such claims. Brief survey of medical assistance, welfare, related matters.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Description</th>
</tr>
</thead>
</table>
public and private efforts in defense of environment. Problems of proving environmental impact of selected projects, interpretation and evaluation of scientific data, use of expert witnesses. Special environmental concerns of region, e.g., TVA operations, strip mining, forest management, wildlife preserves. Prereq: 8490.

8910 Administrative Law Seminar (2) Principles of administrative law. Discretion, choice of adjudication or rulemaking to develop administrative policy, consistency in administrative action.

8930 Consumer Protection Seminar (2) Selected problems in consumer protection.

8935 Law and Medicine Seminar (2) Medical profession's involvement in judicial process: (1) medical malpractice and alternatives to fault-based liability; (2) responsibilities for disposition and care of dead bodies and legal principles governing organ transplantation; (3) expert medical proof and testimony; (4) medico-legal aspects of euthanasia; (5) more specific matters: legal import of medical profession's various canons of ethics.

8995 Land Acquisition & Development Seminar (2) Alternative business forms to prepare and present for seminar discussion. Major documents (notes, deeds, prospectus, etc.) necessary to accomplish acquisition or development of large pieces of raw land. Prereq: 8990.

Course Offerings Subject To Change

The necessity of adjustments to accommodate changing conditions may dictate modifications in the course offerings and other features of the program described above. Accordingly, the college reserves the right to make such variation in its program as circumstances may require. Prospective students who are interested in the precise course offerings at a given time or who desire other special information should make inquiry in advance.

It is necessary to offer some courses and seminars only on an every-other-year basis. Choice is based on subject matter and past patterns of student enrollment.
The College of Liberal Arts offers programs leading to eight advanced degrees. See page 9 for degrees and majors.

General Information

FOREIGN STUDY COURSES
Foreign study courses offered in some departments of the College provide an opportunity to undertake independent study outside the United States. Prior to departure the student must have a plan of study approved by the department head and a supervising faculty member of the department concerned. Credit will be given only upon fulfilling all requirements set by the department and may vary from 1-12 hours. The maximum credit which may be applied toward a degree in the College is established in each individual case by the department in which the student is working.

OFF-CAMPUS STUDY
Recognizing that learning is not restricted to formal classroom situations, the College provides for students to earn credit toward graduation for approved off-campus study. Such study may be undertaken only with prior approval of the faculty member and the department concerned. It may include certain kinds of work experiences, community involvement, working in political campaigns, etc. Credit per quarter will vary from 1-12 hours. The maximum credit which may be applied toward a degree in the College is established in each individual case by the department in which the student is working.

INDEPENDENT STUDY
Certain educational goals may best be met through independent study done by an individual under the direction of a faculty member. Students who wish to do such independent work should obtain the approval of the faculty members and the departments concerned prior to embarking upon their study. Credit per quarter will vary from 1-12 hours. The maximum credit which may be applied toward a degree in the College is established in each individual case by the department in which the student is working.

Departments of Instruction

Anthropology

MAJOR

Anthropology

DEGREES

M.A., Ph.D.

Professors:

W. M. Bass (Head), Ph.D. Pennsylvania;
C. H. Faulkner, Ph.D. Indiana; R. L. Janitz, Ph.D. Kansas; F. W. Parmalee, Ph.D. Texas A. & M.

Associate Professors:

I. C. Harrison, Ph.D. Syracuse; W. E. Klippel, Ph.D. Missouri; M. H. Logan, Ph.D. Pennsylvania State;
G. F. Schroedl, Ph.D. Washington State; F. H. Smith, Ph.D. Michigan;

Assistant Professors:

B. J. Howell, Ph.D. Kentucky; P. S. Wilely, Ph.D. Tennessee.

Instructor:

M. A. Bates (part-time), Ph.D. Kansas State.

Research Assistant Professor:


The Department of Anthropology offers the Master of Arts and the Doctor of Philosophy degrees with concentrations in physical anthropology, cultural anthropology, archaeology, zooarchaeology, and folk culture.

THE MASTER'S PROGRAM

The formal requirements for the Master's degree include:

1. A minimum of three quarters of residence at The University of Tennessee, Knoxville.
2. A minimum of 45 quarter hours for graduate credit, including preparation of thesis. Thirty-six of these 45 hours must be in anthropology, 9 hours may be taken in closely related disciplines (at least two-thirds of the courses must be the 5000 level).
4. A thesis. In addition to the two (2) copies required by The Graduate School, one bound copy of the thesis is to be presented to the department and one bound copy to the student's thesis advisor.

THE DOCTORAL PROGRAM

Although there is no minimum credit hour requirement for the Ph.D. degree, students in this program should plan to devote to its attainment no less than 3 years beyond the B.A. level and to complete the following requirements:

1. Admission to Ph.D. program through passing Graduate Evaluation Examination at completion of first year of study, or through departmental acceptance of a previously earned M.A. degree in Anthropology.
2. Formation of an advisory committee and establishment in consultation with that committee of a program of study. Delineation of field(s) of competence by the student and committee and subsequent presentation to graduate advisor.
3. Demonstration of competence in a foreign language as determined by the student's committee.
4. Successful completion of oral and written comprehensive examinations and admission to candidacy.
5. Successful completion of the dissertation and final oral examination.

3070 Genetics and Society (3) (Same as Botany 3070.)

3410 Principles of Cultural Anthropology (3) Basic concept and objectives in study of culture. Range of cultural phenomena and approaches to its study. Recommended prereq: 2530. (Same as Religious Studies 3440.) For Sp

3440 Religion of Primitive Peoples (3) Religions of nonindustrial peoples. Place of religion in their social and cultural systems. Recommended prereq: 2530. A

3450 Community Studies in Complex Culture (3) Review of cross-cultural comparative urban and village communities and methodologies used in community studies. Recommended prereq: 2530. A

3530 Peoples and Cultures of Africa (3) Ethnographic survey of the aboriginal cultures of sub-Saharan Africa. Cultural diversity and human ecology in area perspective. Recommended prereq: 2530. F

3540 North American Indian (3) An ethnographic survey of cultures of Arctic, Southwest, Plains and Eastern Areas. Emphasis on cultural differences of peoples occupying these areas during precontact period. Recommended prereq: 2530. Sp

3555 Cherokee Ethnohistory (3) Survey of sociopolitical aspects of internal affairs and external
4300 Readings in Anthropology (1-9) Intensive reading, problem oriented. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

4340 Field Work in Anthropology (3-9) Practicum work surveying, excavating, processing, and analyzing data. Prereq: 2510-2520 and consent of instructor. May be repeated. Maximum 9 hrs. E

4400 Cultural Ecology (3) Survey of concepts and methods in studying dynamic interaction between cultures and their environments. Topics include ecological theory, methods of analysis, and application from selected case studies. Prereq: 2520, 2530, 3410 or consent of instructor. A

4420 Dynamics of Culture (3) Culture change: innovation, diffusion and acculturation; cultural continuity and stability. Prereq: 2530 or consent of instructor. A

4430 Personality and Culture (3) Analysis of relation among individual, society and culture. Application of psychological techniques in cross-cultural studies. Cultural differences and their influence on group behavior. Prereq: 2530 or consent of instructor. A

4440 Urban Anthropology (3) Survey of theoretical and methodological issues anthropologists encounter researching cross-cultural urban settlements. Focus on anthropological perspective and urban problems and planning. Prereq: 3450 or consent of instructor. A

4460 Current Trends in Anthropology (3) Analytical integrative review in symposium of the current debates, research directions, theories, fieldwork methods, and general assumptions of the four subfields of anthropology: archaeology, physical anthropology, linguistics, and cultural anthropology. Sp

4550 Indians of the Southeastern United States (3) Survey of Southeastern Indian cultures; emphasis on aboriginal adjustment to environment; lifeways of Southeastern American groups prior to European contact. Prereq: 2530, 3540 or consent of instructor. A

4560 Cherokee Ethnology (3) Intensive survey of ideology and material aspects of Cherokee culture existing at time of first European contact.

4600 Method and Theory in American Archaeology (3) Historical development of New World archaeology with emphasis on theory and field techniques. Prereq: 2520 or consent of instructor. Sp

4610 African Prehistory (3) Survey of cultural history in Africa, south of the Sahara, from earliest evidence of human activity to time of European contact. Prereq: 2520, 2530 or consent of instructor. Sp

4640 Zooarchaeology (3) Basic osteological studies of vertebrate classes; emphasis on aboriginal human's utilization of native animals in subsistence and trade. Identification, analysis, and interpretation of archaeologically derived molluscan and vertebrate remains. F

4650 Archaeology of Southeastern United States (3) Intensive study of prehistoric American Indian. Special emphasis on Tennessee prehistory. Prereq: 3610 or consent of instructor. W, A

4720 American Folklore (3) Anthropological perspectives of folklore of geographical regions and ethnic groups in the United States. Prereq: 3700 or consent of instructor. Sp

4740 Southern Appalachian Folk Culture (3) Survey of settlement history and economic development of southern Appalachia in relation to traditional culture: technology and economics, social organization, beliefs and values, oral traditions, and customs. Prereq: Consent of instructor. F

4741 Research in Southern Appalachian Folk Culture (3) Research-oriented, wide range of traditional culture in Southern Appalachia: settlement patterns, folk housing, economy, clothing, beliefs, spiritual practices, oral traditions and customs. Prereq: 4740. May be repeated. Maximum 6 hrs. F

4760 Italian Folklore (3) (Same as Italian 4760.)

4930 Physical Growth and Constitution (3) Comparative growth patterns throughout the human life cycle, skeletal and dental maturation, sex differences in growth; human constitutional types. Prereq: 2510 or consent of instructor. F

4940 Biology of Native Americans (3) American Indian zoology and ethology, with emphasis on the study of skeletal remains and morphology and genetics of living populations. Emphasis on North American Indians. Prereq: 2510 or consent of instructor. Sp

4950 Primeval Studies (3) Survey of field and laboratory methods and techniques of primatology and other human primate behavior. Prereq: 2510 or consent of instructor. A

4960 Primate Paleontology (3) Survey of fossil primate forms; origin and evolution of major primate lineages, emphasizing the earliest Hominid and related forms. Prereq: 2510. Recommended prereq: Zoology 4360. F


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

5000 Thesis (1-15) P/NP only. E

5010 Graduate Research (1-9) Independent investigation of special problems in anthropology. May be repeated. Maximum 18 hrs. E

5100 Seminar in Cultural Anthropology (3-9)

5101 Foreign Study (1-12) See page 103.

5102 Off-Campus Study (1-12) See page 103.

5103 Independent Study (1-12) See page 103.

5149 Laboratory Studies of the Vertebrate Skeleton (4) Examination and comparison of skeletons of major groups of fish, amphibians, reptiles, birds, mammals. Oriented toward identification of archaeologically derived faunas. May be repeated. Maximum 8 hrs. Sp, A

5159 Laboratory Study of the Mollusca (4) Examination and identification of terrestrial and freshwater molluscs 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 9 hrs.

5180 History of Thought in American Archaeology (3) Intensive review of continuity and change in concepts and methodologies, contributions of influential archaeologists. Prereq: 2520, 3610 and consent of instructor.

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

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

5220 Nutritional Anthropology (3) Anthropological contributions to study of food-related cultural and biological variability in present and past populations. Prereq: 2510, 2520, 2530 or consent of instructor. Recommended: Basic nutrition course.

5340 Fieldwork in Archaeology (3-9) Practicum work surveying, excavating, processing, and analyzing of data; intensive reading. Prereq: 9 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. Prereq: Consent of instructor.

5450 Comparative Social Organization (3) Social structure in nonliterate societies. Kinship, age, sex, locality, and other factors in determining relations between individuals and groups. Prereq: At least one area course.

5460 Quantitative Methods in Anthropology (3) Application of quantitative methods to anthropological data. Correlation and derivative procedures, distribution analysis, discriminant analysis, and implementation of computer routines. Prereq: Statistics 2100 or equivalent.

5470 The Healer in Cross-cultural Perspective (3) Graduate seminar in the cultural and medical roles of healers in predominantly non-Euro-American cultures. Prereq: 4520 W.

5510 Education in Cultural Perspective (3) Same as Curriculum and Instruction 5510.

5511 Non-Western Education: Anthropological Approaches (3) Analysis of traditional educational practices among non-Western peoples, problems facing non-Western education models of education among American Indian, African tribal groups and Asian cultures. (Same as Curriculum and Instruction 5511 W).

5600 Theory in Archaeology (3) Review of development of archaeological theory. Coverage up to and including recent systems approaches. F.

5610 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 six times.

5620 Problems in Old World Archaeology (3) Selected topics and research problems in European, Asian and African prehistory investigated in depth. Prereq: Consent of Corr. May be repeated Maximun nine times. (Same as Classics 5620.)

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; archaeology and public; conservation archaeology as career. May be repeated. Maximum six hrs.

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

5670 Seminar on Aborigonal Lithic Resources (3) Training and research in stone materials utilized by prehistoric populations—cultures, natural occurrence and geological context, relative abundance and quality extraction and distribution, processing and ultimate forms and functions. Theory and implementation of regional resource surveys, discrete regions in terms of lithology and cultural homogeneity, particularly East and Middle Tennessee. Input from professional geologists, and field research. Recommended prereq: 5650.

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 six hrs.

5900 Dental Anthropology (3) Dental anatomy, theories of dental evolution, genetic and environmental influences controlling dental morphology, comparative primate dental morphology, dental trait analysis, and uses in studies of differential 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 application to growth, nutrition and human engineering. Prereq: Consent of instructor.

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 anthropological principles to determine sex, age, race, and sex of skeleton and preparation of reports for legal medicine. Prereq: 3900 Sp.

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 measures of biological relationships as they relate to population as adaptive unit. Prereq: 3900 F.

5950 Paleopathology (4) Identification and descriptive analysis of pathological conditions affecting human skeleton. Reintegration, homologous, and gross visual examination of skeletal material. Prereq: 3900 and/or consent of instructor. Lecture and lab.

5960 Dermatoglyphics (3) Methods of dermatoglyphic analysis: genetics and population variation of various dermatoglyphic elements: forensic applications; relationships to various genetic and chromosomal abnormalities. Prereq: Consent of instructor.

5980 Neanderthal Man and Human Evolution (3) Morphological, physiological, and evolutionary relationships of Neanderthals. Prereq: 4970 or consent of instructor. W.

5990 Human Variation (3) Nature of human biological variation with emphasis on microevolutionary processes responsible for establishing and maintaining variation and relationships of variation to populations. Prereq: 3930 or consent of instructor.

6000 Doctoral Research and Dissertation (1-15) P/NP only. E.

6220 Seminar in Nutritional Anthropology (3) Analytical review of major theoretical viewpoints in nutritional anthropology. Prereq: 5220 and consent of instructor.

6410-30 Seminar in Cultural Anthropology (3) Seminar is offered each quarter primarily for doctoral candidates.

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

6810 Selected Topics in Physical Anthropology (3) May be repeated. Maximum nine hrs.

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

7000 Doctoral Research and Dissertation (1-15) P/NP only. E.

7220 Seminar in Nutritional Anthropology (3) Analytical review of major theoretical viewpoints in nutritional anthropology. Prereq: 5220 and consent of instructor.

7410-30 Seminar in Cultural Anthropology (3) Seminar is offered each quarter primarily for doctoral candidates.

7610 Selected Topics in Archaeology (3) May be repeated. Maximum nine hrs.

7810 Selected Topics in Physical Anthropology (3) May be repeated. Maximum nine hrs.

7970 Seminar in Human Paleontology (3) Prereq: 4970 or consent of instructor.

DEGREE REQUIREMENTS FOR M.A.

1. Successful completion of 30 hours of dissertation research and (2) use of Department of Art facilities so as to make their research as productive as possible. Inter-area studies must normally be approved by the faculty no later than the third quarter in residence. Fifteen hours of the major must be in second year courses.

2. Twelve hours of art history for graduate credit.

3. Seminar in Art History (4 hours) and Seminar in Art Criticism (4 hours)

4. Ten hours of electives which may consist of any committee-approved combination of graduate credit courses outside the student's departmental concentration.

5. First year evaluation: At the end of the first three quarters in residence the student must present work for evaluation by the faculty and receive permission to continue in the program.

6. Second year evaluation: At the end of the second year the student must present work for evaluation. The student must receive permission to register for the following:

   7. At least 30 credits in Lieu of Thesis (30 hrs)

8. Exhibition and oral examination: With the completion of all course work the student must present work for evaluation at the faculty and receive permission to register for Projects in Lieu of Thesis (Art 5999).
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 degree, or its equivalent, and reading knowledge of French, German, or Italian, unless waived by the art history faculty.

3516 Typography (4) Theories and techniques of typesetting and printing as fine art medium. Creative problems using type and printing presses. May be repeated. Maximum 12 hrs.

3517 Airbrush (4) Technique of airbrush. Emphasis on skill and creative applications. For art majors only. F, Sp.

3794 Medieval Art (4) Byzantine and western art of Middle Ages; manuscript illumination, Romanesque pilgrimage church, Gothic cathedral. F.

3795 Northern European Painting: 1530-1600 (4) From courtly art of late Middle Ages to Northern Renaissance. Jan van Eyck, Memling, van der Weyden, Bosch, and Durer; early printmakers. A.


3716 The Art of Italy, 1475-1575 (4) Leonardo da Vinci, Michelangelo, Titian, Raphael, Pontormo and Giorgione. F.


3726 The Art of Northern Europe 1550-1675 (4) Concentrated study of Bruegel, Rubens, Rembrandt, and other leaders of seventeenth century. F.


3776 Chinese Art (4) F

3777 Japanese Art (4) F

3811 Introduction to Museology (3) Concepts, practices, and logistical development of museums of art, archaeology, anthropology and science. (Same as Anthropology 3811.)


4900 Special Topics (2-4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.

4915 Individual Problems (4) Prereq: Consent of instructor. May be repeated. Maximum 16 hrs.

4106 Special Topics in Drawing (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.

4115 Drawing IV (4) Individualized pursuit of personal drawing techniques and concepts; individual and group critiques; weekly life drawing sessions. Prereq: 12 hrs 3115. May be repeated. Maximum 12 hrs. E.

4206 Special Topics in Painting (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.

4215 Painting IV (4) Individual concepts of personal expression with varied media on canvas. Prereq. 12 hrs 3215 for art majors; consent of instructor for non-majors. May be repeated. Maximum 12 hrs. E.

4256 Special Topics in Fiber and Fabrics (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.

4270 Fabric: Advanced Projects (4) Prereq: 8 hrs of 2270 or consent of instructor. May be repeated. Maximum 12 hrs.

4275 Fiber: Advanced Projects (4) Prereq: 8 hrs of 3275 or consent of instructor. May be repeated. Maximum 12 hrs.

4315 Watercolor IV (4) Individual concepts of personal expression with varied water-based media in paper. Prereq. 12 hrs 3315 for art majors; consent of instructor for non-majors. May be repeated. Maximum 12 hrs. E.

4406 Special Topics in Sculpture (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.

4415 Advanced Sculpture IV (4) Individual development of sculptural problems and techniques. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. E.

4470 Advanced Wood Sculpture (4) Application of laminations, carving, and jointing techniques in design and construction of contemporary forms. Prereq. 2450 or consent of instructor. May be repeated. Maximum 12 hrs.

4506 Special Topics in Graphic Design/ Illustration (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.


4516 Portfolio and Exhibition Techniques (4) Application of design principles to promotion, construction, display and evaluation for two- and three-dimensional artists. Prereq: Senior or graduate standing or consent of instructor. Sp.

4545 Visual Communications Seminar (2) Political, social, economic and ethical problems of contemporary design. Sessions with outside guest speakers and field trips. Prereq: 4515. W

4606 Special Topics in Printmaking (4) Student or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 12 hrs. F, W, Sp.


4855 Studies in Art History (2) Concentration in selected areas. Prereq: 16 hrs of art history and consent of instructor. May be repeated. Maximum 6 hrs.

4956 Special Topics in Ceramics (4) Student- or instructor-initiated course offered at convenience of department. Prereq: Determined by department. May be repeated. Maximum 16 hrs.


4970 Glaze Calculation (4) Prereq: Senior or graduate standing and consent of instructor. W

4971 Kiln Construction (4) Prereq: Senior or graduate standing and consent of instructor. Sp.

5000 Thesis (1-15) P/NP only. E

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

5011-21-31 Exhibition in Lieu of Thesis (3, 3, 3) S/N only. E.

5101 Foreign Study (1-12) See page 103.

5102 Off-campus Study (1-12) See page 103.

5103 Independent Study (1-12) See page 103.


5325 Graduate Watercolor II (2-6) May be repeated. Maximum 18 hrs. F, W, Sp.


THE MASTER’S PROGRAM

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

The intent of each major program is to provide the student with the scholarly and professional skills necessary for functioning as an independent professional clinician in any clinical environment. Within this broad coverage of speech pathology or audiology, it is possible to specialize to some extent. For example, in the M.A. in Audiology program, a student may emphasize audiological assessment, aural rehabilitation, medical or pediatric, or industrial audiology. Within the M.A. in Speech Pathology program, a student may emphasize language disorders, cultural or speech disorders such as aphasia or stuttering. Students interested in graduate study beyond the typical broad M.A. program should consult the department office or their advisor for lists of suggested courses, practica and independent studies.

Students majoring in the two areas are expected to complete the academic requirements for clinical certification from the American Speech and Hearing Association, including the required number of clock hours of clinical practicum. An exception to this rule must be approved by the Department Curriculum Committee. Enrollment in clinical practicum courses is required for all clinical practice experiences. If the undergraduate preparation does not include sufficient course work in speech pathology, audiology, psychology, and related fields, the student may be required to make up such deficiencies.

