilitating group growth and development, and small group individual and group change and group effectiveness. Prereq: Completion of core or consent of instructor. Sp

5510 Interpersonal Skill Development (2-3) Training group employed to enhance interpersonal competence in application of human relations skills in social work practice. Prereq: Completion of core or consent of instructor. W

5570 Comparative Methods of Group Treatment (2-3) Comparative analysis and critical review of theory and methodology of some of major group treatment modalities. Includes the role of leadership, techniques and procedures, and research. Prereq: Completion of core or consent of instructor. W
5601 Social Work in Rural Communities (2-3) Characteristics of rural populations and rural communities. Analysis of rural social services and delivery systems. Development of social work generalist concept and occupational function in rural areas. Prereq: Completion of core or consent of instructor. W

5661 Community Organization (2-3) Using behavioral and social science knowledge about communities and organizations to assist in development of resources to meet human needs. Prereq: Completion of core or consent of instructor. W

5670 Social Planning (2-3) (Same as Planning 5670) F

5671 Planning and Management of Change in Social Welfare (2-3) Theories and models of change such as planned change, conflict, and evolutionary change in relation to organizational change, community improvement, locality development, and economic development related to social welfare services. Prereq: Completion of core or consent of instructor. W

5701 Administration in Social Work (2-3) Introduction to administrative practice as it relates to social work purpose and values and development of administrative principles that make possible effective provision of welfare services. W

5702 Organizational Design of Social Welfare Agencies (2-3) Critical problems of adapting organizational structure and operational patterns to new tasks, objectives, and mandates. Planning and design techniques for new programs and for modifications of existing programs for appropriate deployment of resources and personnel for maximum effectiveness and efficiency. Integration of theory and experience for development of skills for coping with variety of situations. Prereq: Second-year administration or community organization students, or consent of instructor; 5761 or equivalent W

5741 Supervision in Social Work (2-3) Dual roles of supervisor in various settings, and supervision distinguishing from teaching and learning practice. Responsibility and accountability to client system, supervisee, and executive, problems of middle management position of supervisor. Differences and similarities in supervision of varying levels of personnel. Goals, tasks, techniques, and processes in relation to individual and group supervision and field instruction. Prereq: Second-year status or consent of instructor. A

5742 Consultation in Social Work (2-3) Constellation of roles, relationships, and behaviors required of consultant. Consultation as distinguished from supervision, administration, and direct practice. Types of consultation in relation to various settings and levels of responsibility. Processes and practices of consultation and dilemmas and pitfalls of consultant's position. Prereq: Second-year status or consent of instructor. W

5743 Management of Human Resources in Social Welfare (2-3) Personnel function in administration of human services programs and agencies. Personnel recruitment, selection, appointment, and supervision; staff development, training, and evaluation; salary and benefit systems; employer-employee relations; and fair employment practices. Prereq: Completion of core or consent of instructor. W

5744 Education and Training in Social Welfare (2-3) Philosophes and practices of teaching and learning related to adults in social work and social welfare. Distinctions between teaching and learning, training and education; unique aspects of adult learning. Measurement issues; models and styles of education. Prereq: Completion of core or consent of instructor. W

5745 Professional Leadership in Social Work (2-3) Leadership in social welfare. Theories of leadership; complexity of leadership; function, effectiveness, and satisfaction of leaders; leadership styles; values, motivation and morale; and leadership development. Prereq: Completion of core or consent of instructor. W

5761 Social Welfare Administration and Planning (3) Topics significant to managerial-planner role such as decision making, budgeting, planning, and programming. Prereq: Completion of core or consent of instructor. Sp

5762 Seminar in Social Welfare Administration and Planning (3) To assist students in acquiring specific administrative and planning techniques appropriate for social welfare delivery systems. Prereq: Completion of core or consent of instructor. Sp

5771 Information Systems and Decision Making (2-3) Centralized decision making related to allocation of scarce resources in social service organizations. Utilization of information in policy formulation, decision of services and evaluation of organizational performance. Information generation, collection, processing, storage, retrieval, and utilization in relation to management control, evaluation and forecasting. Prereq: Completion of core or consent of instructor. F

5772 Financial Management for Social Welfare Administration (2-3) Centralized decision making related to allocation of scarce resources in social service organizations. Technical aids to budgetary choice and other aspects of financial management examined for utility, parsimony, and feasibility. Prereq: Completion of core or consent of instructor. F

5800 Management of Residential Settings (2-3) Issues and trends in management and programming in residential institutions for children, aged, mentally ill, mentally retarded, juvenile and adult offenders, and other groups. Prereq: Completion of core or consent of instructor. F

5812 Organizational Perspectives in Juvenile Justice (2-3) Aspects of juvenile justice system: overview of juvenile delinquency, introduction to theories of causation, role of police in detecting delinquency and apprehension of delinquent offenders, police procedures, role of juvenile court, alternatives to institutions, correctional institutions, aftercare programs, and preventive strategies. Prereq: Second-year standing.

5820 Social Aspects of Illness (2-3) Social, economic, and emotional problems arising from or related to illness and disability as they affect individual, family, and community. Services needed to obtain optimum results from medical care. Lectures, discussion, illustrative case material. Sp

5825 Drugs: Use and Abuse (2-3) Survey and analysis of social, cultural, medical, and psychological factors underlying alcoholism and drug abuse, recent research and treatment innovations, social work with user and family. Prereq: Completion of core or consent of instructor. W

5826 Social Work Treatment for Marital Adjustment (2-3) Theories regarding social and cultural values and personality processes which gain expression in marriage. Concepts regarding contemporary marriage styles, problem areas in marriages, and appropriate treatment approaches. Prereq: Completion of core or consent of instructor. Sp

5830 Law and Social Work (2-3) Basic principles of law which relate to social work practice; organization of courts; legal aid societies; and other problems of legal nature that affect social work. Sp

5860 Social Gerontology (2-3) Physical, psychological, and social aspects of aging; economic and health status of aging; older person and family; community programs for aging; retirement—phenomenon of modern society. Sp

5865 The Roles of Women (2-3) Roles and statuses of women; emphasis on contemporary American scene. Empirical research as well as popular literature. Ascribed and achieved facets of women's statuses. A

5910-20 Field Practice (3, 4) Instruction and supervision in practice with individuals, groups, and communities. Prereq: Admission to the School; 5140 concurrently or prior to 5160; 5420 concurrently or prior to 5620. Must be taken in sequence. Required course. S/NC only. F, W

5930-40-50 Field Practice (4, 8, 8) Specialized instruction and supervised practice in methods of social work practice, decision making in human services organizations. Prereq: Admission to the School. Must be taken in sequence. S/NC only. Sp, W, Sp

5961 Integrative Seminar (2) Required seminar facilitates integration of two-year M.S.S.W. pro-
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