Students are required to choose a major or the non-thesis option. Students in both programs are required to take 5110 and 5119. The Master’s program with the thesis option will include a minimum of 45 quarter hours of approved graduate credit including 9 quarter hours of 5000 credit in the preparation of an approved graduate credit, including 9 quarter hours of 5000 credit in the preparation of an approved research tool(s) and a final oral examination. A minimum of 32 quarter hours must be at the 5000 or 6000 level. The decision as to choice of the thesis or non-thesis program is normally made following completion of 5110 and a conference with the student’s advisor.

THE DOCTORAL PROGRAM

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

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

The program will normally consist of three or more calendar years of graduate study beyond the Master’s degree with the first year being devoted primarily to formal course work and the last year to full-time research culminating in the doctoral dissertation. Specific programs of study will be determined by the student in consultation with his/her advisory committee. Within the general Graduate School requirements, specific requirements for the degree of Doctor of Philosophy in Speech and Hearing Science will include:

1. Successful completion of course work in the study of one or more research tools, or other specific scientific methodological vehicles pertinent to the research interests of the candidate. The choice of research tool(s) is subject to departmental approval.
2. A minimum of 9 quarter hours of graduate credit obtained in course work in a cognate field outside the Department of Audiology and Speech Pathology. These hours are in addition to those required in item 1 above.
3. Sufficient course work within the department 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. Pre-req: 3040, 3050, 3310, and consent of instructor.

4200 Practicum in 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.)

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

4320 Introduction to Clinical Practice in Speech Pathology (3) Pre-req: 3300, 3302, 3310, 4040, and consent of instructor. (Same as Special Education 4320.) S/NC only. E
systems, accountability, performance appraisal and clinical supervision. For audiologists and speech language pathologists interested in private practice, supervisory or administrative positions. Su

5600 Independent Study in Audiology (1-6) Special study in areas of research and development in field of audiology. May be repeated. Maximum 6 hrs. E

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

5651 Seminar in Language Differences (3) Significant research relevant to language difference of culturally different children. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

5700 Hearing Disorders (3) Advanced study of auditory disorders commonly encountered in medical environment. Etiology, pathology and etiologic considerations. Prerequisites and follow-up. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

5719 Psychacoustics Laboratory (2) Must be taken concurrently with 6010. W

5720 Psychoacoustics (3) Auditory reception and perception of sound stimuli. Prereq: Consent of instructor. F

5730 Hearing Disorders (3) Advanced study of theoretical and practical considerations of procedures to evaluate hearing of infants and small children. Prereq: Consent of instructor. F

5740 Pediatric Audiology (3) Advanced study of theoretical and practical considerations of procedures to evaluate hearing of infants and small children. Prereq: Consent of instructor. F

5750 Educational Audiology (3) Advanced case management; identification, follow-up; educational alternatives, teacher and student counseling. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

5790 Seminar in Psycholinguistic Concepts in Speech Pathology (3) Psycholinguistic concepts and information theory in studying the normal acquisition of language and certain disorders of language. Prereq: Consent of instructor. (Same as Psychology 5790.) Sp

5930 Advanced Aural Rehabilitation (3) Procedures and program, assessment of communicative functions and counseling strategies for hearing-impaired. Prereq: Consent of instructor. F

5940 The Verbo-Tonal System (3) Theory, procedures, and instrumentation of Verbo-Tonal System in habilitation, rehabilitation, diagnosis, speech therapy, and foreign languages. Prereq: Consent of instructor. F

5950 Seminar in Speech Science (3) Advanced study of experimental areas such as speech physiology, articulation analysis, recognition, perception and intelligibility of speech, communication theory, and psycholinguistic measurement of speech and language. Topics vary from quarter to quarter. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

6010 Experimental Phonetics (3) Acoustical and physiological analyses of speech production, acoustical analysis, recognition, perception and intelligibility of speech, communication theory, and psycholinguistic measurement of speech and language. Topics vary from quarter to quarter. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

6019 Experimental Phonetics Laboratory (2) Must be taken concurrently with 6010. W

6020 Psychacoustics (3) Auditory reception and perception of nonspeech acoustic signal; detectability, pitch, loudness, differential threshold, adaptation, and fatigue. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. W, A

6029 Psychacoustics Laboratory (2) Must be taken concurrently with 6010. W

6030 Seminar in Hearing Science (3) Advanced study of perception of nonspeech acoustic signal; intelligibility of speech, communication theory, and psycholinguistic measurement of speech and language. Topics vary from quarter to quarter. Prereq: 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 journals. Psychophysical methods for data acquisition. Generation of experimental designs based on parametric and nonparametric statistics. Prereq: Consent of instructor. S

6117 Theories of Hearing (3) Physiological process basic to classical theories of hearing related to sensitivity, loudness, pitch; and discrimination of acoustic stimuli. Prereq: Consent of instructor. S

6119 Advanced Instrumentation in Speech and Hearing Science (3) Selection, use and calibration of instrumentation used in speech and hearing research. Prereq: Consent of instructor. S

6500 Advanced Seminar in Audiology (3) Consent of instructor. 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 abstractions of voice, articulation, speaking time and rhythm, language development or use, and language symbolization. Prereq: Consent of instructor. May be repeated. E

6560 Directed Research (1-6) Participation in ongoing or non-dissertation 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 DEGREES

Biochemistry M.S., Ph.D.

Professors:


Associate Professor:

L. Huang, Ph.D. Michigan State.

Assistant Professors:

R. H. Feinberg, Ph.D. Cornell (Biology); E. Fierer, Ph.D. Virginia; J. W. Koontz, Ph.D. Kentucky; J. D. Richter, Ph.D. Arizona State.

The graduate program involves successful completion of a series of graduate courses and seminars. 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 extensive research leading to the Ph.D. dissertation and its oral defense.

THE MASTER'S PROGRAM

This program requires about two years of full-time study and provides both breadth and depth of training by mixing classroom instruction with research laboratory experience. Students completing this program will have a sound foundation in modern biology and chemistry and will be equipped to follow and absorb future advances in these fields. Recent graduates of this program are now involved in such occupations as industrial pharmaceutical research, junior college and high school teaching, hospital and university laboratory work, cancer research, scientific journalism, and pursuit of Ph.D. degrees.

Candidates usually should offer course work covered by an undergraduate major in the biological sciences, chemistry or biochemistry. Departmental requirements consist of the satisfactory completion of 45 credit hours of graduate work and the mastery of the subject matter of the following courses:

1. Introductory Organic Chemistry with laboratory (at least one year)*, 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.


4. At least 9 hours of advanced lecture or seminar courses from the following:

- Biochemistry 6410, 6010.

5. At least 9 hours of Master's research and a thesis.

6. A final oral examination which will cover both the thesis endeavor and the subject matter of the course requirements.

THE DOCTORAL PROGRAM

An incoming student must present course work covered by an undergraduate major in the biological sciences, chemistry or biochemistry. Departmental requirements for the awarding of the Ph.D. include mastery of the subject matter indicated in the following list of courses:

1. Introductory Organic Chemistry with laboratory (at least one year)*, Introductory Physics*, Differential and Integral Calculus*, minimum of three quarters of approved physical chemistry (Biochemistry 4210-20-30 or Chemistry 3410-20-30) and at least 18 hours of biology beyond the introductory level including at least 3 hours of genetics and 3 hours of physiology.


3. At least two quarters of approved graduate courses in biology, chemistry, physics, or other physical sciences, for example: Chemistry 5110-20-30-35, Chemistry 5340, Physics 5440, Physics 5510-20-30. No survey or review courses will be allowed.

4. At least two courses selected from 6110-20-30-40-50-60.

5. Participation in Biochemistry 6410 and in the Advanced Biochemistry Seminar (6010) during the entire period of residence.

6. Comprehensive examination: usually taken after the first year of study.

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

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

*Though completion of these courses or the equivalent is required, they may not be taken for graduate credit.
Petitioning for Master's degree: Students who have passed the comprehensive examination in the Ph.D. program and have completed at least 45 hours of approved course work for graduate credit, at least two-thirds of which must be at or above the 5000 level, may apply for a departmental award of a Master's degree. The additional requirements for such a degree shall be:

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

4110-20 Cellular and Comparative Biochemistry (4, 4) Electrophoretic behavior; chemistry and structure of proteins; enzyme behavior and biological function; catabolism and energy capture, synthesis metabolism; nucleic acid function; protein synthesis and biochemical genetics; regulation of biological processes. Must be taken in sequence. Prereq: Chemistry 3211-21-31, 3219-29-39, and 1 course from Biology 1240-49, Botany 1110-20. 3 lectures and discussion. F, W.

4119 Cellular and Comparative Biochemistry Laboratory (2) Basic biochemical procedures of gene regulation, physical and molecular biology. Prereq or coreq: 4110. F, W.

4210-20 Introduction to Physical Biochemistry (3, 3) 4210—Introduction to thermodynamics; phase stability and phase change; chemical potential; osmotic pressure; activity and the Debye-Hückel model; electrochemistry; membrane permeability; 4220—Elements of statistical mechanics, diffusion; collision theory; chemical kinetics and transition state theory, higher order kinetics; specialized kinetics of enzymatic processes; some biopolymer considerations. Prereq: Mathematics 1840-50-60, Chemistry 3211-21-31, 3219-29-39, and an introductory course in biology. F, W

4230 Introduction to Physical Biochemistry (3) Physical characterization of macromolecules; polarized light, absorption and fluorescence, sedimentation and transport hydrodynamics; electrophoretic mobility; conformational transitions and characterization of proteins; macromolecules; x-ray crystallography of proteins and nucleic acids. Prereq: 4220 or Chemistry 3430, or equivalent. Sp.

5000 Thesis (1-15) P/NP only. E

5300 Graduate Research Participation (3-9) May be repeated. Maximum 12 hrs.

5310 Experimental Techniques (3) Laboratory course in modern experimental methodology and instrumentation. Intended primarily for departmental graduate students. Prereq: Consent of instructor.

5320-30 Experimental Techniques (3, 3) Laboratory rotations. Student works in laboratory of faculty member on clearly defined project. Written proposal and oral report required. Intended primarily for departmental graduate students. Prereq: 5310. W, Sp.

5450 Special Topics (1-3) Registration only by prior arrangement with department. May be repeated.

5510-20-30 Advanced Biochemistry (3, 3, 3) Topics in biochemistry and molecular biology. Prior knowledge of important biochemical and biological structures, metabolic pathways, and fundamentals in gene expression. Lecture material, original literature and review articles. Experimental approaches to current problems in biochemistry and molecular biology. Desirable background in physical sciences: Must be taken in sequence. Prereq: 4110-20 or equivalent, or consent of department. F, W, Sp.

5610 Environmental Toxicology (3) Basic concepts in toxicology, interactions at subcellular level; cellular, organ, organismal, population, and environmental levels, legal aspects. Major emphasis on biochemical toxicology. Prereq: 4110-20. Chemistry 3211-21-31, 3219-29-39, or consent of instructor. (Same as Ecology 6510.) W

5640 Techniques in Environmental Toxicology (3) Survey of experimental techniques for assessment of presence, toxicity, and impacts of pollutants in global ecosystem. Laboratory exercises focus on analytical, biochemical, and bioassay methods employed in toxicological studies. Prereq: Chemistry 2140-49, 3211-21-31, 3219-29-39. (Same as Ecology 5640.) Sp

6000 Doctoral Research and Dissertation (3-15) P/NP only. E


6100 Advanced Topics in Biochemical and Biophysical Methods (1-3) Application of modern biochemical and biophysical techniques and instrumentation to biological macromolecules and membranes. Static and time-resolved fluorescence spectroscopy, calorimetry, magnetic resonances, x-ray crystallography, gene cloning, hybridoma technoloy, electron microscopy and others. Prereq: 5510-20-30 and 4230.

6120 Advanced Topics in Mechanisms of Enzyme Catalysis (1-3) Structures and functions of enzymes; specificity and rate accelerations; enzyme-substrate complex; Ipectivity of catalysis; measurements and magnitude of catalytic rate constants; rapid mixing techniques; relaxation methods; rate-determining processes; group transfer reactions; oxidations and reductions; eliminations, isomerizations and rearrangements and reactions that make and break carbon-carbon bonds. Prereq: 5510-20-30 and 4220.


6140 Advanced Topics in Membrane Structure and Function (1-3) Structural organization of biological membrane components, dynamic properties as studied biochemically and biophysically, selected topics of membrane functions related to structural organization. Prereq: 5510-20-30, 4230.

6150 Advanced Topics in Metabolic Regulation (1-3) Current literature. Regulation of enzymatic activity by metabolites or hormones; regulation due to ligand interaction with membrane proteins; receptor interaction, internalization, degradation and recycling. Prereq: 5510-20-30.


6410 Current Topics in Biochemistry (1) Seminars and lectures dealing with current advances in field of chemical biology. May be repeated with consent of department. Prereq: 5510-20-30.

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

6431 Current Topics in Environmental Toxicology (1) Critical reviews of research problems and methods in environmental toxicology; behavioral toxicology; advanced state of knowledge of global effects, biotransformation and epidemiology. Presentations by students, faculty and guest lecturers from academia and industry. May be repeated with consent of department. Maximum 6 hrs. (Same as Ecology 6431.) S/NC only. F, W, Sp.


6450 Advanced Special Topics (1-3) Registration only by prior arrangement with department. For students who have passed Ph.D. preliminary examination or are in advanced stage of graduate studies. Topic title posted in advance. May be repeated. Maximum 9 hrs.

Biology

4150 Scientific Illustration (3) Introduction to design and production of graphs, charts for scientific illustration; planning of poster presentations and displays. No graphics background required. Prereq: Advanced standing in a science curriculum; consent of instructor.

Botany

MAJOR

DEGREES

Botany

Professors:

R. W. Helton (Head), Ph.D. Michigan;
E. C. Cleieagh, Ph.D. Duke; H. G. Deselman, Ph.D. Ohio State; A. M. Evans, Ph.D. Michigan;
W. H. Herndon, Ph.D. North Carolina State; W. J. Ross, Ph.D. Texas; J. F. McCormick, Ph.D. Emory; F. H. Norris (Emeritus), Ph.D. Ohio State; R. H. Patterson, Ph.D. Colorado; A. C. Sharp (Emeritus), Ph.D. Ohio State; H. H. Shugart, Ph.D. Georgia; P. L. Warnie, Ph.D. Texas.

Associate Professors:

C. C. Amundsen, Ph.D. Colorado; J. D. Caponetti, Ph.D. Harvard; A. S. Heilman, Ph.D. Ohio State; R. R. Harke, Ph.D. Miami (Ohio); L. G. Hickok, Ph.D. Massachusetts; K. W. Hughes, Ph.D. Utah; B. Mullin, Ph.D. North Carolina State; O. J. Schwarz, Ph.D. North Carolina State; W. O. Smith, Ph.D. Duke.

Assistant Professors:

E. E. Schilling, Ph.D. Indiana; D. K. Smith, Ph.D. Tennessee; J. E. Wofford, Ph.D. Tennessee.

The Department of Botany offers the Master of Science and Doctor of Philosophy degrees with concentrations in anatomy, birology, cytology, cytogenetics, ecology, genetics, lichenology, morphology, mycology, physiological and pedology, and taxonomy.

Requirements for admission: In addition to the general Graduate School requirements (see page 11) the botany department also strongly recommends submitting aptitude and advanced scores from the Graduate Record Examination, at least three letters of recommendation from academic or professional persons, a short statement describing probable areas of interest in botany, and the following specific courses: (1) general botany or biology, 12 quarter hours; (2) advanced botany or closely allied biological sciences, 18 quarter hours; (3) physical sciences; general inorganic chemistry, 12 quarter hours organic chemistry and physics highly recommended; (4) college mathematics, 9 quarter hours.

General degree requirements are given on pages 19-22. 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. Special departmental requirements include successful completion of the following.

THE MASTER'S PROGRAM

A. Thesis Program

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

2. Demonstrated reading proficiency in one modern foreign language or in the use of computers for data analysis. Proficiency in a foreign language may be demonstrated by satisfactory performance on an examination or an A or B in French 3030 or German 3030 (can also be applied to the doctoral program). Proficiency in computer use may be demonstrated by satisfactory completion with a grade of A or B of the following computer science courses or their equivalent: Computer Science 1510 or 1610, Computer Science 2710, and Computer Science 4310 or 4850.

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


5. Presentation of a thirty-minute departmental seminar.

B. Non-Thesis Program

1. Satisfactory completion of 51 quarter hours of approved graduate courses of which 30 quarter hours must be in Botany 5000 and 5004.

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

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

THE 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 problem. Must be completed before enrollment in Botany 6000.

2. Satisfactory performance on a written and oral comprehensive examination.

3. Preparation of a thesis or more cognate areas outside of the department totaling 9 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.

*Note: Graduate School requirements are denoted by an asterisk. 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.

*3010-20 Plants in Evolution (4, 4) Monera to angiospermae; emphasis on evolutionary relationships, morphology and development. Prereq: 6 hrs. in biological sciences. F, W

*3030 Field Botany (4) Study of plants in natural environments including plant identification, collection, preservation and basic ecological concepts. Prereq: 6 hrs in biological sciences. Sp, Su

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

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

*3070 Genetics and Society (3) An introduction to genetics, anthropology and plant field trips, field recognition on their implications for human society. (Same as Anthropology 3070.) W

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

*3210 Introductory Plant Physiology (4) Organismal physiology of plants; water relations, mineral nutrition, morphogenesis, elements of metabolic processes, effects of age, light, natural rhythms, temperature and other environmental factors. Lecture and lab. Prereq: 1 yr general chemistry and 1 yr biological science. F, Sp, Su

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

4022 Field Lichenology (3) Field experience on identification of lichens, recognition of species and habitats; laboratory sessions. Prereq: 6 hrs botany. Recommended prereq: 3010-20 or equivalent.

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: 3010-20 or equivalent.

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

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

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


4061 Field Physiology (3) Field experience on identification of fresh water algae. Frequent field trips, field recognition of species and habitats; laboratory sessions. Prereq: 6 hrs botany. Recommended prereq: 3010-20 or equivalent.

4075 Botanical Photography (3) Photography of natural history subjects and achievement of technical and aesthetic skills and knowledge to produce illustrations for classes, seminar or public lecture. Landscape, habitat, close-up and small object photography, in color, using 35 mm format. Limited shared equipment available. Students encouraged to have own equipment. Film and processing costs paid by student. Photos processed and critiqued in class. Prereq: 6 hrs of botany. Recommended prereq: 3010-20 or equivalent.

4080 Field Pteridology (3) Field experience on identification of ferns and fern allies. Frequent field trips, field recognition of species and habitats, laboratory sessions. Prereq: 6 hrs of botany. Recommended prereq: 3010-20 or equivalent.


4240 Paleobotany (4) (Same as Geology 4240.)

4310 Plant Ecology (4) Interactions between individuals, species, communities and their environments. Concept of energy and matter in ecosystems. Weekly field trips or laboratory periods, and at least two weekend field trips. Prereq: 3030 or equivalent.

4830 Field Measurements in Plant Ecology (3) Practice in use of field and laboratory instruments for measurement of environmental factors, plant functions, and population ecology. Data collection, analysis and interpretation of data. Visits to highly instrumented field sites. Prereq: 3030 or equivalent, 1 yr physics and chemistry recommended. F

5000 Thesis (1-15) FPN only. 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

5003-04 Non-Thesis Research (3, 3) Library, field, or laboratory research under supervision of staff members. Not for thesis candidates. E

5011 Mycology (4) Intensive survey of fungi, including all major classes, utilizing lecture, laboratory and field information. Occasional field trips. Prereq: 3010-33 and lab. W, A

5021 Bryology (4) Taxonomy, phylology, ecology, physiology, and developmental morphology of bryophytes with emphasis on field studies and current research. Prereq: 3020. 1 hr and 3 labs. W, A

5022 Lichenology (4) Taxonomy, phylology, ecology, economic uses of lichens with emphasis on modern studies, field studies and current research. Prereq: 3010, 5011 or 4017. Recommended prereq: 5061. 1 hr and 3 labs. W, 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: 3330 or equivalent. 2 hrs and 2 labs. Sp, A

5061 Phycology (4) Intensive comparative study of major divisions of algae, both freshwater and marine. Taxonomical, ecological, morphological, developmental and phylogenetic aspects. Field and laboratory studies, identification and classification; introduction to experimental phycology. Prereq: 3010 or consent of instructor. 2 hrs and 2 labs. F, A

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. F, A

5070 Principles of Biological Illustration (3) Principles and application of photography, including photomicrography and photomacrography, drawing
ecosystem optimization and adaptation. Prereq: 5810. F, W.

5700 Plant Cytology (4) Intensive consideration of cellular organization, structure and function, with emphasis on correlation where possible of ultrastructure, 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 analytical centrifugation; photomicrography and microcinematography. Intended for graduate students in the biological sciences. 2 hrs and 2 labs. Sp, A

5810 Cytogenetics (4) Chromosome structure and behavior during mitotic and meiotic divisions in relation to structural changes, genetic controls, hybridization, speciation, and polyploidy. Laboratory emphasis on normal and aberrant meiotic systems and somatic chromosomes from plants and animals. Prereq: Biology 5110 and at least 6 additional hrs in biological sciences. Sp, A

5820-21-22-23-24 Methods and Instrumentation in Laboratory Investigation (1, 1, 1, 1, 1) Intensive field investigations and laboratory work using appropriate methods and instrumentation. Topics vary according to needs of students. May be repeated with consent of instructor. Sp, A

5850-51-52-53-54 Methods and Instrumentation in Field Investigations (1, 1, 1, 1, 1) Intensive field work using appropriate methods and instrumentation. Topics vary according to needs of students. May be repeated with consent of instructor. Sp, A

5910-20 Developmental Plant Morphology (3, 1) Developmental morphology of plants from aspect of general, analytical, organic and physical factors. Data from aspects of phenomena of morphogenesis-correlations, polarity, symmetry, differentiation, regeneration, tissue mixtures, abnormal growth, environmental and genetics factors. Prereq: 3010-20 or 4120, and 3210 or 5210 for 5910; 5910 to 5920, 2 hrs and 1 lab for 5910; 1 hr and 1 lab for 5920. F.

6000 Doctoral Research and Dissertation (3-15) P/N only. E

6010 Advanced Topics in Morphology of Vascular Plants (2-4) Needs of students determine content. Topics selected from broad categories of experimental anatomy, morphology, and morphogenesis. Prereq: 3010-20 or 4120, 5910-20 or consent of instructor. May be repeated with consent of department. Sp.

6060 Advanced Topics in Cryptogamic Botany (2-4) Advanced studies and current research in experimental physiology, mycology, bryology, phytology, or developmental morphology of cryptogams. May be repeated with consent of department. Sp.

6120 Advanced Topics in Cytology and Cell Biology (3-6) Requirements and interests of students determine topics, such as actions of chemicals on actively dividing cells, current ultrastructural research in selected cytoplasmic organelles and cellular systems, experimental cytology, cellular control of nucleic acid biosynthesis. Prereq: 5780; Biology 5110-20. May be repeated with consent of department.


6200 Seminar in the History of Botany (2) F, A

6220 Advanced Topics in Plant Physiology (2-4) Requirements of student determine content, including growth and growth hormones, minor element nutrition; photoperiodism; radiation effects. Prereq: 5210; 1 yr college physics. May be repeated with consent of department. Sp, A

6300 Advanced Topics in Ecology (2-4) Needs of student determine content, including community analysis; biogeochemistry; genome and paleoecology; biogeography and system ecology. Prereq: 4310, 5340, 5350. May be repeated with consent of department.

6390 Advanced Topics in Systematic Botany (2-4) Needs of student determine content, such as morphology and evolution; biogeography; systematic taxonomy; cens systems of classification. Seminars or lectures and labs depending on subject. Prereq: 3020-30, 5031. May be repeated with consent of department. Sp, A

Chemistry

MAJORS

DEGREES

M.S., Ph.D.

Professors:

G. Malmantov (Head), Ph.D. Louisiana State; J. E. Bloor, Ph.D. Massachusetts Institute of Technology; Ph.D. Princeton; C. A. Buehler, (Emeritus), Ph.D. Ohio State; F. E. Bull, Ph.D. Illinois; J. C. Chambers, Ph.D. Kansas State; A. T. L. Dann (Emeritus), Ph.D. Michigan; J. F. Eastham, Ph.D. California (Berkeley); W. H. Fletcher, Ph.D. Minnesota; G. W. Kalesa, Ph.D. Purdue; D. C. Kleinleiter, Ph.D. Princeton; J. W. Larsen, Ph.D. Purdue; M. H. Liebke, Ph.D. Wisconsin; R. M. Maigd, Ph.D. Yale; R. M. Pagni, Ph.D. Wisconsin; J. K. Persister, Ph.D. California (Berkeley); G. K. Schueler, Ph.D. Illinois; D. A. Shirley (Emeritus), Ph.D. Iowa State; W. T. Smith (Emeritus), Ph.D. Ohio State; W. A. Van Hook, Ph.D. Johns Hopkins; E. L. Wehry, Ph.D. Purdue; T. W. Williams, Ph.D. London; J. H. Wood (Emeritus), Ph.D. North Carolina.

Associate Professors:

J. L. Adcock, Ph.D. Texas; F. A. Grimm, Ph.D. Cornell; J. F. Kinzie, Ph.D. Akron; J. D. Kovac, Ph.D. Yale; C. A. Lahti, Ph.D. California (Berkeley); L. J. Magid, Ph.D. Tennessee; F. M. Scheff, Ph.D. Indiana; C. Woods, Ph.D. North Carolina State.

Assistant Professors:

S. D. Alexandaros, Ph.D. California (Berkeley); M. J. Sapian, Ph.D. Iowa State.

Students majoring in Chemistry for the Master's or doctoral degree are required to present as a prerequisite one year each of general, analytical, organic and physical chemistry with a satisfactory record. 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

*Alumni Distiguished Service Professor.
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 program leading to the M.S. degree with specialization in polymer science is conducted jointly with the Department of Chemical, Metallurgical, and Polymer Engineering, which offers a degree with similar specialization.

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

1. A research and a dissertation to give at 9 to 18 hours of graduate credit (5000).
2. Participation in seminars (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.)
3. Sufficient graduate course work in chemistry and/or a related field to make an overall total of 45 hours.
   a. 4160-70.
   b. Two of the following (except for polymer science): 5511, 5512, 5531.
   c. For emphasis in polymer science, 5531, 5140-51, Polymer Engineering 4910 and participation in the Polymer Seminar Program during the entire period of graduate study.
   d. For emphasis in environment, 5220, 5250-60-70, Ecology 5310, and Environmental Engineering 4030.
   e. For emphasis in energy, 5410, 5610-20-30, a chemistry sequence (5110-20-30-35 or 5250-60-70 or 5420-30 or 5710-20-30, 5810), Mechanical Engineering 4180, plus other courses from the following: catalysis, heterogeneous equilibria, kinetics, thermal science, combustion and propulsion engines, resource economics, nuclear engineering, and electrical engineering.
4. For specialization in chemical physics, an examination on the basic principles of mechanics, electricity, and magnetism; 5410-20-30-50, 5110-20 or 5710-20-30, 5210, 5610-20-30.
   a. For specialization in polymer science, 4160-70, 5511, 5140-50, 5160 or 5170, Polymer Engineering 4910; 30 hours of additional graduate course work, including at least 6 hours at the 6000 level and at least 12 hours of chemistry courses; participation in the Polymer Seminar Program during the entire period of graduate study.

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

All course selections must be approved by the appropriate departmental committee.

4. A final oral examination.

**THE DOCTORAL PROGRAM**

The department offers specialization in nine areas for the Ph.D. degree: analytical chemistry, chemical physics, environmental chemistry, energy, inorganic chemistry, organic chemistry, physical chemistry, polymer science, and theoretical chemistry.

The program in chemical physics is conducted jointly with the Physics Department which offers a similar degree.

A program leading to the Ph.D. degree with specialization in polymer science is conducted jointly with the Department of Chemical, Metallurgical, and Polymer Engineering, which offers a degree with similar specialization.

For the Ph.D. degree in 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. Participation in seminar (5911-21-31) during the entire period of graduate study.
3. Course and specialization requirements:
   a. 4160-70.
   b. Two of the following (except for polymer science): 5511, 5521, 5531.
   c. For specialization, analytical, inorganic, organic, physical, or theoretical chemistry, 39 hours of additional graduate course work including at least 6 hours at the 6000 level and one of the following groups: (1) for analytical, 5250-60-70. (2) for inorganic, 5420-30 or 5430-50 or 5410-20-30-50. (3) for organic, 5110-20-29-30-35; (4) for physical, 5340-50, 5410-20-30-50; Physics 5210.
   d. For specialization in environment or energy, a six-month internship in a governmental or industrial laboratory; 39 hours of additional graduate course work including 6 hours at the 6000 level and the following: (1) 5220, 5250-60-70, Ecology 5310, Environmental Engineering 4030, plus selected courses from other areas of chemistry, environmental engineering, meteorology, microbiology, health physics, ecology, or related science, statistics, and industrial health; (2) for energy, 5410, 5610-20-30, a chemistry sequence (5110-20-30-35 or 5250-60-70 or 5420-30 or 5710-20-30, 5810), Mechanical Engineering 4180, plus other courses from the following sequences: catalysis, heterogeneous equilibria, kinetics, thermal science, combustion and propulsion engines, resource economics, nuclear engineering, and electrical engineering.
   e. For specialization in chemical physics, an examination on the basic principles of mechanics, electricity, and magnetism; 5410-20-30-50, 5110-20 or 5710-20-30, 5210, 5610-20-30.
   f. For specialization in polymer science, 4160-70, 5511, 5140-50, 5160 or 5170, Polymer Engineering 4910; 30 hours of additional graduate course work, including at least 6 hours at the 6000 level and at least 12 hours of chemistry courses; participation in the Polymer Seminar Program during the entire period of graduate study.

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

All course selections must be approved by the appropriate departmental committee.

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

5. Demonstration of a reading knowledge of one of the following languages: French, German, Russian, Polish, and/or Russian alternate.
6. A final oral examination.

**3211-21-31 Organic Chemistry (3, 3, 3) Compound of carbon and their reactions, reaction mechanisms, spectroscopic and other physical properties. Must be taken in sequence. Prereq: 1110-20-30. Corresponding laboratory (3219-29-39) is a coreq for students not having credit for the laboratory. E.

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


**3511-21-31 Principles of Organic Chemistry (3, 3, 3) Structure and reactivity of aliphatic and aromatic compounds emphasizing reactions of synthetic utility. Use of spectroscopic and physical techniques to elucidate reaction mechanisms. Recommended for chemistry majors desiring training in general or physical or biological sciences. Must be taken in sequence. Prereq: 1110-20-30. Corresponding laboratory (3519-29-39 or 3219-29-39 or 3219-29-39 as a coreq; latter is recommended.

**3529-39 Organic Chemistry Laboratory (1, 1) Experiments on topics discussed in 3521-31. Similar to 3229-39 except designed for students who have need for operating knowledge of various spectroscopic and chromatographic techniques. Corresponding lecture (3521-31 or 3221-31) is coreq for students not having credit for the lecture.

**3810 Radioactivity and Its Application (3) Radioactive materials in tracer and therapeutic applications. Radioactive decay, detection apparatus and techniques, tracer procedures and safety precautions in agriculture, biology, medicine, nutrition. Not for credit by chemistry or physics majors or minors. Prereq: 1 yr of general mathematics or equivalent, 1 yr of general chemistry, 2 hrs and 1 lab. Sp.
4610 Advanced Chemical Experimentation (2) Laboratory course in application of modern experimental techniques to rate problems of chemical kinetics. Synthesis and characterization of organic and inorganic compounds with emphasis on independent study and write-up of research. Prereq: 3251-39, 3430-39, 4220. 4610 not open to students who have completed 4510, W, Sp.

4910-20-30 Biophysical Chemistry (3, 3, 3) Physicochemical principles with application to biologial and biochemial systems. Prereq: Not open to students having 3410-20-30, 4910—Gas laws; first, second and third laws of thermodynamics; equilibrium. 4920—Solution chemistry; electrochemistry; kinetics; nuclear chemistry. 4930—Elementary quantum chemistry; optical and magnetic spectroscopy; infrared and mass spectroscopy. Prereq: 1110-20-30; Mathematics 1540-50 or equivalent. F, W, Sp.

5000 Thesis (1-15) P/NP only. E


5140 Introductory Polymer Chemistry (3) Fundamental principles, role of chemistry in interdisciplinary field of polymer science; relation of molecular structure to bulk properties of polymers. Prereq: 1 yr each undergraduate organic and physical chemistry. Sp.

5150 Kinetics of Polymerization (3) Kinetics of formation and molecular weight distributions of polymers; kinetics of chain growth and chain growth polymerizations. Prereq: 5140 and 4160-70 or equivalent.

5180 Organic Chemistry of Polymers (3) Synthesis of monomers; mechanism, stereochemistry, and sequence distribution of polymerizations. Formation of block, graft, and network polymers. Reactions on polymers, including degradation. Prereq: 5140 and 5531. A

5170 Physical Chemistry of Polymers (3) Rubber elasticity; solution properties of macromolecules; structural, configurational, and conformational statistics of polymer systems. 5220 Analytical Chemistry of Environmental Polutants (3) Application of modern analytical chemistry to problems in aquatic and atmospheric pollution. Prereq: 2250-60-70 or consent of instructor. A

5240 Chemical Instrumentation (4) Principles of chemical instrumentation. Practice in design and construction of chemical instruments; special project. Prereq: Consent of instructor. 5250-60-70 Advanced Analytical Chemistry (3, 3, 3) 5250-Chemical separation methods. Fundamental principles, short-lived species like benzyne and carbenes, transition states, aromatic compounds, nuclear reactions, radiations and other chemical effects of electron excitation of organic systems. 5260—Solvent extraction, chromatography, electrochemistry; radioactive chemical methods; fluorescence; x-ray methods; 5270—Electroanalytical, magnetic and nuclear methods. Prereq: 5240. 5290 Quantum Chemistry (3) Postulate approach to fundamental principles of quantum mechanics. Accurate solutions to Schroedinger equation; approxiamte (ab initio and semiemipirical) molecular orbital methods; calculation of molecular properties. F, W, Sp.

5340 Quantum Chemistry (3) Postulate approach to fundamental principles of quantum mechanics. Accurate solutions to Schroedinger equation; approxiamte (ab initio and semiemipirical) molecular orbital methods; calculation of molecular properties. F, W, Sp.

5350 Quantum Chemistry (3) Electronic excited states of atoms and molecules; reaction rates and reaction mechanisms. Prereq: 3251-39, 3430-39. W


5511 Survey of Inorganic Chemistry (3) Atomic structure, wave mechanics, valence bond, and covalent bond, periodic relationships of elements, inorganic stereochemistry, coordination chemistry, and descriptive chemistry of the elements. F

5521 Survey of Analytical Chemistry (3) Volume, gravimetric analysis, acid-base, oxidation-reduction, 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, monofunction oxygenated derivatives, carbonyl compounds, stereochemistry, aromatics, and spectral 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 visiting lecturers from industry. Course content varies, selected topics from good past and current industrial research practices. Prereq: Completion of 5000 chemistry course sequence.

5610-20-30 Chemical Basis of 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 electrochemistry and photochemical conversion systems. Prereq: 5410 and one 5000 sequence.

5710-20-30 Theoretical Inorganic Chemistry (3, 3, 3) 5710—Nature of chemical bonding; ionic, covalent, metallic, molecular. 5720—Coordination complexes. 5730—Descriptive methods of structural inorganic chemistry. Prereq: 1 yr of physical chemistry.

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

5911-21-31 Chemistry Seminar (1, 1, 1) Departmental research seminar. 5911 Seminar in Research, current research literature, general topics. May be repeated. Registration required each quarter except summer for resident graduate students. 5911-21-31-59 only. F, W, Sp.

6000 Doctoral Research and Dissertation (1-15) P/NP only. F

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.


6190 Organometallic Chemistry (3) Structure, binding and synthesis of organometallic reagents. Applications to current work in organic synthesis. Prereq: Two of 5110-20-30-35.

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: environmental chemistry, spectroelectrochemistry, modern liquid chromatography, new electroanalytical methods, bioanalytical methods, and miniaturization and microprocessor applications in chemical instrumentation. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. A

6311 Selected Topics in Polymer Chemistry (3) Subject matter varies among important topics of current significance. Prereq. Two of 5140-50-60-70 or consent of instructor. May be repeated.

6320 Natural Polymers (3) Structure, modification, and nonbiochemical utilization of natural polymers and biomacromolecules derived from naturally-occurring monomers. Prereq: 5140 or two of 5110-20-30-35.

6411 Selected Topics in Physical and Theoretical Chemistry (3) Subject matter varies among important topics of current significance. Prereq. Two of 5140-20-30-30, 5340-50. 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 molecular structure and behavior. Prereq: Two of 5110-20-30-35.

6430 Photochemistry and Radiation Chemistry (3) Fundamental physical and chemical processes pursuant to excitation of molecules by photons and electrons; multiphoton processes and uses of laser sources; fluorescence and phosphorescence; radiationless transitions as studied by opacoatomic 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 5250.

6475 Electronic Structure of Radicals (3) Applications of spin-resonance techniques to study of molecular conformation, structure, and bonding in organic and inorganic radicals; comparison of experimental results with theoretical predications based on Wals rules and on INDO molecular orbital calculations. Prereq: 5340-50 and 6520.

6480 Statistical Thermodynamics (3) Application of statistical mechanical methods to systems of chemical interest such as isotope effects on equilibrium and rate processes, phase equilibria, condensation phenomena. Prereq: 5410, 5450.

6495 Advanced Chemical Kinetics (3) Mechanism of elementary chemical reactions at molecular level including topics such as dynamics of molecular collisions, potential-energy surfaces, reaction cross-sections, "direct" vs "complex" modes of reaction, photofragmentation, energy partitioning and transfer, chemical ionization, and chemical lasers. Prereq: 5430.

6510 Thermodynamics of Solutions (3) Theory of regular solutions and solutions of electrolyte solutions; measurement of activity coefficients and other thermodynamic properties; selected topics from literature. Prereq: 5410.
4370 Readings in Medieval Latin (3) A
4510-20 The Latin Epic: Lucanetus, Vergili (3, 3) A; A
5510-20 Roman Comedy: Plautus (3, 3) A; A

General Courses

3210 Early Greek Mythology (3) Comprehensive study of Greek myths through readings, lectures, and discussion with emphasis on significance for Greek thought and religion. Slides and tapes illustrate influence of Greek myths on art, music, and literature of ancient Greek and later cultures. (Same as Religious Studies 3210.) F

3220 Greek Mythology in the Classical Period (3) A A

A study of use of myth in literature, history, religion, philosophy, and art of Classical Age of Greece, and change of attitude toward myth from earlier periods. Familiarity with basic Greek myths is assumed. Readings, lectures, slides, and discussion. (Same as Religious Studies 3230.) Sp

3230 Roman Mythology (3) Study of myths created by Romans, as well as those the Romans borrowed from the Greeks, with reference to Roman attitude toward history, religion, and society. Readings, lectures, slides, and discussion. (Same as Religious Studies 3230.) Sp

3310 Art and Archaeology of the Aegean Bronze Age and Early Greece (3) A A

Troy, the Cyclades islands, Greek mainland, and Crete. Emphasis on palaces of Crete and Mycenae, Tiryns and Pylos, their fall, the following Dark Age, and rebirth of Greek civilization. Illustrated lectures. W

3320 Art and Archaeology of Archaic and Classical Greece (3) Survey of development of Greek architecture, sculpture, and painting from 650 B.C. to death of Alexander. Illustrated lectures. W

3330 Art and Archaeology of Hellenistic Greece and Rome (3) A A

Study of Greek and Roman sculpture, painting with attention to city planning. Illustrated lectures. Sp

3340 Cities of the Greek and Roman World (3) Archaeological surveys 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 Athens, Mycenae, Priene, Alexandria, Rome, and Lepcis Magna will be studied. F

3350 Shrines and Sanctuaries of the Greek and Roman World (3) Survey of major shrines and sanctuaries of Greek and Roman world with emphasis on archaeological remains. Such sites as Olympia, Ephesus, Corinth, Delphi, and Baalbek will be considered. Readings in selected classical authors will add to understanding of place of great shrines and sanctuaries in Greek and Roman religion. F

4230 Seminar in Classical Studies (3) Special problems in literatures and other arts of Greece and Rome. May be repeated with consent of department. A

4510 Selected Readings in Latin Literature in Transition (3) Content varies, may be repeated with consent of department. A

4610 Studies in Classical Archaeology (3) Variable content course offering subject matter not taught in existing course, or concentrating on one aspect of existing survey. Prereq: According to topic. May be repeated. Maximum 9 hrs. A

5820 Problems in Old World Archaeology (3) (Same as Anthropology 5620.) A

4310 Selected Readings from Latin Literature (3) A
4320-30 Selected Readings from Latin Literature (3, 3) May be repeated. A; A
4340 Horace, Odes (3) A
4350 Tacitus (3) A
4360 Lucretius (3) A

4310 Selected Readings from Inorganic Chemistry (3) Subject matter varies among important topics of current significance: photoelectron spectroscopy, transition 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


6570 Molten Salt Chemistry (3) Structure, spectroscopic properties, solution thermodynamics, electrochemistry and phase equilibria of molten salts. Solutions of metals in molten salts. Prereq: 4110 and 5410 or equivalent.

6820 Molecular Vibration-Rotation Theory (3) (Same as Physics 6820.)

Classics

Professor: H. C. Rutledge (Head), Ph.D. Ohio State.

Associate Professors: G. C. Gessel, Ph.D. North Carolina; J. E. Shelton, Ph.D. Vanderbilt.

Assistant Professors: C. P. Craig, Ph.D. North Carolina; S. D. Martin, Ph.D. Michigan; D. W. Tandy, Ph.D. Yale.

The graduate courses in the Classics include the wider reading of Greek or Latin authors in a selected field, a more detailed study of one of the great departments of classical literature, and the development of background for the appreciation of Greek or Roman life and literature.

Greek

3010 Plato (3) A
3020 Herodotus (3) A
3030 Euripides (2) A
4020 Aeschylus, Sophocles (3) A
4040 Aristophanes (3) A
4050-60-70 Directed Readings in Greek (3, 3, 3) F, W, Sp

Latin

3440 Livy (3) A
3460 Elegiac Poets (3) A
3490 Selected Readings from Latin Literature (3) A

Computer Science

MAJOR DEGREE

Computer Science M.S.

Professors: T. Feagin (Head), Ph.D. Texas (Aerospace Engineering); F. Donaldson, Ph.D. Texas; R. C. Gonzalez, Ph.D. Florida (Electrical Engineering); R. T. Gregory, Ph.D. Illinois (Mathematics); E. L. Hall, Ph.D. Missouri (Electrical Engineering); G. R. Sherman, Ph.D. Purdue

*UT Space Institute.
Programming (3) Roots of equations, systems of linear equations, least-squares data fitting, numerical integration, numerical methods for ordinary differential equations. Introduction to FORTRAN. 3150 and 3155 may not both be taken for credit. Students with a knowledge of FORTRAN should take 3155. Prerequisites: Mathematics 2860. (Same as Mathematics 3150.)

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. Prerequisite: 1510 or 1610 or consent of instructor. Prerequisite or corequisite: Mathematics 2860. (Same as Mathematics 3155.)

3215 Discrete Structures II (3) Continuation of Computer Science or Mathematics 2215. Partially ordered sets, lattices, Boolean algebras. Propositional and predicate calculus. Trees and operator domains. Elementary discrete probability. Prerequisite: 2215. (Same as Mathematics 3215.)

3520 Assembly Language Programming (3) Machine and assembly language programming. Language for organization and analysis. Interpretation of memory dumps. Prerequisite: 2710.

4050 Number Systems for Digital Computers (3) Floating-point number representation, mixed-radix number representation, multiple-modulus number representation, finite-segment p-adic number representation, errors in floating-point computation, finite fields and exact computation using digital computers.


4225 Numerical Solutions to Equations and Numerical Approximations (3) (Same as Mathematics 4225.) F, W

4235 Numerical Methods for Ordinary Differential Equations (3) (Same as Mathematics 4235.) F, W, Sp

4245 Numerical Linear Algebra (3) (Same as Mathematics 4245.) F, Sp

4310 Statistical Data Processing (3) FORTRAN language programming. Analysis of scientific data. SPSS and SAS programs for standard statistical analyses; frequency distributions, percentages, data organization, and regression, analysis of variance. Not for credit for computer science majors. Prerequisite: Statistics 2100 or equivalent. F, Sp

4330 Independent Study in Computer Science (1-3) Special project in area of student's primary interest. To be directed by Computer Science faculty, perhaps jointly with student's faculty advisor. Prerequisite: Consent of instructor. May be repeated. Maximum 8 hrs.

4470 Programming Languages (4) Comparison and analysis of programming languages, design, features and implementation. Processors, operations, sequence control, data control, and storage management. Detailed discussion and programming experience in LISP, and either SNOBOL, APL, or SIMULA. F. Prerequisite: 4515. W

4510 Data Structures and Non-Numeric Programming (3) Data structures and algorithms for their manipulation. Arrays and orthogonal lists; stacks, queues, lists, binary trees, dynamic storage allocation; organization of files, programming languages for information structures. Prerequisites: 1020 and 2610.

4550 Systems Programming (3) Computer organization and advanced programming. Machine language and design of computers, representation of information, microprogramming, computer systems, input-output systems, interpreters, macro assemblers. Prerequisite: 3520 or equivalent.

4570 Introduction to Data Base Management Systems (3) Hierarchical, network and relational models; logical and physical views of data. Data definition and data manipulation languages. Data independence and data administration. Design and implementation of complex databases. Performance considerations; protection, integrity, security, and reliability. Prerequisite: 4510 or equivalent. Students may not receive credit for both 4570 and 4550.

4590 Advanced Systems Programming (3) Multi-tasking, overlays, advanced I/O techniques, high-level language macro, interrupt handling, multiprocessing facilities, virtual systems (all in a high-level language), and OS utilities. Prerequisite: 4510 and 4550.

4610 Operating Systems—Concepts and Facilities (3) Detailed examination of major operating system memory, processor, device and data management. Interrupts, machine-level input/output, loaders and relocation, device characteristics, data set organization, SPOOLing. Prerequisite: 4510 and 4550. Students may not receive credit for both 4610 and 5670.

4620 Operating Systems—Case Studies (3) Alternatives in operating system design, dynamic reorganization, segmentation, real time sharing, time sharing, slicing, protection, concurrency, real time systems. Examples from different operating systems analyzed as appropriate. Prerequisite: 4610 or equivalent or consent of instructor. W

4660 Principles of Compiler Design (3) Techniques of compiler design, scanning and parsing of languages—deciphering regular and context-free grammars. Prerequisite: 4710.

4710 Formal Languages and Automata (3) Grammars of Chomsky hierarchy and their recognizers. Properties of languages and machines. Emphasis on regular and context-free languages. Introduction to context sensitivity and computability and enumerability. Prerequisite: 2215. F, Sp


4750 Interactive Computer Graphics (3) Point plotting, vector generation, interactive graphical techniques, two- and three-dimensional transformation, perspective depth, hidden line elimination, shading, software and hardware system design. Discussion of use of these techniques in design, problem solving, mapping, architecture, and many other areas. 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.) Sp

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

4910 Analysis and Management of Computer Installations (3) Analysis and design of computer systems, implementation, justification, personnel in systems; perspective on systems. Prerequisite: 3520 or equivalent. W

4980 Special Topics in Computer Science (1-4) Credit determined at registration. Prerequisite: Recommendation of Computer Science staff. May be repeated with consent of department. Maximum 9 hrs.

5000 Thesis (1-5) F/P/NP only. E

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

5010 Computer-Assisted Instruction (3) History and development of CAI systems. Emphasis on studying success and failure of major projects, future role of CAI in education. Use of a CAI programming language to implement a CAI course. Prerequisite: 4510.

5050 Computer Modeling and Simulation of Physical Systems (3) Techniques for computer modeling and simulation. Inputs, driving functions, events and strategies. Time-step, step-size and time-step strategies as applied to various physical systems. Models to represent spatial relationships. Prerequisite: 3510 or 3155, and 3520 and Mathematics 5450-5460.

5100 Immigration to Computer Science (5) Designed for graduate students with limited computer science background who wish to enter computer science major or minor program. Advanced programming techniques; control of input-output devices; machine organization and assembly languages programming; introduction to data structures and algorithm analysis. Prerequisite: One course in programming.

5109 Immigration to Computer Science Practicum (3) Design and implementation of medium to large-scale computer programs. Corequisite: 5100.

5175 Introduction to Logic Design (3) (Same as Electrical Engineering 5175.)

5210 Artificial Intelligence (3) Simulation of intelligent processes by computer. Techniques of representation, search, and manipulation for various areas; problem solving, game playing, pattern perception, theorem proving, semantic information processing. Computer simulation of AI problems. Prerequisite: 4510 or consent of instructor. (Same as Electrical Engineering 5690.) W

5250 Medical Computing (3) Achievements and problems associated with application of computer technology to field of health care. Various areas of medical computing; laboratory data systems, patient monitoring systems, diagnostic assistance, patient records, automatic history taking, and hospital administration systems. Prerequisite: 4510. Sp

5310 Computer Networks (3) International Standards Organization open system interconnection model and protocols. Analysis of model as it applies to existing major longhaul networks. (ARPANET, SNA, DECNET, and X.25) and major local networks (ETHERNET). Prerequisite: 4510 and 4550.

5430 Advanced Compiler Design (3) Design and implementation of compilers, affix and two-level grammars, compiler-compilers, incremental compilation, run-time organization, data flow analysis, optimization, and error recovery. Prerequisite: 4600.

5455 Finite Difference Methods for Partial Differential Equations (3) (Same as Mathematics 5455.) F

5465 Finite Element Methods (3) (Same as Mathematics 5465.)

5475 Advanced Topics in Numerical Partial Differential Equations (3) (Same as Mathematics 5475.) Sp

5570 Database Management Systems (3) Data model theory, comparison of several existing data base systems, implementation and operation techniques, integrity, security, authorization and protection, hardware architectures, and future trends in DBMS area. Prerequisite: 4590. W

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

5670-80 Advanced Operating Systems (3, 3) Theory and analysis of operating systems. Synchronization and deadlock. Analysis of operating system user and designer interfaces, memory protection and virtual memory systems. Analysis of page swapping and placement strategies. Prerequisite: 4610 or equivalent or consent of instructor. F, W

5710 Finite Automata Theory (3) Finite-state sequential machines. Minimization, experiments, composition, regular sets and regular expressions. Nondeterministic, incompletely specified and linear automata. Prerequisite: 4710. A

5730 Computability and Computational Complexity (3) Computability and decidability; Turing...
machines and halting problem. Register machines. Recursive and recursively enumerable sets, partial and total recursive functions. Time and space bounded computations; the P vs NP problems. Pre-
requ: 4710. A

5750 Theory of Formal Languages (3) Phrase-
structure languages, their generators and proces-
sors. Type 0, 1, 2, and 3 languages, operations on
languages and grammars; deterministic context-free

5775 Combinatorial Algorithms (3) Algorithms for
solving optimization problems in graphs, networks
and matrices. Preises notions of time and space
complexity. Preq: 4730. (Same as Mathematics
5775). A

5790 Computer Architecture (3) Elements, major
components. Storage components and tradeoffs,
size, speed, virtual storage, cache storage. Proces-
sor organization, instruction set organization, stack
machines, pipelining, overlap and vector processors.
Operating system considerations. Preq: 5670 or
5940.

5810 Information Organization and Retrieval (3)
Organization, storage, searching and retrieval of
information. Development of IR systems from off-line
to modern on-line operations. Information analysis
and dictionary construction and operations. Search
and matching procedures; retrieval process. In-
formation dissemination systems. Data base retriev-
als systems. Preq: 4950. F

5840-50 Pattern Recognition (3, 3) Formulation of
pattern recognition problem. Role of pattern recogni-
tion within framework of artificial intelligence. Vector
representation of signals. Feature extraction. Deter-
mination and statistical pattern classification algo-
rithms. Syntactic pattern recognition. Examples of
practical applications. Computer solution of simplif-
ied pattern recognition problems. Preq: 3150. Sta-
tistics 3450 and Mathematics 4050 or equivalent.
(Same as Electrical Engineering 5670-80.) F, W

5880 Data Security (3) Need for security and
methods for achieving it; encryption, machine
architecture, hardware and software implementa-
tions, historical and current approaches. Case stud-
es in fraud and misuse. Preq: 3520 or consent of
instructor.

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

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

5970 Independent Study in Computer Science
(1-3) Consent of instructor. May be repeated. Maximum 9
hrs.

Cultural Studies

Asian Studies

3670 Islamic Literature in English Translation (4)
Survey from origins to modern period of major Isla-
ic literatures, especially Arabic, Persian and Tur-
kish. Readings include The Arabian Knights, The
Rubaiyat of Omar Khayyam and Gibran’s The
Prophet.

4010-20-30 Readings in Asian Literature (4, 4, 4)
Prereq: Mastery of intermediate level of Japanese,
Chinese, Sanskrit, or Arabic and consent of in-
structor.

4012 Selected Topics in Asian Studies (4) Content
varies. Maximum 12 hrs.

4531-32-33-34 Advanced Chinese (4, 4, 4, 4)
Taped language program. Preq: 3531-32 or
equivalent or consent of instructor. Must be taken in
sequence.

4531-32-33 Advanced Japanese (4, 4, 4, 4)
Reading in classics and introduction paid for points.
Grammar. Conversation, drill and composition prac-
tice with native speaker. Must be taken in sequence.
Preq: 3531-32-33.

Afro-American Studies

3140-50-60 Directed Readings in Afro-American
Studies (1-5, 1-5, 1-5) Designed for students who are in-
terested in doing intensive reading in some area of
Afro-American Studies which is defined by the stu-
dent and the instructor. Preq: 2010 or 2020 and
consent of instructor.

4210 Pan-Africanism: An Afro-American Per-
spective (4) American Pan-African movements and
theoriticians such as W.E.B. DuBois, Alexander
Grummel, Marcus Garvey, Paul Cuffe, Edward
Blyden, Chief Sam, John Russwurm, Stokely Car-
michael.

4310 Research in Afro-American Studies (4)
Deals with Black experience and research process.

4500 Issues and Topics In Afro-American Studies
(3-4) Problems, topics and issues in area of Afro-
American Studies. Content and credit determined by
instructor. May be repeated. Maximum 12 hrs.

4830 Afro-American Women in American Society
(4) Historical and contemporary social, economic
and political factors in American society as they re-
late to the Black woman. (Same as Women’s Studies
4850.)

4880 Afro-American Psychology (4) (Same as
Psychology 4880.)

Comparative Literature

4013-23-32 Special Topics in Comparative Litera-
ture (3, 3, 3) Content varies; may be repeated. F, W,
Sp

4050-60-70 Dante and Medieval Culture (3, 3, 3)
(Same as Italian 4050-60-70). A, A, A

5012 Comparative Theories of Literature (3)
Croce, Richards, Frye, Wellesk, and others. Prereq:
Completion of three literature courses in foreign lan-
guage above 3000, or equivalent. F

5022 Approaches in Comparative Literature (3)
French and American schools; “comparative litera-
ture” vs “general literature”; Van Tieghem, Carre,
Baldensperger, Wellesk. Preq: 5012; completion of
three literature courses in foreign language above
3000, or equivalent.

5032 Studies in Comparative Literature (3) Inde-
pendent research problems. Prereq: 5012 and 5022.

Cultural Studies

5101 Foreign Study (1-12) See page 103.

5102 Off-campus Study (1-12) See page 103.

5163 Independent Study (1-12) See page 103.

Linguistics

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

4020-30 Historical Linguistics, Neogrammarian
School, and Growth of Structuralism (3, 3) 4020—
Traces development of scientific approach to linguis-
tics from Jacob Grimm and Franz Bopp through
nineteenth century. 4030—Traces change in linguis-
tic 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 4250.)

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

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

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

4440 Sociolinguistics (3) (Same as English 4440.)
writing, specialize in teaching writing courses at the college level, or work as professional writers in business or industry. Students who go on to complete the Ph.D. may also find the M.A. with Writing Option helpful when they are seeking teaching positions.

1. A minimum of 36 quarter hours beyond the B.A. degree.
   a. 12 hours at the 6000 level.
   b. 12 additional hours at the 5000-6000 level. (A student may take only three hours of 5103 Independent Study toward the degree.)
   c. 12 hours for graduate credit at any level, including the 3000-4000 level.
   A student must take at least 15 hours in writing and 15 hours in literature, the remaining 6 to be selected from any English course at the proper level. Of the courses in writing, at least 9 hours must be taken at the 5000 level.

2. Students in the M.A. with Writing Option program may choose one of the following writing projects:
   a. A thesis, using research to analyze some aspect of writing or rhetorical theory, for which 9 hours credit is given. The nature and length of each project will be determined by the Director of Graduate Studies and approved after consulting with the student and his/her project director. In addition to the director, two other English Department faculty members will supervise and approve the project.
   b. A creative project, for which 9 quarter hours credit is given. A collection of poems or short stories, a short novel, a play, or a creative work of non-fiction prose would be acceptable as creative projects. The nature and length of each project will be determined by the Director of Graduate Studies after consulting with the student and his/her project director. In addition to the director, two other English Department faculty members will supervise and approve the project.

3. A final examination. A candidate presenting a thesis or creative project must pass a one-hour oral examination, consisting of questions covering the general history and interpretation of English and American literature, not merely the courses which he/she has taken. A reading list of primary works designed to help the M.A. with Writing Option project students is available in the Office of the Director of Graduate Studies in English. This reading list may be modified by the M.A. examining committee, meeting in a body with the student, to reflect the candidate's particular writing emphasis, but most of the oral examination should focus upon the literature outlined in the original reading list.

4. Evidence of proficiency in one foreign language, to be fulfilled in one of the following ways:
   a. The completion of a second year of language at college level with a grade of C or better.
   b. The completion of French 3020 or German 3020 at UTK with a grade of B or better.
   c. The passing of the regular Ph.D. language examination as currently administered at UTK.

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

THE DOCTORAL PROGRAM

The departmental requirement for the Ph.D. degree in English is completion of a minimum of three academic years of resident graduate study. This includes a balanced program of at least 72 quarter hours as follows: (A) 12 quarter hours in the 5000 level; (B) 18 quarter hours in the 6000 level; (C) 54 quarter hours in the 7000 level; (D) 27 quarter hours in the 9000 level; (E) 12 quarter hours in the history of English literature. In addition, 9 (or 8) 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 5000-6000 series may be repeated for credit with the permission of the department.

*2111 Written and Oral English for Foreign Students (6) Rapid review of English grammar structure, emphasis on the more advanced structural elements, oral and written drill. Required during the first quarter of residence of all foreign students (graduates, undergraduates and transfer students) who are not exempt from the above based on the English Proficiency Examination required of all 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 to Thomas and more recent poets.

3080 Modern American Poetry (3) From Robinson to Stevens and more recent poets.


3135 Tennyson and His Successors (3) Includes such poetry as that by the Pre-Raphaelites, humorists, and Decadents.

3136 Browning, Arnold, and Hopkins (3)

3150 Melville (3)

3210-20 English Literature and Culture of the Nineteenth Century (3, 3, 3) Survey of literature dealing with leading movements in politics, science, religion, and the arts. 3110-1800 to 1835, 1830-1890.

3411-12-20 Modern Drama (3, 3, 3, 3) 3411- Continental to 1930. 3412—Continental since 1930. 3420—British. 3430—American.

3510 Sixteenth-century Prose and Poetry (3) Wedgwood and his contemporaries.

3520 Elizabethan Drama (3) Marlowe, Jonson, and others.

3610 Restoration and Eighteenth-century Poetry (3) Emphasis upon Dryden and Pope.

3620 Restoration and Eighteenth-century Drama (3) Dryden through Sheridan.

3630 Restoration and Eighteenth-century Prose (3) Defoe, Addison, Steele, Swift, and others.

3670 The Age of Johnson (3)

3710 Literature of English Bible (3) Types of Old Testament literature, excluding Wisdom literature. A


3721 Introduction to Folklore (3) Essential terms and concepts in modern folklore-folk life studies. Emphasis on North American materials; folk tale, folk song, myth, legend, proverbs, superstitions, dance, games, and architecture.

3710-30 Comparative Literature (3, 3, 3) 3910—Ancient. 3990-Medieval and Renaissance. 3990—Modern. A

3840 The Novel of the Contemporary Western World (3) Huxley, Joyce, Conrad, others.

4010-20 Shakespeare (3, 3) 4010—Early plays, c. 1590-1601, including Henry IV, Twelfth Night, and Hamlet. 4020—Later plays, 1601-1613, with emphasis upon tragedies and dramatic romances. B

4042-43 Topics in Mode and Genre (3, 3) Content varies. Special topics in principal forms and modes of British and American literature, e.g., comedy, tragedy, epic, lyric, satire, etc. May be repeated with consent of department. Maximum 6 hrs each.

4045 Topics in Literary Theory and Criticism (3) Content varies. Special topics in theoretical and practical approaches to British and American Literature. May be repeated with consent of department. Maximum 6 hrs.

4097 Special Topics in Literature: Major Authors (3) Content varies. Studies in major British and American writers. May be repeated with consent of department. Maximum 6 hrs.

4050-60-70 American Novel (3, 3, 3) 4050—From earliest sentimental novels through Brown, Cooper, and Kennedy, and major figures to 1875. 4060—Harley James and Mark Twain through early works of Faulkner and Hemingway. 4070—Early thirties to present. F, W, Sp.

4099 Topics in Film Study (3) Content varies. In-depth study of particular directors, film genres, national cinema movements, or other topics. May be repeated with consent of department. Maximum 6 hrs.

4140 Advanced Technical Writing (3) For students planning careers in business, industry, education, and government who need technical writing skills. Definitions, process descriptions, sets of instruction, descriptions of mechanisms, recommendation reports, abstracts, proposals, and technical reports. Prereq: Junior standing in the student's major or consent of instructor. F, W.

4150 Professional Writing (3) Articles, theses, and dissertations in which data are marshaled and analyzed. Abstracts, varieties of documentation styles, proper use of visuals, guidelines, and procedures for manuscript submission, and process of editorial review. Prereq: 4140 or consent of instructor.

4250 Advanced Fiction-Writing (3) Further development of skills acquired in basic Writing Fiction course. Prereq: 3450 or consent of instructor.

4254 Writing the Detective and Mystery Story (3)
4500 Dialectology (3) Theories and methodologies of dialect research, fieldwork, and analysis. Prereq; 3340 or consent of instructor.

4455 Varieties of English (3) Theories, methodologies, and findings of English and American dialectology with emphasis on implications for cultural pluralism. Prereq 3330 or consent of instructor.

4460 Special Topics in English Linguistics (3) May be repeated with consent of department. (Same as Linguistics 4460.)

4471-81 English as a Second or Foreign Language (3, 3) Phonological and grammatical structure of present-day English. Analysis of differences (phonological, grammatical, and lexical) between English and another language. Prereq: Second year of a foreign language: 4481—Materials and methods of language teaching, with emphasis on preparation of materials and structured teaching situations. Theory of testing language competence and performance, with emphasis on construction of tests. Team teaching with an experienced member of the staff. Prereq 4471. (Same as Linguistics 4471-81) W; Sp

4910-20-30 Black Literature (3, 3, 3) Trends and developments.

4851 Southern Literature through the Nineteenth Century (3) Southern writing from colonial period to end of nineteenth century, including frontier humorists and local color writers. A

4852 Southern Literature in the Twentieth Century (3, 3) Voices of modern southern literature, the Fugitives and Agrarians, Faulkner and more recent writers such as Welty, O'Connor, and Porter. A

4660 Emerson and Thoreau (3)

4680 American Humor through Mark Twain (3)

4721-31-41 Ballad and Folktale (3, 3, 3) 4721—Study of traditional English and Scottish popular ballads and their North American variants. 4731—Study of native American ballad and folk tale; 4741—The folk narrative; functions, categories, and patterns of storytelling.

4850 Milton (3) Emphasis on major poems. A

4860 Seventeenth-century Prose and Poetry (3) Bacon and Donne to Marvell. A

5000 Thesis (1-15) P/NP only. E

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

5101 Foreign Study (1-12) See page 103.

5102 Off-campus Study (1-12) See page 103.

5103 Independent Study (1-12) See page 103. E

5140 Teaching Freshman Composition (3) Introduction to teaching of Freshman English through study of various techniques and philosophies of composition. Required of all first-year teaching Assistants. F

5150 Old English Prose (3) A

5179-80 History of the English Language (3, 3) 5179—Phonetic transcription, Old English, development of inflection and syntax. 5180—Middle and Early Modern English, developments in pronunciation and vocabulary. F; W

5210-20-30 Reading in American Literature from the Colonial Period to the Present (3, 3, 3) F,A,W; A, Sp, A

5240 Readings in Black American Literature (3) Critical analysis of poetry, prose, drama, criticism, historical and cultural background; discussion of relevance or irrelevance of race as influence on text and reader.

5250 Fiction Writing (3) Advanced fiction projects, under supervision of instructor and time for independent study. Prereq: Extensive background in reading and writing fiction.

5255 Writing of Advanced Non-Fiction Prose: The Genres (3) Practice in writing of biography, travel book, historical study, and associated genres. Prereq: 4000-level writing course or consent of instructor.

5270 Poetry Writing (3) Major poetic project or continuation of project begun in 4270. Individual consultation with instructor (supplements class analysis; readings in contemporary poetry and theory. Prereq. 4270 or consent of instructor.

5280 Special Topics in Writing (1-3) Topic varies. May be repeated. Maximum 9 hrs. Enrollment by consent of Director of Graduate Studies only.

5290 Analysis of Technical Writing (3) Theory and practice of technical writing. Exploration of current theories of scientific, business, technical, academic, and government rhetoric. Analysis of shared elements and practice in producing such writing. Prereq: 4140 or consent of instructor.

5310 Rhetoric and Composition: History and Theory (3) Modern developments in rhetorical theory, their origins in Plato, Aristotle, and others.

5410-20 Readings in Middle English Literature (3, 3)

5410-20 Readings in Literary Criticism from Plato and Aristotle to the Present Day (3, 3)

5410-20-30 Reading in English Literature of the Nineteenth Century (3, 3, 3)

5690 Film History, Rhetoric, and Criticism (3) Film as narrative art form: historical development of film; the "auteur," the "auteur" of film; critical approaches to film study, including genre, auteur, formalist, and historical-critical analysis of individual films.

5710-20-30 Readings in English Literature of the Eighteenth Century (3, 3, 3)

5810-20-30 Readings in English Literature of the Renaissance (3, 3, 3)

5860 Introduction to Literary Research (3) Critical examination of aims of English studies, profession of English teacher, theory of literature, and methods of research, including collecting of information, evaluation of material, and transmitting of results of scholarly research.

5910-20-30 Readings in English and American Literature of the Twentieth Century (3, 3, 3)

6000 Doctoral Research and Dissertation (3-15) P/NP only. E

6110-20-30 Studies in Elizabethan Literature (3, 3, 3) A

6140 Studies in Old English Language and Literature (3) For students who know Old English well and who wish to do research in literature, structure of language, paleography, Anglo-Latin backgrounds and sources, and related topics.

6150 Old English Poetry (3) Prereq: 5150.

6160 Beowulf (3) Prereq: 5150, 6150.

6170 Studies in Middle English (3)

6181-82-83 Studies in English Language (3, 3, 3)

6210-20-30 Studies in American Literature (3, 3, 3)

6241-42 Studies in Colonial American Literature (3, 3) 6541—From Thomas Hariot through Increase and Cotton Mather. 6242—From Jonathan Edwards to adoption of Constitution.

6270-80 Studies in American Fiction (3, 3)

6310-20-30 Studies in Victorian Literature (3, 3, 3)

6410-20-30 Studies in Chaucer (3, 3)

6510-20-30 Studies in Spencer and Milton (3, 3)

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. Humor, history of ideas, biography, autobiography, literature of travel, literature and extra-literary disciplines, etc.

6610-20-30 Studies in English Romanticism (3, 3)

6710-20-30 Studies in Eighteenth-century Literature (3, 3)

6810-20-30 Studies in Drama and Theatre (3, 3, 3)

6860 Textual Bibliography and Criticism (3) Study of evidence gathered from printing process to make critical judgments about text of literary work. Prereq: 5860 or consent of instructor.

6910-20-30 Studies in Twentieth-century Literature (3, 3, 3)

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); C. W. Minkel, Ph.D. Syracuse, T. H. Schmidmeier, Ph.D. Wisconsin.

Associate Professors: L. W. Brinkman, Jr.; Ph.D. Wisconsin; J. R. Carter, Ph.D. Georgia; C. T. Taludan, Ph.D. Danver (UT Space Institute); B. Ralston, Ph.D. Northwestern; J. B. Rehder, Ph.D. Louisiana State.

Assistant Professors: T. J. Blasing (Adjunct), Ph.D. Wisconsin; R. Foresta, Ph.D. Rutgers; L. Puleurher, Ph.D. Southern Illinois.

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

THE MASTER'S PROGRAM

The department offers both the thesis and non-thesis option for the Master of Science degree. Both options require a minimum of 45 quarter hours beyond completion of a sound undergraduate major program. At least
photographic imagery for interpretation and mapping of geographic data. Prereq: 4740 or consent of instructor. A

5790 Topics in Cartography (3) Trends, concepts, problems, and methods in cartography. Prereq: 4730, or consent of instructor. May be repeated with consent of instructor. Maximum 9 hrs. A

5799 Advanced Practicum in Cartography: Remote Sensing (2-4) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

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

6000 Doctoral Research and Dissertation (2-15) P/NP only. 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

6710-20 Seminar in Physical Geography (3, 3) A

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

Geological Sciences

MAJOR DEGREES
Geology M.S., Ph.D.

Professors: K. R. Walker (Carden Professor and Head), Ph.D. Yale; H. J. Keigwin (Emeritus), Ph.D. Ohio State; O. C. Kopp, Ph.D. Columbia; R. E. McLaughlin, Ph.D. Tennessee; K. C. Miura, Ph.D. Western Ontario; L. A. Taylor, Ph.D. Lehigh; J. G. Walls (Emeritus), Ph.D. North Carolina.

Associate Professors: R. W. Arnot, Ph.D. Northwestern; T. W. Broadhead, Ph.D. Iowa; P. A. Delcourt, Ph.D. Minnesota; S. G. Dries, Ph.D. Wrensong; T. C. Labbota, Ph.D. California Institute of Technology; N. B. Woodward, Ph.D. Johns Hopkins.

Two quarters each of chemistry and calculus, a two-course sequence in one of the following: physics, biology, botany; zoology; statistics; and one quarter of optical mineralogy are required if not taken as an undergraduate.

A minimum of one quarter enrollment for undergraduate credit in Geology 5350 is required during the senior year.

THE MASTER'S PROGRAM

The department requires a minimum of 45 quarter hours including at least 21 hours in courses (other than the 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 field camp are required to take Geology 4440, or an equivalent course elsewhere, as part of the above department requirements. Thesis committee and topic must be 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. Requirements include a minimum of 84 quarter hours in courses for graduate credit, in addition to dissertation. These courses must include a minimum of 45 hours in the 5000 or 6000 series, of which at least 15 hours must be taken in the second quarter. One-third of the required hours may be taken in related fields. A Master's degree is recommended.

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

3. Each Ph.D. student must satisfy a research tool requirement which will be determined by his/her faculty committee and which will consist of one of the following:
   a. Demonstration by examination of a reading knowledge in one modern foreign language in which there is a significant body of geological literature.
   b. Completion of course 3030 in an appropriate foreign language with a B or better.
   c. Courses (minimum of 6 hours) at 3000 level or higher taken for undergraduate credit and completed with a B average in appropriate mathematics, statistics, or computer science courses. The courses must be taken during a student's graduate program and must be approved by the student's entire committee.

In no case will option c above be available unless the student has had reading training as a college undergraduate in an appropriate foreign language.

*3180 Mineralogy (4) Introduction to crystallography and study of minerals. Laboratory includes hand specimen, chemical and x-ray methods of identification. Prereq: 1410, Chemistry 1110-20 or equivalent. 3 hrs and 1 lab. A

*3210-20 Invertebrate Paleontology (4, 4) Systematic review of important Metazoa invertebrate fossil groups. 3210—Porifera to Annelida, including cnidarians, echinoderms, brachiopods, and conodonts. 3220—Mollusca through lesser Chordata, including arthropods and echinoderms. May be taken separately or in sequence. Prereq: 3260; Biology 1210-20 or consent of instructor. 3 hrs and 1 lab or field period.

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

*3270 Geological History of Land Organisms (4) Geological history and development of terrestrial biota and ecosystem with special emphasis on fossil record of land plants and vertebrates. Prereq: Biology 1210-20 or consent of instructor. 3 hrs and 1 lab or field period.

*3310 Introductory Petrology (4) Introduction to classification and properties of igneous and metamorphic rocks, processes which produce them, and tectonic environments in which they form. Prereq: 3180, Coreq: 3190. 3 hrs and 1 lab. A

*3330 Geology of East Tennessee (4) Lectures and field excursions. Prereq: 12 hrs of geology and consent of instructor. 12 hrs and 1 lab. A

*3360 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. A

*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 see-

tions, structure contour maps. Prereq: 1420, Mathematics 1840-50 or equivalent 3 hrs and 1 lab. A

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

*3910 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) Ore-forming processes, classification, of mineral deposits, survey of different types of mineral deposits with examples. Prereq: 3180, 3190, 3310 or equivalents. Recommended. Prereq: 4610 3 hrs and 1 lab.

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 Paleocology (4) Principles of environmental analysis applied to fossil assemblages and associated lithologies. Prereq: 3260 or consent of instructor. 3 hrs and 1 lab.

4240 Paleoecology (4) Survey of geologically stratigraphically important microfossils and their biological association if known. Special emphasis is given fossil foraminifers, foraminifers, and palynomorphs. Prereq: 3260 or consent of instructor.

4307 Introduction to X-Ray Methods (1) Generation and nature of x-rays as applied to x-ray diffraction, x-ray fluorescence, and x-ray microprobe analysis. Prereq: 3180 or consent of instructor.

4308 Electron Microprobe and X-Ray Fluorescence Analysis (3) Application of electron microprobe analysis and x-ray fluorescence techniques as analytical tools for determination of chemistry of solid particles such as minerals and rocks. Prereq or coreq: 4307 or consent of instructor.

4390 X-Ray Diffraction Methods (3) Application of x-ray in identifying crystalline substances, including powder camera, Gandolfi camera and diffraction meter. Prereq or coreq: 4307 or consent of instructor. 2 hrs and 1 lab.

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

4370 Tectonic Styles (4) Tectonic evolution of structures and their associations with metamorphism, plate motions, and stratigraphic assemblages as determined through case study examination of different orogenic belts. Prereq: 3370 or consent of instructor. 3 hrs and 1 lab.

4460 Field Geology (9) Five-week field course, first term senior quarter. Advanced undergraduates or first-year graduates in geology. Employed entire time...
Students must show a fluent command of German, both oral and written, and a knowledge of two foreign languages, French and another language, such as Italian, Latin or Russian, appropriate to the field of research. A comprehensive examination, both written and oral, on German language and literature and the minor field or fields, must be passed before the student may be admitted to candidacy. The student will be examined on an extensive reading list which covers the whole range of German literature, and will be expected to show familiarity with major works of world literature. The candidate will be required to defend the dissertation in an oral examination, which will cover also the general area of the dissertation. Central emphasis is put on the doctoral dissertation as a final test of the candidate's scholarly qualifications.

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

3010-20-30 Elements of German for Upper Division and Graduate Students (3, 3, 3) Elements of German grammar, 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. No credit for students having completed elementary German.

3210-20-30 Seminar in Petrology (3) Prereq: 4610 or consent of instructor.

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, 3) Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation) or equivalent. Su

4160 Studies in German Authors (3) Life and works of a single outstanding German literary figure. Content varies. Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, or courses in English translation). May be repeated. Su

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

4210-20-30 Studies in German Literary Types (3, 3, 3) 4210—Lyric poetry. 4220—Drama. 4230—Narrative prose. Prereq: 9 hrs of 3000 courses (exclusive of 3010-20-30, 3510-20-30, 3310) or equivalent.

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

4260 Introduction to Historical and Comparative Linguistics (3) Linguistic change, protolanguages. Phonological and morphological change. Cultural, historical, sociological influences upon the development of language, phonemic change. Lexicography. All these topics copiously illustrated by selected examples from the various 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 translation, and general courses in Latin and Greek requiring no knowledge of these lan- guages), or consent of department. (Same as French, Russian, Spanish, and Linguistics 4260.) W

4270 Introduction to Germanic Linguistics (3) Phonetics and phonemics of German. Grammar and vocabulary from descriptive point of view. Dialects of German. Other Germanic languages.

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

4630 German Civilization (3) Prereq: Intermediate German or equivalent.

4810-20-30 Advanced Conversation and Composition (3, 3, 3) Prereq: 3810-20-30 or equivalent or consent of department. F, W, Sp

5000 Thesis (1-19) P/NP only. E

5100 German Phonetics and Advanced Grammar (3) Advanced work in phonetics, pronunciation, and selected topics in German grammar. For teachers and prospective teachers. Prereq: Consent of instructor.

5101 Foreign Study (1-12) See page 103. E

5160 Introduction to German Semantics (3)

5200 Semipracticum (3) Bibliography; methods; illustrative problems; preparation of papers. F

5210-20-30 College Teaching of German (1, 1, 1) Required of all M.A., MACT, or Ph.D. candidates, except those whose previous teaching experience warrants exempt 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; 5420-30—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)

5580 Modern German Literature (1899-1945) (3)

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

5600 German Literary Theory and Criticism (3) W

5610-30-40-50-60 Directed Readings in German Language and Literature (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 sagas as literary genre.

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

6000 Doctoral Research and Dissertation (3-15) P/NP only. E

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

History

MAJOR

History

DEGREES

M.A., Ph.D.

Professors

J. Morrow (Acting Head), Ph.D., Pennsylvania; P. H. Bergeirson, Ph.D., Vanderbilt; E. V. Chi-meliak, Ph.D., Harvard; R. E. Duncan, Ph.D., California (Berkeley); L. P. Gries, Ph.D., Berkeley; A. G. Haas, Ph.D., Chicago; Y. P. Hao, Ph.D., Harvard; R. W. Haskins (Emeritus), Ph.D., California (Berkeley); C. O. Jackson, Ph.D., Emory; M. M. Klein, Ph.D., Columbia; R. G. Landen, Ph.D., Princeton.

Associate Professors:

S. D. Becker, Ph.D., Case-Western Reserve; J. D. Bing, Ph.D., Indiana; J. Bohstedt, Ph.D., Harvard; J. R. Finger, Ph.D., Washington; C. W. Johnson, Ph.D., Michigan; P. A. Mars, Ph.D., Harvard; M. J. McDonald, Ph.D., Pennsylvania; J. Muldowny, Ph.D., Yale; P. J. Pinchney, Ph.D., Pennsylvania; E. Vanderford, Ph.D., Emory; J. G. Utley, Ph.D., Illinois; W. B. Wheeler, Ph.D., Virginia.

Assistant Professors:


THE MASTER'S PROGRAM

Plan I: Course requirements include History 5240 and 5270; 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 5270; two M.A. reading courses; 12 additional hours 5300 or above; at least 2 of which must be 6300 or above. Total hours—45.

M.A. IN HISTORY WITH A CONCENTRATION IN HISTORIC PRESERVATION

The option in historic preservation is a non-thesis program. Students will be examined in one field—historic preservation, and either American history to 1815 or American history since 1879. A student is required to take two M.A. readings courses: 5215 or 5216 and 5225.

Total hours 47, 26 outside the History department and 21 within.

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 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 over 5000. Not less than 45 must be in courses that are numbered over 5000. Not less than 45 must be in courses that are numbered over 5000. Not less than 45 must be in courses that are numbered over 5000. Not less than 45 must be in courses that are numbered over 5000.

3. Language Requirements: Candidates must possess a reading knowledge of one foreign language and such additional languages as may be determined by the student's committee. Under normal circumstances, those specializing in European history will need two languages. The committee may also specify any other research tools, such as statistics, essential for the student's preparation. Upon student petition, the committee may accept in place of a language a B or better performance in appropriate statistical courses and History 5290.

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

* By examination. When the student is ready to take a language examination he/she should consult with an advisor. The appropriate forms and the time of the examination may be obtained from the Graduate School.

(b) By course work. Upon consultation with the advisor, a student may elect to complete an appropriate 3010-20-30 sequence in a language department (or an intermediate sequence in a language in which no 3010-20-30 sequence is available.) Satisfactory completion requires that a student must have at least a B in the final quarter.

4. Comprehensive Examination and Committee: Incoming students will be advised by the department head.

The comprehensive examination must be taken by the student after coursework is completed, language requirements fulfilled, and at least nine months before the degree is expected. This exam should normally be taken after the first 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 work outside the History Department. Three of the four areas listed below must be represented by a major or a minor field, or both.

I. Ancient and Medieval

(a) Greece

(1) Ancient Near East

(Greece

(2) Rome

(3) Egypt and Middle East, 375-1122

(4) Late Middle Ages, 1095-1450

II. Early Modern

(a) Renaissance and Reformation

(b) Europe, 1559-1815

(c) Latin America to 1815

(d) Latin America, 1492-1825

III. Modern

(a) Europe, 1815-1914

(b) United States to 1815

(c) Latin America, 1817-present

(d) East Asia, 1641-present

(e) Middle East, 1798-present

IV. National, Sectional and Topical

(a) England, 1485-1763

(b) Great Britain, 1760-present

(c) France, 1559-1815

(d) France, 1789-present

(e) Germany, 1555-1806

(f) Germany, 1806-present

(g) Russia, 1600-1800

(h) Russia, 1800-present

(i) Colonialism and Imperialism

(j) Diplomatic History of the United States

(k) Social and Cultural History of the United States

(1) The South

(m) Frontier and Westward Movement

(n) African American History

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.
dynastic and religious struggles, rise of powerful princes, economic and cultural growth and decline. Medieval state, church and society; origins of Anglo-American law monarch and parliamentary government. Reformation, seventeenth-century politics, economy, culture and industrial revolutions; class conflict, empire, warfare, state world, wars, economic crisis.

3311-21 History of Tennessee (3, 3) 3311—Eighteenth Century to Civil War Era. 3321—1865 to present.

3411 The Renaissance (3) (Same as Religious Studies 3411.)

3412 The Reformation (3) Counter Reformation, and Wars of Religion, 1517-1618. (Same as Religious Studies 3412.)


3431-32 Nineteenth-century Europe (3, 3) 3431—French and industrial revolutions 1848. The milieu of ferment for conflicting economic, social and political ideas. The mounting in massive revolutionary upheaval. 3432—Maturity and change (1848-1890). Industrial and capitalist maturity in era of intense national rivalry, triumph of bourgeoisie, intellectual climate of realism, socialism, and materialism.

3445-46 History of France (4, 4) 3445—Emergence of Modern France (1715-1875). Social, intellectual and political transformations of the Revolution and the period of reform and reaction. The crisis of the Restoration. The search for a political solution to the problems of the Restoration. 3446—From the French revolution to the Napoleonic regime: age of experimentation as revolutionary and traditional France confront one another. 3446—Since 1871.

3470-80-90 History of Russia (3, 3, 3) 3470—To 1801. 3480—Nineteenth Century. 3490—Twentieth Century.


3870-80 Austria and Central Europe (3, 3) 3870—From Austria to World War I. 3880—First World War to present, 1914-1918.

3890-90 History of the Middle East (3, 3) 3890—Rise and spread of Islamic civilization to the sixth century. 3890—The impact of the West on the Middle East from the sixteenth century to World War I. 3895 Contemporary Middle East (4) Background of current problems in the area, from World War I to present.

3900 North Africa Since 1830 (3, 3) Morocco, Algeria, Tunisia, and Libya in the nineteenth and twentieth centuries.


3930-40 History of Latin America (3, 3) 3930—Colonial and independence, 1500-1825. 3940—National Development, 1825 to present.

3951 The United States, 1817-1914 (3) Impact of industrialization, urbanization, overseas expansion and Progressive reform programs upon American society.

3961 The United States, 1914-1945. (4) American experience during World War I, Great Depression, New Deal, and World War II. Emphasizes domestic history but includes military and foreign policy.


4015 Studies in History (3) 4015—Complete survey of history. 4015—The American experience. 4015—Comparative, international, or specialized course in history. 4015—May be repeated by non-majors. Maximum 8 hrs.

4130 History of Colonialism and imperialism (3) Nineteenth century to present.

4250-60-70 European Intellectual and Cultural History (3, 3, 3) 4250—From Reforma to the scientific revolution, 1500-1700. 4260—From the Enlightenment to the Age of Revolution, 1700-1870. 4270—From Subjectivism to Relativism, 1870-present.

4280 Women in European History (4) Comparative analysis of role and image of women in Medieval, Renaissance, and Early modern periods. Attention given to parallel changes in structure of family as well as relationship between Western culture and women's protest movements.

4290 Women in American History (4) Approaches of 4280 applied to American society.


4360 The American Experience in World War II (4) Team-taught. Diplomacy and warfare in Europe and Asia and impact of war on American society.

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 Western World (3) Civilian-military affairs from about 1900 to present. World War I and II, the Cold War; beginning with Dreyfus Affair, Army in Nazi Germany, and Truman-MacArthur controversy.

4410-20-30 Europe in the Twentieth Century (3, 3) 4410—1900-1919. 4420—1919-1939. 4430—1939 to present.

4470 Poland and Its Neighbors (3) A survey of Polish history from its beginnings to present with some emphasis on the Polish question within context of major political events.

4480 Russian Intellectual History (3) From eighteenth century to present, emphasizing problems of Westernization, nationalism, and revolutionary tradition.

4490 Soviet Foreign Policy (3) 4500 History of Medieval England (3) From Anglo-Saxons to coming of Tudors, relationship between legal and constitutional developments and structure of society.


4551 British Society and the Industrial Revolution, 1760-1848 (3) Emergence of modern industrial society: urbanization, mechanized factory production, social engineering via schools and police, mass politics and reform, class conflict, economic and population growth.

4570 Twentieth Century Britain (3) Emergence of welfare state, political impact of Labour movement, Welfare State and Depression, chronic economic crisis, persistence of class.

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

4641-51 America: Mind, Mood and Society (3, 3) Social and cultural history and thought from mythology behind colonization to major beliefs and values which form the foundation of present-day life in the United States. 4650—Colonial period to 1865. 4651—1865 to present.

4661 Studies in American Social and Cultural History and Thought (3) Intensive examination of specific themes, problems, or ideas.

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.

4680 History of Knoxville (3) Knoxville, Tennessee, as a historical case study to analyze interplay of tradition and change in urban America in general and urban South in particular. Economic growth and development, population changes, and political, social, and cultural conflicts of focus centered on change and modernization.

4710-20 Medieval History, (3, 3) 4710—Age of Heroes: 500-1000. Pattern of early medieval heroic, its social and cultural assumptions, individual who exemplify it, continuing harsh environment of early Middle Ages. 4720—Age of Chivalry; 1000-1300. Chivalry from heroes of feudal epics of eleventh century to questing knights of thirteenth century romances.

4741 Italian History (3) 1250-1500 (3) Policy of urban civilization in northern and central Italy in medieval and Renaissance periods. Architectural and townscapes forms studied in socioeconomic as well as cultural contexts. Florence is primary focus, but other major city-states also included.

4770-80 Austria and Central Europe (3, 3) 4770—To 1867. 4780—Since 1867.

4811-21 History of Japan (4, 4)

4840 History of Mexico (3)

4850 History of the Caribbean (3) Caribbean region from discovery and colonization to contemporary times.

4870-80-90 China (3, 3, 3) 4870—Chinese high culture from Confucius to Mao Tse-tung. Traditional religion, philosophy, fine arts, literature, culture, language, literature. 4880—To 1895. Uniqueness of Chinese experience, its influence...
540 Topics in American Social and Cultural History (3)
5645 Topics in American Urban History (3)
5650 Topics in the American Westward Movement (3)
5660 Topics in Afro-American History (3) May be repeated. Maximum 9 hrs. (Same as Religious Studies 5660.)
5670 Topics in American Colonial History (3)
5675 Topics in the Early National Period of American History (3)
5680 Topics in Nineteenth-century American History (3)
5690 Topics in Twentieth-century American History (3)
5720 Topics in Medieval History (3)
5750 Topics in Ancient History (3)
5780 Topics in German National Socialism (3)
5790 Topics in Middle Eastern History (3)
5820 Topics in Mexican History (3)
5850 Topics in Chinese History (3)
5860 Topics in Japanese History (3)
5910 Topics in Southern History (3) May be repeated. Maximum 9 hrs.
5940 Local and Regional History (3) Concept and application of regionalism, analysis and study of United States regional models. May not receive credit for both 4940 and 5940.
5950 Material Culture (3) Use of cultural artifacts—public, residential, and commercial buildings, photographs, films, clothing, furnishings—to gain insight into American past. Primary emphasis on 19th and 20th centuries.
5990 Historical Agencies (3) Management and organization: philosophy and purpose, problems of fund raising, and publication.
5990 Historic Preservation Internship (3) Practical work experience with regional historical agency, project or site. Students expected to do internships near completion of graduate program, and to submit scholarly written analysis of relationship between academic program and applied project to both project supervisor and departmental advisor.
6000 Doctoral Research and Dissertation (3-15) P/NP only. E
6210-20-30-40 Directed Readings (3, 3, 3, 3) Individual readings directed toward preparation for preliminary examination fields. Open only to candidates for Ph.D. degree who are in residence and who have been in residence at least two quarters. Only one course may be taken in preparation for each of four fields. Depending on field in which he/she is reading, student will be assigned to appropriate member of department. S/NC only. E
6300 Seminar in Special Studies (3)
6310 Seminar in Tennessee History (3)
6350 Seminar in American Diplomatic History (3)
6410 Seminar in Western Europe (3)
6444 Seminar in French History (3)
6480 Seminar in Russian History (3)
6510 Seminar in English History (3)
6610 Seminar in American Colonial History (3)
6620 Seminar in the Era of the American Revolution (3)
6630 Seminar in Early National Period of American History (3)
6635 Seminar in Jacksonian Period (3)
6650 Seminar in Social and Cultural History of the United States (3)
6670 Seminar in the American Westward Movement (3)
6710 Seminar in Medieval Institutions (3)
6770 Seminar in Central European History (3)
6810 Seminar in Latin American History (3)
6910 Seminar in the Civil War Era (3)
6930 Seminar in Twentieth-century America (3)
6940 Seminar in the History of the South (3)

NOTE: Registration in topics and seminar courses may be repeated for credit with consent of department.

Latin
See Classics

Mathematics

MAJOR DEGREES
Mathematics M.M., M.A., M.S., Ph.D.

Professors:
G. E. Albert (Emeritus), Ph.D. Wisconsin; J. W. Bradley (Head), Ph.D. Iowa; H. J. Carruth, Ph.D. Louisiana State; C. E. Clark, Ph.D. Louisiana State; R. E. Cline, Ph.D. Purdue; R. J. Davenport, Ph.D. Wisconsin; D. A. Doran, Ph.D. Maryland; D. E. Dobbs, Ph.D. Cornell; E. D. Eaves (Emeritus), Ph.D. Texas; H. Frandsen, Ph.D. Indiana; D. A. Gardner, Ph.D. North Carolina State; T. R. Gregory (Emeritus), Ph.D. Illinois; T. G. Huffman, Ph.D. Missouri; D. B. Hinton, Ph.D. Tennessee; A. S. Householder (Emeritus), Ph.D. Chicago; L. S. Hjorth, Ph.D. Florida State; G. A. Klaseen, Ph.D. Nebraska; R. M. McConnel, Ph.D. Duke; H. T. Mathews, Ph.D. Tulane; D. Miller (Emeritus), Ph.D. Michigan; B. S. Rajput, Ph.D. Illinois; K. C. Reddy*, Ph.D. Indian Institute of Technology (India); P. W. Schaefer, Ph.D. Maryland; F. W. Stallmann, Ph.D. Giessen (Germany); E. Wachspitz, Ph.D. Rensselaer Polytechnic Institute; W. R. Wade, Ph.D. California (Riverside); C. G. Wagner, Ph.D. Duke.

Associate Professors:

Assistant Professors:
L. A. Cannon, Ph.D. Cornell; L. Barker, Ph.D. Florida State; J. Cohen, Ph.D. Washington; S. Ellner, Ph.D. Cornell; L. J. Gross, Ph.D. Cornell; S. Hairnstein*, Ph.D. Carnegie Mellon; G. Kalamath, Ph.D. Harvard; S. Lenhart, Ph.D. Kentucky; M. Miller, Ph.D. Illinois; S. Malley, Ph.D. Purdue; H. Simpson, Ph.D. California Institute of Technology; C. Sundberg, Ph.D. Wisconsin.

MAJOR DEGREES

Mathematics M.M., M.A., M.S., Ph.D.

Professors:
G. E. Albert (Emeritus), Ph.D. Wisconsin; J. W. Bradley (Head), Ph.D. Iowa; H. J. Carruth, Ph.D. Louisiana State; C. E. Clark, Ph.D. Louisiana State; R. E. Cline, Ph.D. Purdue; R. J. Davenport, Ph.D. Wisconsin; D. A. Doran, Ph.D. Maryland; D. E. Dobbs, Ph.D. Cornell; E. D. Eaves (Emeritus), Ph.D. Texas; H. Frandsen, Ph.D. Indiana; D. A. Gardner, Ph.D. North Carolina State; T. R. Gregory (Emeritus), Ph.D. Illinois; T. G. Huffman, Ph.D. Missouri; D. B. Hinton, Ph.D. Tennessee; A. S. Householder (Emeritus), Ph.D. Chicago; L. S. Hjorth, Ph.D. Florida State; G. A. Klaseen, Ph.D. Nebraska; R. M. McConnel, Ph.D. Duke; H. T. Mathews, Ph.D. Tulane; D. Miller (Emeritus), Ph.D. Michigan; B. S. Rajput, Ph.D. Illinois; K. C. Reddy*, Ph.D. Indian Institute of Technology (India); P. W. Schaefer, Ph.D. Maryland; F. W. Stallmann, Ph.D. Giessen (Germany); E. Wachspitz, Ph.D. Rensselaer Polytechnic Institute; W. R. Wade, Ph.D. California (Riverside); C. G. Wagner, Ph.D. Duke.

Associate Professors:

Assistant Professors:
L. A. Cannon, Ph.D. Cornell; L. Barker, Ph.D. Florida State; J. Cohen, Ph.D. Washington; S. Ellner, Ph.D. Cornell; L. J. Gross, Ph.D. Cornell; S. Hairnstein*, Ph.D. Carnegie Mellon; G. Kalamath, Ph.D. Harvard; S. Lenhart, Ph.D. Kentucky; M. Miller, Ph.D. Illinois; S. Malley, Ph.D. Purdue; H. Simpson, Ph.D. California Institute of Technology; C. Sundberg, Ph.D. Wisconsin.

Masters of Science in Mathematics

The M.S. degree is intended primarily for teachers of high school mathematics. 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 requirement being met must be supplied by the student.

Applicants for admission to this program must be graduates of accredited institutions, and must have completed the following requirements:

1. A bachelor's degree in mathematics or a closely related field.
2. A minimum grade point average of 3.0 on a 4.0 scale in mathematics courses.
3. Satisfactory scores on the Graduate Record Examination (GRE).

Applicants who do not meet these requirements may be provisionally admitted, subject to the approval of the Department of Mathematics.

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 requirement being met must be supplied by the student.

Applicants for admission to this program must be graduates of accredited institutions, and must have completed the following requirements:

1. A bachelor's degree in mathematics or a closely related field.
2. A minimum grade point average of 3.0 on a 4.0 scale in mathematics courses.
3. Satisfactory scores on the Graduate Record Examination (GRE).

Applicants who do not meet these requirements may be provisionally admitted, subject to the approval of the Department of Mathematics.
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. The course work must include:
   a. 36 hours of mathematics courses numbered 3050 or above.
   b. 9 hours of additional work from mathematics courses numbered 3050 or above or from courses in other departments selected in consultation with the advisor.
   c. 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 industrial employment 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 courses numbered above 4000. Of the additional hours, 9 must be in an area outside the department and 21 must be in courses in mathematics numbered above 5000.

After two quarters of graduate study, a student whose supervisory committee gives its approval may choose the non-thesis option, for which 45 hours of work in courses numbered above 4000 are required. Of these, 30 hours (at least 24 of which are in mathematics) must be in courses numbered above 5000. Of the 45 hours, 15 in courses approved by the supervisory committee may be taken in fields other than mathematics. For this option it is also required that a written comprehensive examination be passed, and that credit be received for a 3-hour seminar or reading course (5990-5995) in which a term paper or project is required.

A student offering mathematics as a minor for the Master's degree is required to obtain at least 3 hours of graduate credit in mathematics courses numbered above 4000 and approved by both the major department and the Department of Mathematics.

THE DOCTORAL PROGRAM

For the Ph.D. in Mathematics, the student must meet the following departmental requirements:

1. Pass a written examination 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 Analysis 5250-60
   f. Partial Differential Equations 5450-60-70
   g. Ordinary Differential Equations 5870-80-90
   h. Numerical Mathematics 5655-65-75
   i. Mathematical Statistics 5760-60-70

Students may not take examinations in both a. and e. nor may they take examinations in both f. and g. as their comprehensive examination subjects. Those students who choose four from this list must choose two from a. to d. and the subjects who choose only three from this list must choose one from a. to e.

A student selecting only three from the above list will also be required to pass a written exam on an area of applied mathematics (e.g., Fluids, Elasticity, Mathematical Ecology) approved as an examination topic for that student by the Graduate Committee and the Applied Mathematics Committee. For a given student and a given area, the Graduate Committee will appoint a section of faculty whose responsibility is to submit a list of topics and references to the Graduate Committee and the Applied Mathematics Committee for its approval.

A student may take as many of the written examinations as desired at any time these exams are given subject to the following conditions:

a. The exams to be taken must be approved in advance by the student's supervisory committee.
   b. At most 4 exams may be taken at any one time, where n denotes the number of exams previously passed by the student.
   c. A student may take a collection of written examinations a maximum of four times; but no one failing five exams, counting possible repetitions, will be permitted to take another round of exams.
   d. Pass an intensive exam in the field of specialization. This exam will be given by a committee appointed by the department head at some time after the requirements in 1. have been met. A student may take this specialty exam only twice.
   e. 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 one or two, 6000-level courses 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 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 winter. The fall exams usually are given during the fall quarter, and the winter exams are given early in January. Note: Math 3050, 3060, 3090, 3100, 3110, 3310, 3320, 3330, 3530, 3720, are intended primarily for students preparing to teach in elementary or secondary schools. Any 3000 or 4000 course in the department whose course number ends in "zero" may be offered as an honors version. In this case, the last digit will be preceded by the word "Honors" both in the timetable and on the student's transcript. Honors versions of courses listed in the Graduate Catalog are acceptable for graduate credit. Such courses may be offered upon the initiative of interested faculty, students, or the department head (though in all cases subject to the approval of the department head).

3050 Elementary Probability and Statistical Analysis (3) Combinatorial problems; sample spaces, sets and events; statistical independence; axiomatic probability theory; random variables and their distributions; simple random processes. Does not satisfy requirements of minor or minor in mathematics. Prereq: 1500-60-00 equivalent. W, Sp
128 College of Liberal Arts/Mathematics

selection within discrete systems. Enumeration by recursion formulas and generating functions, linear theory, finite geometries and finite fields, partitions, block designs. Prereq: 2860 or consent of instructor. F, W, or W, Sp.

3810 How To Prove It (3) Course is designed to improve understanding of nature and methods of mathematical proof by means of practice and participation in seminar setting. Variable content but will include topics such as elementary set theory, relations and functions, and mathematical induction. Coreq: 2850 or 2560. E.

3861 Mathematical Models in the Life Sciences (3) Emphasis on difference equations and differential equations. Mathematical modeling techniques applied to biological phenomena. Does not satisfy requirements of major or minor in mathematics. Prereq: 1841-51 or consent of instructor.

3920-30 Topology of Euclidean Spaces (3, 3) Topics will include topology of line and plane, separation properties, compactness, connectedness, and partitioning; properties of lines, homeomorphisms, continua, and topological invariants. Must be taken in sequence. Prereq: 3810, 2868, or consent of instructor. W, Sp.

3990 Studies in Mathematics (1-4) Credit determined at registration. Prereq: Consent of instructor. May be repeated with consent of department. Maximum 9 hrs.

4050-60 Matrix Algebra and Applications (3, 3) Vector spaces, linear transformations, eigenvalues and eigenvectors, similarity and unitary transformations, singular value decomposition and least square problems, basis vectors, dot and cross products, directional derivatives, directional cosines, surfaces, and projections. Jordan canonical form, evolution of discrete and continuous systems, quadratc forms and variational principles, related topics. Must be taken in sequence. Prereq: 2860.

4070 Matrix Algebra and Applications (3) Topics to be chosen at discretion of instructor. Prereq: 4050-60.

4120 Linear Algebra (3) Abstract vector spaces, linear transformations, and their matrices, systems of linear equations and determinants, inner products, orthogonality, the vibrating string; solution by series; heat flow. Bessel functions. Prereq: 2860. Recommended: 4610 or 4710 E.


4460 Calculus of Finite Differences (3) Real differential equations, application to problems in engineering and physics. Prereq or coreq: 4710.

4510-20-30 Introduction to Analysis (3, 3, 3) Real functions of several variables: theorems of Fermat and Wilson, properties of sequences and series of functions, uniform convergence, Taylor's and Maclaurin's series; applications to construction of logarithmic and trigonometric functions; infinite series; convergence; Taylor's and Maclaurin's series; applications to construction of logarithmic and trigonometric functions; infinite series. Prereq: 3510 or 3110 or consent of instructor.

5011 Elementary Functions from an Advanced Standpoint for Teachers (3-4) Advanced techniques applied to graphing functions. Curves, surfaces, parametrizations, singular points, tangent lines and tangent planes, osculating planes, arclength of curves in plane and curves on surface, curvature, torsion, asymptotes, local coordinates. Prereq: 3510 or 3110 or consent of instructor.

5013 Geometry for Teachers (3-4) Primarily for high school teachers of geometry. Historical and modern presentations of topics encountered in a high school geometry class: axioms, synthetic and metric; models; betweenness; congruence of segments and triangles; parallel postulate; similarity, area; ruler and compass constructions; Klein's Erlangen Program. Prereq: Consent of instructor.

5024 Analysis for Teachers (3-4) Functions of several variables, vectors, limits and continuity, partial derivatives, directional derivatives and gradient, implicit function theorem, maxima and minima, transforms, integrals. Prereq: 5211.

5030 Probability and Statistical Inference for Teachers (3-4) Probability distributions including binomial, hypergeometric, and Poisson, moment generating functions, expectation of continuous random variables; moment generating functions of uniform and normal distributions. Sampling including Chi-square, F, and t distributions; interval estimation of parameters; succinct and rigorous testing. Prereq: 1 yr of calculus and 3050 or consent of instructor.

5051 Introductory Business Mathematics (3) Graphs of simple equations, straight lines, circle, parabola, functions, algebra of functions, limits, continuity, derivatives of algebra functions, applications to maxima and minima, convexity and concavity, implicit differentiation, chain rule, higher derivatives, and applications. Credit available only to satisfy MBA core requirement. Prereq: Math 1560 or equivalent.

5052 Mathematics for Business Decisions (3) Exponential function, applications to growth and decay models, antiderivatives, integration as area, function theorems of Fermat and Wilson, properties of sequences and series of functions, uniform convergence, Taylor's and Maclaurin's series; applications to construction of logarithmic and trigonometric functions; infinite series. Credit available only to satisfy MBA core requirement. Prereq: Math 5051 or equivalent.


5250-60 Linear Algebra (3, 3) 5250—Complex numbers, Cauchy-Riemann equations. 5260—Linear transformations and Laurent series, residues and their applications. 4260—Conformal mapping, Schwarz-Christoffel transformations, Dirichlet problems (steady state potentials, electrostatics, fluid flow), additional topics in complex function theory. Must be taken in sequence. Prereq: 2860. Recommended: one 4000-level mathematics course recommended.


4540 Infinite Series and Functions of Several Variables (3) General theory, power series and Taylor formula, uniform convergence. Partial differentiation and maxima and minima for functions of several variables. LaGrange multipliers. Prereq: 2860.

4550 Partial Differential Equations (3) Fourier series, Fourier integrals, orthogonal functions; the vibrating string; solution by series; heat flow. Bessel functions. Prereq: 2860. Recommended: 4610 or 4710 E.


4640 Calculus of Finite Differences (3) Real differential equations, application to problems in engineering and physics. Prereq or coreq: 4710.


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

4750-60-70 Introduction to Probability Theory (3, 3, 3) 4750—Elementary combinatorial analysis, probability distributions and expectations, conditional probability and stochastic independence, binomial, Poisson, hypergeometric and normal distributions. 4760—Probability generating functions and characteristic function of random variables, infinite sequences of random variables, the weak and strong laws of large numbers, and the central limit theorem. 4770—Markov chains; limiting probabilities; steady-state and stationary distributions; Stochastic processes: Poisson, birth and death processes; Kolmogorov equations. Prereq: 2840-50-60, F, W, Sp.

4810 Elementary Number Theory (3) Divisibility; congruences; theorems of Fermat and Wilson, primitive roots, indices, quadratic reciprocity. Prereq: 2860 or consent of instructor. Sp.

4980 Readings in Mathematics (1-3) Open to superior students with consent of department head. Independent study with faculty guidance. May be repeated. May be taken for credit. Prereq: 3155 or 3510 or consent of instructor.

4980 Studies in Mathematics (1-4) Credit determined at registration. Prereq: Recommendation of Mathematics Department faculty member and consent of department. May be repeated. Maximum 9 hrs.

5000 Thesis (1-15) P/NP only. E

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

**This course is intended for students in the Master of Arts program and it is not intended for students interested in education. It may not be applied as graduate credit toward the M.A. or M.S. degree in Mathematics.**
5610-20-30 Mathematical Methods in Physics (3, 3, 3) (Same as Physics 5610-20-30) F, Sp
5775 Combinatorial Algorithms (3) (Same as Computer Science 5775.)
5810-20-30 Number Theory (3, 3, 3) Arithmetic functions, distribution of primes, Diophantine equations, approximation theory, Shirelman density and Mann's theorem, quadratic forms, Dirichlet's theorem, prime number theorem. Prereq or coreq: 5510 for 5610; 5520 for 5620.
5840-50-60 Mathematical Ecology (3, 3) Discrete and continuous models in ecology. Population, community, and ecosystem models from qualitative and quantitative perspectives. Physical environmental modeling with ecosys stems. Specific ecosystem models; predator-prey, competition, parasit-host, food chains, and food webs. Stochastic growth models; random mixing effects. Comparison of stochastic with deterministic models. Prereq for 5840-50: 4610, 4500 or consent of instructor; prereq for 5860: 4750 or 45450 or consent of instructor.
5910-20-30 Elementary Topology (3, 3, 3) Topological spaces; metrizability, homeomorphic invariants of point sets; structure of Peano continua. Mapping; homotopy. Introduction to combinatorial topology. F, W, Sp, A
5980 Graduate Reading in Mathematics (1-3) Open to graduate students with consent of department head. Independent study with faculty guidance. May be repeated. Maximum 5 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/NC or letter grade.
NOTE: Registration for seminars may be repeated with consent of department.
6000 Doctoral Research and Dissertation (3-15) P/NP only. E
6450-50-60 Partial Differential Equations (3, 3, 3) Advanced topics, analytical and modern theoretical partial differential equations. Prereq or coreq: 5110-20-30 and 5210-20-30 or consent of instructor.
6510-20-30 Modern Algebra (3, 3, 3) Intensive study of a major branch of algebraic theory. Subject matter will vary according to interests and prepa ration of students. Prereq: 5510-20-30.
6570 Theory of Groups (3) Structure of groups, free groups, nilpotence and solvability, extensions and products, permutation groups, abelian groups. Prereq: 5520.
6610-20-30 Advanced Ordinary Differential Equations (3, 3, 3) Theory of ordinary differential equations from advanced viewpoint. Topics from current literature. Subject matter varies according to interests and preparation of students. Prereq or coreq: 2610 or 4610, 4150-60, and 5110-20-30 or 5210-20-30 or consent of instructor.
6810-20-30 Topological Algebra (3, 3, 3) Topics chosen from topological semigroups, topological groups. Lie groups; transformation groups; topological lattices; relations in topological spaces; topological rings, fields, algebras. Prereq or coreq: 5910-20-30.
6910-20-30 Modern Topology (3, 3, 3) Technical background to current literature in topology. Topics vary from year to year.
6940-50-60 Introduction to Algebraic Topology (3, 3, 3) Homology, cohomology, and homotopy theories. Homology and cohomology groups, the Eilenberg-Steenrod axioms, cup and cap products, duality theorems, homotopy equivalence, higher homotopy groups, fiber spaces, spectral sequences. Prereq: 4160 and 5920.
6991 Seminar Analysis (1-3)
6992 Seminar Topology (1-3)
6993 Seminar Algebra (1-3)
6995 Seminar Applied Mathematics (1-3)
6996 Seminar in Numerical Mathematics (1-3)

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

**MAJOR**

**Microbiology**

**DEGREES**

M.S., Ph.D.

Professors:

A. Brown (Head), Ph.D. Chicago; R. W. Beck, Ph.D. Wisconsin; J. M. Becker, Ph.D. Cincinnati; R. J. Courtney, Ph.D. Syracuse; T. C. Montie, Ph.D. Massachusetts; J. W. D. Yales, Ph.D. Yale; T. T. Rouse, Ph.D. Georgia; J. M. Woodward (Emeritus), Ph.D. Kansas; C. J. Rutt, Ph.D. Indiana.

Associate Professors:

D. A. Banks, Ph.D. Cornell; D. A. Brian, Ph.D., D.V.M. Michigan State; G. S. Sayler, Ph.D. Idaho.

Assistant Professors:

R. N. Moore, Ph.D. Texas (Austin); K. M. Skotkin, Ph.D. Michigan State; G. Slacey, Ph.D. Texas (Austin).

Lecturers:


Students planning to major in Microbiology are expected to present, as undergraduate 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.

3810 Food Microbiology (3) Standard methods for examination, cultivation, and identification of bacteria associated with food preservation and food spoilage. Prereq: 2910 or 3700 and Chemistry 2230 or 3211. Sp

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: 2910 or 3519. Coreq: 3820. W

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

4119 Bacterial Physiology Laboratory (2) Prereq: 3519. Coreq: 4110. W

4320 Pathogenic Bacteriology (3) Disease-producing microorganisms including bacteria, rickettsia, and chlamydia. Prereq: 3200. W

4329 Pathogenic Bacteriology Laboratory (2) Techniques for isolation, cultivation, and identification of pathogenic bacteria. Prereq: 3500. Coreq: 4320. W

4330 Medical Mycology (3) Disease-causing fungi; cytology; physiology, pathogenesis and immunity; emphasis on mycology of isolation and identification. Prereq: 3700. Sp

4339 Medical Mycology Laboratory (2) Prereq: 3519. Coreq: 4330. Sp

4420 Molecular Virology (3) Molecular aspects of the replication, assembly and expression of viruses, with emphasis on bacteriophage. Prereq: 3700. F

4430 Medical Virology (3) General virology with emphasis on medical aspects. Prereq: 3700. W

4439 Medical Virology Laboratory (2) Laboratory procedures for isolation, handling, and culturing of animal viruses. Prereq: 3519. Coreq: 4430. W

5000 Thesis (1-15) Pr/NP only. E

5002 Non-Thesis Graduation Completion (3-15) Required for the nonthesis 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

5011-12-13-14-15-16 Mini-course in Microbiology (1, 1, 1, 1, 1, 1) Selected, advanced topics in microbiology, concentrated in time and subject matter. Consult departmental listing for topics offered. Prereq: as posted. May be repeated. Maximum 9 hrs. S/NC only.

5130 Topics in Taxonomy (3) Isolation, cultivation and taxonomic relationships of spirochocytes, emphasis upon less frequently encountered orders. Prereq: 4130. 3 hrs.

5310 Selected Topics in Microbiological Research (3) Literature surveys and laboratory methods for development and interpretation of microbiological research. May be repeated.

5350 Advanced Microbiology for Secondary Education Internship (4) Major bacterial populations encountered in natural habitats; laboratory methods for isolation and characterization of naturally occurring microorganisms. Prereq: Consent of instructor and introductory course in microbiology and general chemistry. Not for degree credit in microbiology. Su

5360 Topics in Immunology and Immunochromatography (4) Molecular and genetic aspects of immunoglobulin synthesis. Theoretical and practical exercise in immunochromatology. Prereq: 4270, Biochemistry 4110-20 or equivalent.

5510-20-30 Research Problems (3, 3, 3) Prereq: 4140 and Biochemistry 4110-20. E

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

5730 Pathogenesis of Infectious Disease (3) Host responses to infection. Alteration of host-metabolism stimulated by microbial invasion, exotoxins, endotoxins 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 consequences of bacteriophage infection. Text supplemented by readings from literature. Prereq: 4420; Biochemistry 4110-20.

5819 Molecular Genetics Laboratory (3) Principles and methods of research in molecular genetics. Fundamental genetic concepts (mutation, complementation, recombination) at molecular level. Studies of lactose operon. Prereq: 4140 and Biochemistry 4110-20 or consent of instructor.

5910-20-30 General Seminar (1, 1, 1) Reviews of current literature. May be repeated with consent of department. S/NC only, E

6000 Doctoral Research and Dissertation (3-15) Pr/NP only. E

6310 Seminar in Immunology (1) Readings and discussions based on current literature. May be repeated. S/NC only. E

6320 Seminar in Microbial Pathogenesis (1) Readings and discussions based on current literature. May be repeated. S/NC only. E

6340 Seminar in Microbial Genetics (1) Readings and discussions based on current literature. May be repeated. S/NC only. E

6350 Seminar in Virology (1) Readings and discussions on current literature. May be repeated. Maximum 6 hrs. S/NC only. W

6360 Seminar in Environmental Microbiology (1) Reading, discussions, and critical evaluation of current literature. May be repeated. Maximum 6 hrs. S/NC only. F

6410 Concepts of Immunity (3) Discussion and readings of recent advances in immunobiology and immunopathology. F

6420 Current Topics in Biological Membrane Research (1) Same as Biochemistry 6420. S/NC only.

6720 Advanced Topics in Microbial Physiology (3) Prereq: 5720. May be repeated with consent of department.

6730 Advanced Topics in Microbial Pathogenesis (3) Prereq: 5730. May be repeated with consent of department.

6740 Advanced Topics in Virology (3) Prereq: 4420 or 4430. May be repeated with consent of department.

6750 Advanced Topics in Microbial Genetics (3) Prereq: 5840. May be repeated with consent of department.

8610-20-30 Problem Seminar (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.

## Music

**MAJOR**

**Music**

**DEGREES**

M.M., M.A.

Professors:

J. J. Meacham (Head), M.M. Northwestern; J. P. Brock, M.M. Alabama; W. J. Carter (Emeritus), M.M. Eastman; D. M. Combs, M.M. Missouri; G. F. Devine, Diploma, Schola (Chicago); W. Dom, M.A. Georgia; H. W. Fred, Ph.D. North Carolina; A. G. Hufford (Emeritus), M.M. Northwestern; C. R. Huber, Ph.D. North Carolina; D. M. Pederson, Ph.D. Iowa; W. J. Starr (Emeritus), M.M. Eastern; D. Van Vactor (Emeritus), M.M. Northwestern.

Associate Professors:


The Department of Music offers the degrees of Master of Music with concentrations in performance, composition, theory, choral conducting, instrumental conducting, Suzuki string techniques, and piano pedagogy and literature, and the Master of Arts with a major in Music with concentrations in theory and musicology.

Applicants for these degree programs must have completed an undergraduate degree approximately equivalent in music requirements to those required in degrees conferred by The University of Tennessee, Knoxville, appropriate to the prospective area of concentration on the Master's level. Applicants who plan to pursue the degree in performance (applied music) are required to audition before the appropriate area committee. Applicants for admission to the program in composition must submit scores and tape recordings of representative works. All applicants are required to take the Diagnostic Examinations in music theory and music history and literature.

General requirements for the Master's degree begin on page 19 of this catalog.

THE MASTER OF MUSIC PROGRAM

The department requires a minimum of 45 quarter hours of coursework for the Master of Music degree. These hours are specifically distributed according to the area of concentration. All areas require coursework in music history/literature and/or theory and allows for elective courses. Music theory and composition require a thesis. Detailed programs will be established by the student's faculty committee.

THE MASTER OF ARTS PROGRAM

The department requires a minimum of 45 quarter hours including 21 hours of coursework above the 5000 level and 9 hours of thesis.

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.

3122 Oratorio (3) Oratorio history and practice, including French and German Oratorios. Prereq: 3112 or consent of instructor.

3340 Oratorio (3) Choral works other than those appropriate for use in church. Prereq: Consent of instructor.

3500 Flute (1-4)

3505 Oboe (1-4)

3510 Bassoon (1-4)

3515 Clarinet (1-4)

3520 Saxophone (1-4)

3525 Horn (1-4)

3530 Trumpet (1-4)

3535 Trombone (1-4)

3540 Baritone (1-4)

3545 Tuba (1-4)

3550 Percussion (1-4)

3555 Viola (1-4)

3560 Violin (1-4)

3565 Viola (1-4)

3570 Cello (1-4)

3575 String Bass (1-4)

3580 Piano (1-4)

3585 Harpsichord (1-4)

3590 Organ (1-4)

3595 Guitar (1-4)

3597 Composition with Electronic Media (1-3) Prereq: Consent of instructor.

3599 Composition (1-3) Prereq: Consent of instructor.

3950 Evolution of Jazz (3) Study of origin, development and styles of jazz music and its exponents.

4003-04-05 The Organ and Its Literature (3, 3, 3) Development of organ and organ literature from Middle Ages to present; problems of style and interpretation; pedagogical literature and methods; organ design. Prereq or coreq: 2500-25-30-40 and consent of instructor.

4025 Keyboard Literature Before 1750 (2) Survey of music for harpsichord and other keyboard instruments from Elizabethan period through 16th century. 10 hours.

4036-37-38 Advanced Piano Literature (2, 2, 2) Piano methods and materials designed for teaching pre-college level students. Prereq: Consent of instructor.

4037-38 Advanced Piano Literature (2, 2, 2) Piano music for pre-classic period to present. Prereq: Consent of instructor.

4041 Styles in Opera Acting (3) Study and practices of styles in opera acting based on historical and national characteristics. Prereq: 3015 or consent of instructor.

4050 Advanced Instrumental Conducting (3) Development of knowledge and skills in instrumental conducting; study of various periods and composers and relationship of different styles to the conductor's art; musical analysis and practice in conducting. Prereq: Music Education 4430 or equivalent.

4055-56-57 Elementary and Intermediate Piano Pedagogy (2, 2, 2) Piano methods and materials designed for teaching pre-college level students. Prereq: Consent of instructor.

4060 Advanced Choral Conducting (3) Development of refinement of conducting techniques: chant and changing meters. Prereq: 4510 or equivalent.

4074-84 Church Music Seminar (3, 3) History and philosophy of church music; liturgies and liturgical music; church music administration. Prereq: Consent of instructor.

4085 Harpsichord Techniques (1) Techniques literature, performance practice, continuo playing, and basic tuning and maintenance. Requires a thorough keyboard background. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs.

4113 Pedagogy of Music Theory (3) Techniques, methods and materials involved in college-level theory programs. Prereq: Consent of instructor.

4117 Choral Arranging (3) Analysis of scores and writing of arrangements for men's, women's and mixed choruses. Prereq: 3112 or consent of instructor.

4124 Marching Band Arranging (3) Study and application of techniques employed in scoring for marching band. Prereq: 3112 or equivalent.

4134 Concert Band Arranging (3) Study and application of techniques employed in scoring for concert band. Prereq: 3112 or equivalent.


4241 Music of the United States (3) From colonial times to present. Emphasis on 20th century. Includes both folk and art music traditions. Recommended: 1210.


4290 Gregorian Chant (3) Chants of Latin rite. Masses and Offices examined as functional music as well as by type.

4340-50 Works of Bach (3, 3) Detailed examination of sonatas, chamber, keyboard, and orchestral works; cantatas, motets, passions and oratorios. 4340—instrumental works; 4350—vocal works.

4400 Jazz Directing (1) Rehearsal techniques for jazz ensembles: special conducting techniques, repertoire, library systems, programming, and supervised laboratory experience in rehearsing university jazz ensembles. Prereq: Enrollment in Applied Music with jazz emphasis or consent of instructor.

4500 Flute (1-4)

4505 Oboe (1-4)

4510 Bassoon (1-4)

4515 Clarinet (1-4)

4520 Saxophone (1-4)

4525 Horn (1-4)

4530 Trumpet (1-4)

4535 Trombone (1-4)

4540 Baritone (1-4)

4545 Tuba (1-4)

4550 Percussion (1-4)

4555 Voice (1-4)

4560 Violin (1-4)

4565 Viola (1-4)

4570 Cello (1-4)

4575 String Bass (1-4)

4580 Piano (1-4)

4585 Harpsichord (1-4)

4590 Organ (1-4)

4595 Guitar (1-4)

4599 Composition with Electronic Media (1-3) Prereq: Consent of instructor.

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

*May be repeated. Maximum 6 hrs.
4840 Jazz Pedagogy (1) Methods and materials relating to teaching of jazz and administering of jazz program. Prereq: Enrollment in Applied Music with jazz emphasis or consent of instructor.

4850 Jazz Composition (2) Prereq: 4870-75.

4860 Advanced Improvisation (2) Emphasis on further development of individual skills and solving individual problems in jazz improvisation. Prereq: 3053-55.

4870-75 Stage Band Arranging (2, 2) Analysis of scores and scoring for stage band. Prereq: 3112 and consent of instructor. Must be taken in sequence.

5000 Thesis (1-15) P/NP only. E

5001 Project in Choral Conducting Performance (1-3) Public performance; critical document; recording project. May be repeated. Prereq: Consent of instructor.

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. Requires instructor. Consent of Instructor.

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

5012-22-32 Pedagogy of Voice (2, 2, 2) 5012—Survey of voice production processes in singing including voice classification, quality, diction registration, breath support, and control. 5022—Examination of teaching materials, preparation of programs for various vocal categories and levels of study. Observation of studio teachings. 5032—Analysis of the vocal problems of a selected group of students. Supervised teaching. Prereq: 4012-22-32 or consent of instructor. May be repeated. S/NC only. Requires instructor. Consent of Instructor.

*5020 Piano Literature Seminar (3) Topics vary. Prereq: Organ literature.

5033-34-35 Advanced Diction for Singers (2, 2, 2) Practical performance and application of diction theory. Prereq: 2055-65-75 or equivalent.

*5040 Vocal Literature Seminar (3) Topics vary. Prereq: Organ literature.


5050 Graduate Recital (3)

5051 Opera Performance (3)

5052 Vocal Chamber Music Performance (3)

5054 Lecture-Recital (3)

5055-56 Practicum for Instrumental Conductors (1, 1) Intern experience in choral music and in an instrumental field other than the area of major interest. S/NC only.

5057 Instrumental Conducting Seminar (3) Rehearsal and performance problems and techniques allied to score reading and preparation. Particular attention to individual problems. Prereq: 4055 or equivalent.

5060 Advanced Choral Conducting II (3) Expansion and continued refinement of conducting technique; development of choral rehearsal skills. Prereq: 4060 or consent of instructor.

5061 Choral Conducting Seminar (3) Score reading and preparation; problems in interpretation, performance practices, and conducting techniques of individuals. May be repeated. Prereq: 5060 or consent of instructor.

5062-63-64 Choral Literature (2, 2, 2) Choral music from Middle Ages to present with consideration of historical development of major choral genres.

*5070 Opera Production (1-3) Prereq: Consent of instructor.

5080 Instrumental Conducting Performances (1) Jury performance; conducting band or orchestra in public.

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

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

5114 History of Music Theory (3) Work and contributions of theorists from ancient Greece to present. Emphasis on 1600 to present. Prereq: Consent of instructor.

5116 Musical Styles (3) Elements of design and their role in definition of musical styles. Exercises in aural and visual identification. Prereq: Consent of instructor.

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

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

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

*5200 Independent Study in Music History and Literature (1-3) Prereq: Consent of department head.

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

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

*5270 Composer Seminar (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.

5362 Music in the Renaissance (3) From 1400 to 1600: Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genre.

5383 Music in the Baroque Period (3) From 1600 to 1750: reed of opera and oratorio, church and secular cantatas, instrumental forms, performance practice.

5385 Music in the Classic Period (3) Preclassical music (Rococo) and music of Haydn, Mozart and early Beethoven. Includes background of other cultural and artistic activities.

5357 Music in the Romantic Period (3) Survey from Beethoven through post-Romantic instrumental and vocal styles.

5359 Music in the Twentieth Century (3) From 1800 (Debussy) to the present (Stockhausen and others).

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

*5500 Flute (1-4)

5505 Oboe (1-4)

5510 Bassoon (1-4)

5515 Clarinet (1-4)

5520 Saxophone (1-4)

5525 Horn (1-4)

5530 Trumpet (1-4)

5535 Trombone (1-4)

5540 Baritone (1-4)

5545 Tuba (1-4)

5550 Percussion (1-4)

5555 Voice (1-4)

5560 Violin (1-4)

5565 Viola (1-4)

5570 Cello (1-4)

5575 String Bass (1-4)

5580 Piano (1-4)

5585 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)

**5601 Woodwind Choir (1)

**5602 Woodwind Choir (1)

**5604 Jazz Ensemble (1)

**5606 Trombone Choir (1)

**5610 Percussion Ensemble (1)

**5611 Marimba Choir (1)

**5612 Baroque Ensemble (1)

**5620 UT Singers (1)

**5630 Chamber Singers (1)

**5632 Collegium (1)

**5634 Saxophone Choir (1)

**5640 Opera Theatre (1)

**5642 Opera Workshop (1)

**5650 Concert Band (1)

**5652 Campus Band (1)

**5654 Varsity Band (1)

**5656 Laboratory Band (1)

**5657 Marching Band (1)

**5670 Symphony Orchestra (1)

**5680 Concert Choir (1)

**5682 University Chorus (1)

**5699 Accompanying (1)

1May be repeated.

2May be repeated. Maximum 6 hrs.

Philosophy

MAJOR

DEGREES

M.A., Ph.D.

Philosophy

Professors:

J. W. Davis (Head), Ph.D. Emory; R. E. Aquila,
Ph.D. Northwestern; L. B.Celko, Ph.D. Nebraska;
R. B. Edwards, Ph.D. Emory; G. C. Graber, Ph.D.
Michigan; D. Van de Vate, Jr., Ph.D. Yale.

Associate Professors:

J. O. Bennett, Ph.D. Tulane; G. G. Brenkert, Ph.D.
Michigan; S. M. Cohen, Ph.D. Northwestern;
K. A. Emmett, Ph.D. Ohio State; M. L. Osborne,
Ph.D. Tennessee; B. C. Postow, Ph.D. Yale.

Assistant Professors:

H. P. Hamlin, Ph.D. Georgia; R. Jones, Ph.D.
Chicago; M. Levin, Ph.D. Stanford; J. E. Nolt, Ph.D.
Ohio State.
THE MASTER'S PROGRAM

The department offers both an M.A. with thesis and a non-thesis M.A. The latter is available only to students who have passed the doctoral comprehensives and are ready to begin writing a dissertation, but who have not written a Master's thesis. See general requirements on page 18. 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, exclusive of credit for the thesis and dissertation) of which not less than 45 hours 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 the Ph.D. may elect to demonstrate a substantially more advanced proficiency in reading knowledge of one language. Requirements for this option may be obtained in the department office. Registration in any course in the 5000 or 6000 series (except 5050) 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 Philosophy or Religious Studies Departments.

3111 Ancient Western Philosophy (4) F, W
3121 Medieval Philosophy (4) F, Sp
3131 Seventeenth- and Eighteenth-century Philosophy (4) E
3141 Nineteenth-century Philosophy (4) F, Sp
3151 Contemporary Philosophy (4) Survey of recent movements in philosophy. F
3270 Russian Philosophical and Theological Thought (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 traditions 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. A
3430 The Concept of Woman (4) Nature of woman as conceived by major western philosophers from Plato to Simone de Beauvoir. F, W
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
3590 Business Ethics (4) Ethical problems as they confront both business as social institution and individuals in business. May not be taken for graduate credit by philosophy majors. Sp
3605-06 Professional Responsibility (4, 4) 3605—Critical analysis of selected classic texts from philosophy, religious studies, and social sciences; nature of responsibility, professionalism, and application of concepts of responsibility to professional activity. Illustrations from various professional fields of practice. 3606—Application of theoretical principles and analytic skills developed in 3605 to selected cases in a variety of professional fields. Engineering/Architecture, Business/Accounting, and at least one of (a) Law/Psychology; (b) Helping Professions (Social Work, Human Services, Religious Ministry); (c) Teaching. (Same as Religious Studies 3605-06.) F, 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.) F
3671 Religion and Philosophy in China (4) (Same as Religious Studies 3671.) W
3690 Philosophy of Religion (4) Analysis of basic issues of religion. (Same as Religious Studies 3690.) F, Sp, Su
3740-50 Conceptual History of Science (4, 4) 3740—The Scientific Revolution: historical evolution of thought in astronomy, mechanics and philosophy of nature up to Newton. 3750—The development and decline of scientific thought in nineteenth century. F, 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. Subject matter to be determined by mutual consent of students and instructor with approval of department. Prerequisites to be determined by department. May be repeated.
4111-21 Modern Religious Philosophies (4, 4) (Same as Religious Studies 4111-21.)
4200 Classical Indian Systems of Philosophy: The Moksha Tradition (4) (Same as Religious Studies 4200.) F
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.
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 understanding and 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) P/NP only. 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
5050 Symbolic Logic (4)
5680 Philosophy of Logic (4) Nature of logic; epistemological, metaphysical and axiological assumptions and implications in various theories of logic. Prereq: 4510 or equivalent.
5101 Foreign Study (1-12) See page 103. E
5102 Off-campus Study (1-12) See page 103. E
5103 Independent Study (1-12) See page 103. E
5110-20-30-40-50-60 Studies in the History of European Philosophy (4, 4, 4, 4, 4, 4) Intensive critical work on major philosopher or school. 5110—Greek. 5120—Hellenistic or Medieval. 5130—Modern, before Kant. 5140—Kant. 5150—Nineteenth Century. 5160—Twentieth Century.
5250 Studies in the History of American Philosophy (4) Intensive, critical work on major philosopher or school.
5355 Orientation to Medical Ethics (2) Survey of ethical theories in application to issues in medical ethics. Consent of Medical Ethics Committee required. (Same as Religious Studies 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.) W
5370 Topics in Medical Ethics (4) Prereq: 4370 or consent of Medical Ethics Committee.
5375 Clinical Medical Ethics (1) Medical terminology, history of medicine, clinical investigation, clinical observation. Open only to students concentrating in medical ethics. Prereq: 5356 and consent of Medical Ethics Committee. May be repeated. Maximum 8 hrs. S/NC only.
5400 Existentialism and Phenomenology (4) Prereq: 8 hrs philosophy or consent of instructor.
5420 Aesthetics (4) Prereq: 8 hrs philosophy or consent of instructor.
5450 Continental Rationalism (4) Prereq: 8 hrs philosophy or consent of instructor.
5460 British Empiricism (4) Prereq: 8 hrs philosophy or consent of instructor.
5470 Kant (4) Prereq: 8 hrs philosophy or consent of instructor.
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 analyze and elucidate traditional philosophical treatments of the 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. 5550—Natural sciences. 5560—Social Sciences.

5610 Recent Developments in Philosophy of Religion (4)

5710 Studies in Metaphysics (4)

5720 Studies in Epistemology (4)

5810 Social and Political Philosophy (4)

5940 Lakeshore Clinical Residence (6) Seven-week clinical practicum at Lakeshore Mental Health Institute concentrating on ethical issues in mental health care. Open only to students concentrating in medical ethics. Consent of Medical Ethics Committee. S/N only.

5950 Clinical Practicum in Medical Ethics (4-12) Prereq: Consent of Medical Ethics Committee. Open only to students concentrating in medical ethics. S/N only.

6000 Doctoral Research and Dissertation (3-15) P/NP only. E

6110-20-30 Seminars in the History of European Philosophy (4, 4, 4)

6150 Seminars in the History of American Philosophy (4)

6250 Seminar in the Philosophy of Religion (4)

6310 Seminar in Axiology (4)

6370 Advanced Topics in Medical Ethics (4) Prereq: 5370 or consent of Medical Ethics Committee.

6510 Seminar in Epistemology (4)

6550 Seminar in Philosophy of Science (4)

6950 Advanced Residence in Medical Ethics (4-12) Prereq: Consent of Medical Ethics Committee. Open only to students concentrating in medical ethics. S/N only.


Associate Professors:


Assistant Professors:

M. Birgling, Ph.D. Oregon; J. Burgdorfer, Ph.D. Frie Universitat Berlin; R. Dejacq, Ph.D. Chicago; T. Ferrell, Ph.D. Clemson; T. H. Handler, Ph.D. Rutgers; S. Nave, Ph.D. Tennessee.

A student who enrolls in The Graduate School with the intention of attaining an advanced degree in philosophy shall, in general, have completed an undergraduate major in philosophy or its equivalent. Physics 3210-20-30, 3710-20-30 or 4110-20-30, 4210-20, 4230 or 4240 constitute the minimum courses undergraduate for physics study.

A student who intends to present Physics as a graduate minor shall, in general, have completed an undergraduate minor in 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 research areas in atomic, molecular, and space flight are available at the Space Institute, Tullahoma.

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

THE MASTER'S PROGRAM

The Physics Department has two Master's degree programs—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 level, or for students specifically intending to go toward a Ph.D. Students seeking an M.S. in Physics by this method must apply to the department's graduate committee for permission to enroll under this program. The requirements for the M.S. under this method are the satisfactory completion of 45 hours of course work composed of 30 hours from courses numbered above 5000 (e.g., 5110-20-30, 5210-20-30, 5310-20-30); 9 hours in a minor field (e.g., mathematics); and 9 hours from other courses in physics numbered above 4000 (preferably of advanced laboratory nature). In addition, the candidate must pass a comprehensive examination administered by the committee.

THE DOCTORAL PROGRAM

All students are expected to take 5210-20-30, 5310-20-30, 5410-20-30, 5510-20-30, 5610-20-30 and 6310. Physics 6210-20-30 are normally required of students specializing in nuclear physics, and Physics 6810-20-30 of students specializing in plasma physics. Physics 6610-20-30 of students in health physics. Physics 6710-20-30 of students in solid state physics, and Physics 6810-20-30 of students specializing in molecular spectra. (The Master's degree is not required.)

A reading knowledge of one foreign language in which there exists a significant body of literature is required. German or French 3030 with a grade of A or B may be substituted for the corresponding language examination.

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 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 6310 or 5720; Chemistry 4160-70, 5430, and any two quarters from 5340-50, 6730 or 6810-20.

Astronomy

4110-20-30 Astrophysics (3, 3, 3) Physics of stars and interstellar matter, planets and interplanetary matter; atmospheres, interiors, and evolution; nebulae, quasars, pulsars, pulsar data and their determination. Current developments. Approach will be interdisciplinary. Acceptable for major credit in Physics; Prereq: Physics 2330 and consent of instructor.

Physics


3230 Heat and Thermodynamics (3) Concepts of temperature and heat, laws of thermodynamics; applications of laws to simple physical and chemical problems Prereq: 2320 or 2330 and calculus; 3210 or consent of instructor. Sp, Su

3160-20 Electronics (3, 3) Electronic components and circuits of interest to physicists. Prereq: 2110-20-30 or 2210-20-30 and calculus. 3 labs. F, W, Su

3160 Nuclear Electronics Laboratory (3) Elementary circuits of interest in nuclear instrumentation are designed and built. Their characteristics are tested as a function of various parameters. Prereq: 3610-20. Sp

3710-20-30 Introduction to Atomic and Nuclear Physics (3, 3, 3) 3710—Special relativity and early
vanced research techniques under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students. 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 modern physics, including nuclear-electron atom; vector model; atomic and molecular spectroscopy; molecular binding; reality; properties of nuclei (spin, magnetic moments, etc.); scattering phenomena; nuclear models and forces; high-energy physics. Prereq: 3210-20, 3710-20-30, 4210-20, differential equations. Must be taken in sequence. F, W, Sp.


5410-20-30 Electromagnetic Theory (3, 3, 3) Advanced special relativity, Lorentz transformation; relativistic tensors; relativistic mechanics; relativistic hydrodynamics. Prereq: 5310-20, 5410-20, 5310-20, 6110-20. E

5420 Advanced Topics in Classical Theory (3) To meet special needs of students. Possible fields: advanced dynamics and hydrodynamics, electromagnetic theory, statistical mechanics, including theory of nonequilibrium processes. Prereq: 5310-20-30, 5410-20, 5510-20. May be repeated with consent of department.

5430 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, theory of fields. Prereq: 5210-20. May be repeated with consent of department.

5500-10 Electrical Conduction in Gases and Plasma Physics (3, 3, 3) Electrical conduction in gases at high and low pressures. Characteristics of spark, arc and streamer discharges. Collective phenomena in plasma; plasma oscillation; magnetohydrodynamics; instabilities. Topics of current interest in astrophysics, geophysics, and nuclear fusion. Prereq: 3710-20-30 and either 5410-20-30 or Electrical Engineering 3320-30. (Same as Electrical Engineering 6560-10). E

5610 Introduction to Radiation with Gases (3) Interaction of electromagnetic radiation with atoms and molecules; oscillator strength, interaction of charged particles with atoms and molecules; ionization; translation and charge emission; Electron interaction, transport and capture; electron swarm and electron beam experiments. Prereq or coreq: 6110-20-30.

5620 Interaction of Electrons with Solids (3) Collisions with free electrons; stopping power; electron slowing down spectra; energy straggling; nuclear scattering; electron diffusion; plasma effects in irradiated solids; techniques in electron spectroscopy; applications to dosimetry. Prereq or coreq: 5610-20-30.


5710-20-30 Advanced Solid State Physics (3, 3, 3) Lattice dynamics; phonons, Brillouin zones; heat

6810 Vibration Problems in Molecular Spectra (3) Normal coordinates and potential functions; group theoretical methods and selection rules in gases and condensed phases. Lasers. Spectroscopy of non-rigid, e.g., molecular vibrators including vibration-rotation interaction terms; intensities and energies of molecular transitions; methods of analysis used in high resolution molecular spectroscopy. (Same as Chemistry 6810).

6820 Molecular Vibration-Rotation Theory (3) Molecules as vibrating and rotating systems possessing specific symmetry properties; quantum mechanical theory of symmetric and asymmetric molecular vibrations including vibration-rotation interaction terms; intensities and energies of molecular transitions; methods of analysis used in high resolution molecular spectroscopy. (Same as Chemistry 6820).

Political Science

MAJORS

DEGREES

Political Science M.A., Ph.D.
Public Administration M.P.A.

Professors:
T. D. Urry (Head), Ph.D. Iowa; R. S. Avery (Emeritus), Ph.D. Northwestern; D. H. Carlisle, Ph.D. North Carolina; L. S. Greene (Emeritus), Ph.D. Wisconsin; V. R. Iredell, Ph.D. Chicago; W. Lyons, Ph.D. Oklahoma; D. D. Nimmo, Ph.D. Vanderbilt; H. Pfaff, Ph.D. Utah; N. M. Robinson, Ph.D. Syracuse; D. F. skiing, Ph.D. Temple; A. H. Hopkins, Ph.D. Syracuse; T. A. Smith, Ph.D. Ohio State; O. H. Stephens, Ph.D. Johns Hopkins; D. M. Welborn, Ph.D. Texas.

Associate Professors:
J. M. Schee, Ph.D. Temple; R. B. Cunningham, Ph.D. Indiana; J. Dodd, Ph.D. Duke; M. Evans, Ph.D. Columbia; K. Fitzgerald, Ph.D. Indiana; D. F. Daniel, Ph.D. New York; A. H. Hopkins, Ph.D. Syracuse; R. L. Peterson, Ph.D. Yale; T. McN. Simpson, Ph.D. Johns Hopkins.

Assistant Professors:

THE BUREAU OF PUBLIC ADMINISTRATION

The University maintains in the College of Liberal Arts a Bureau of Public Administration for the purpose of promoting sound governmental administration through research, publication, and consultation. The staff is as follows: Professor Ungs (director), Professor Fizgerald (associate director), and Professors Freeman and Olishki (assistant professors).

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 two-thirds of the credit hours must be in approved courses numbered 5000 and above.
3. Demonstration of command of the material covered in courses 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 together 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, administration 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 37996-0410.

THE DOCTORAL PROGRAM

Specific requirements for the degree of Doctor of Philosophy in Political Science include:
1. A minimum of 117 quarter hours, following the Bachelor's degree, is required. At least 93 hours shall be in political science.
2. At least 72 hours in political science shall be graduate level hours (i.e. earned in 5000- or 6000-level courses). At least 45 of these graduate level hours shall be at the 6000 level. This figure includes 36 hours of credit for the dissertation.
3. Each Ph.D. candidate must pass an examination in one foreign language.

Students specializing in some areas may be required to demonstrate knowledge of a second language or appropriate research tools or both.
4. Admission to candidacy shall be based on a written and oral comprehensive examination which must be passed not later than three quarters before the date on which the degree is granted.
5. The candidate must pass a final oral examination on the doctoral dissertation.

Successful completion of the degree also depends on course performance and other evidence of professional interest and conduct. Note: Registration in any courses in the 5000-6000 series may be repeated for credit with consent of the department.

3545 United States Constitutional Law: Sources of Power and Restraint (4) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional protection of political rights. Recommended preq: 2510-20. F W

3546 United States Constitutional Law: Civil Rights and Liberties (4) Emphasis on judicial interpretation of First Amendment freedoms, rights of the accused, racial equality, and the right of privacy. F W Sp

3555 Minority Group Politics in the United States (4) Content varies from quarter to quarter. May be repeated with consent of department. Maximum 8 hrs. W

3565 Introduction to Public Administrative Organization and Management (4) Organization and decision-making theory, line and staff services, politics of organization, leadership, personnel and fiscal management, administrative responsibility. Recommended preq: 2510-20. F W Sp

3566 Public Administration and the Policymaking Process (4) Public bureaucracies and the policy making process; their political environments; administrative problems associated with policy making. Recommended preq: 2510-20. F W Sp

3605 Political Change in Developing Areas (4) Characteristics and problems of political changes with primary focus on developing areas. F Sp

3615-16 Dynamics of Black African Politics (4, 4) F W

3621 Government and Politics of the People's Republic of China (4) Chinese political setting, political structures, participation and selected policy areas.

3625-26 Latin American Government and Politics (4, 4) F W

3631-32 Government and Politics of the Soviet Union (4, 4) F W

3635-36 Politics in Western Democracies (4, 4) Political culture, patterns, and institutions of Western democratic systems. F Sp A W

3710 State Politics (4) Focus on formal and informal setting of state government. State government's role in formulating, enacting, and implementing state policy. F W

3720 State Government and Policy Making (4) Nature and functions of the institutions of state government: governors, courts, legislatures, and state administrators. Attention will be paid to state government's role in formulating, enacting, and implementing state policy. W

3750 The Urban Polity (4) Analysis of political institutions and processes in metropolitan areas. W

3760 Urban Policy Process (4) Analysis of urban problems and policies in metropolitan areas. Sp

3796 Contemporary Problems of Soviet Foreign Policy (4) Sp

3801 Studies in Ancient Political Thought (4) Classical Greek and Roman political thought. F

3802 Studies in Medieval Political Thought (4) From Augustine to Luther: emphasis on problems and theories of religion and politics. W Sp

3803 Studies in Early Modern Political Thought (4) Machiavelli through the Enlightenment. W

3804 Studies in Nineteenth- and Twentieth-Century Political Thought (4) Political theories of industrial and technocratic societies, nineteenth and twentieth century. Sp

3890 American Political Thought (4) Examination of role of selected political ideas, doctrines, and themes in America, emphasizing their development and relationships to diverse political interests. F

4060 Revolution (4) Characteristics, theories, and consequences of revolution, with particular focus on left-wing revolutions and movements. Sp

4410 Law and the Administrative Process (4) Powers of, procedures of, controls over administrators. Sp

4535-36 Political Attitudes, Opinions and Communication (4, 4) Nature, development, formation and distribution of politically relevant attitudes and opinions; role of leadership, persuasion, and communication in opinion-policy process. F W


4545 The Judicial Process (4) The study of courts as components of political systems, and public policy formulation through judicial decision making. Recommended preq: 2510-20. F W Sp

4550 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. Maximum 8 hrs. F W

4610 Budgetary Process (4) Fiscal planning, budget and expenditure processes in government, their policy and administrative implications. W Sp

4620 Public Personnel Administration (4) Development of the merit system in government; career systems; public personnel management; recruitment, testing, personnel functions, organization for personnel management. F W

4665-66 Policy Making in Democracies (4, 4)
Comparative approach to theory and process of making public policies. Prerequisite: S or NC. E

4675 Special Topics in Comparative Government and Politics (4) May be repeated with consent of department. Maximum 9 hrs.

4711 International Law (4)

4727 Politics of Inter-American Relations (4) Analysis of selected theoretical and policy issues concerning international relations in the Americas with emphasis upon imperialism, intervention, and the Cuban Revolution, nationalism, foreign assistance, trade and economic integration. S & W

4740 Political Parties and Elections (4) Analysis of party systems and electoral processes. F, W

4750 Political Campaigns (4) All aspects of campaign process. F, W

5000 Thesis (1-15) P/NP only. E

5003 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

5101 Foreign Study (1-12) See page 103. E

5102 Off-campus Study (1-12) See page 103. E

5103 Independent Study (1-12) See page 103. E

5110-20 Seminar in Political Theory (3, 3) Selected topics dealing with political problems of political thinkers, schools, historical periods. F; W; Sp

5140 Politics, Administration and Community in Nonmetropolitan Areas (3) Analysis of problems and processes associated with community development. Sp

5150 Internship in Political Science (3-9) Open to students participating in approved internship programs. May be repeated with consent of instructor. Maximum 9 hrs. S/NC only. E

5210-20 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/NC. 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. F

5310 Seminar in Comparative Government (3) Selected topics in modern governments.

5340 Seminar in Latin American Government (3)

5370 Seminar in Soviet Politics and Government (3) W

5410-20 Seminar in Public Law (3, 3) Special problems in constitutional and administrative law. F

5440 Theory and Analysis of U.S. Foreign Policy Processes (4) Theoretical approaches to decision making in foreign policy area and analysis of policymaking process. W

5510 Seminar in International Organization (3) Introduction to regional international organizations; political integration at international level.

5540 Seminar in Comparative Public Administration (3) Approaches to and methods used in comparative analysis.

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 Administration (3) Basic assumptions and techniques of research in public administration: measurement, analysis, and reporting of data. W

5610 Seminar in Organization Theory (3) Appraisal of major theories of organization and their applicability to public sector. F

5611 Seminar in State-Local Administration (3)

5645 Operations Research for Public Administrators (3) Operations research methodology: applications and limitations in public sector; linear programming, fractional assignment and network problems, network analysis, PERT, dynamic programming and other methods.

5640 Seminar in Metropolitan Areas (3)

5641 Seminar in Contemporary Public Policies (3) Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor.

5670-80 Seminar in Policy Analysis (3, 3) Role of administrators in policy analysis and decision making with special attention to historical and current issues. Sp

5710 Seminar in the Politics of Administration (3) Examination of public administration in context of American political system with emphasis upon political and administrative roles of public administrators and agencies. W

5730 Seminar: Public Budgeting (3) Technical and political aspects of planning, preparing, and adopting government budgets.

5735 Seminar: Public Financial Management (3) Management of public expenditures and management implications of revenue collection, debt management, treasury function, accounting, internal auditing, purchasing, risk management, post-auditing.

5740 Seminar in Organizational Analysis (3) Organization theory applications in public management; field analysis of public organizations.

5750-55 Seminar in Public Management (3, 3) Selected problems. F; W

5765 Law and the Administrative Process (3) Constitutional position; decisional processes; regulation and management; limitations on governmental action; questions of structure, role, and administrative choice. W

5770 Practicum in Public Administration (3) Sp

5790 Seminar in Public Personnel Management (3) Functions and organizations of personnel administration in public service. Sp

5795 Seminar in Staff Functions (3) Functions of administrative assistants, special services, professional, executive, public relations, legislative bodies, and advisory and community groups in public sector. Selected topics include budgeting, personnel evaluation, and other staff functions.

5810 The American Political Process (4) Principal patterns of political activity linking citizens and political institutions.

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 political science. F; W

5840 Ethics, Values, and Morality in Public Administration (3) Moral-ethical-value dilemmas confronting administrators in American political system.

5850 Seminar in Comparative State Politics (3) Intensive readings in comparative state politics focusing on environment of state politics, institutions and policy making.

5910-20 Quantitative Political Analysis (3, 3) Methods and techniques in quantitative political analysis. F; W

6000 Doctoral Research and Dissertation (3-15) P/NP only. E

6210 Advanced Studies in International Politics (3)

6310 Advanced Studies in Political Theory (4) Research into selected topics. F

6440 Advanced Studies in Comparative Politics (3) Research into selected topics. Sp

6510-20 Advanced Studies in American Constitutional Law (3, 3) Systematic investigation of federal relationships, civil liberties, courts in political settings, judicial institutions, personnel, and public policy content.

6510-20 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/NC. E

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

M.A. Ph.D.

Psychologists and Ph.D. Students:


Associate Professors:


Assistant Professors:


The Psychology Department emphasizes doctoral degree programs with specializations in clinical, school, community, social, developmental, 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 37996-0900.

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 Sociology (3) Evolutionary approach to behavior with special reference to controversial issues in applications to psychology, social sciences, and arts.

*Part-time

**Alumni Distinguished Professor.
4107 Experience in Individual Instruction (1-4) Experience as proctor in individualized instruction. Prereq: Consent of instructor. May be repeated. Maximum 20 hrs. S/NC only. F

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

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

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

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.

4610 Group Processes (3) Study and experience of theory and techniques of group processing and facilitation. Those participating in 4610 are expected to continue into 4620 and 4630. Prereq: 3616-26 and consent of instructor. F

4620-30 Seminar in Group Processes (3, 3) Didactic and laboratory experience for those qualified for further training as group facilitators. Prereq: 4610 and consent of instructor. W; Sp

4640 Psychological Tests and Measures (4) Theory and construction of individual and group measures; survey of various methods of assessment of 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: 3210 or consent of instructor.

4670 The Psychology of Language (4) Theories and descriptions of phonology, syntax, and semantics as applied to psychology and related disciplines. Recommended: 4650 or linguistics background.

4670 Cognitive Development (4) Theory and research on development of language and thinking in children and adolescents. Prereq: 3210 or 3550.

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

4719 Physiological Psychology Laboratory (4) 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

4725 Comparative Animal Behavior Laboratory (4) Laboratory and field studies. Coreq: 4720. (Same as Zoology 4729.) F

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

4770 Psychology and the Law (4) Psychological aspects of the legal system. Prereq: Junior standing.

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 critical and biological factors in determining the behavior of women, with emphasis on psychological 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 4850.)

5000 Thesis (1-15) P/NP only. E

5002 Non-thesis Graduation Completion (3-15) Required for students who are 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 graduate requirements. May be repeated. S/N only. E

5017 Colloquium in Ethology (1) May be repeated. Maximum 9 hrs. (Same as Zoology 5017.) S/N only.

5019 Research Practicum (1-3) Required of all first-year students interested in graduate research and comparative psychology. May be repeated. Maximum 9 hrs. S/N only.

5050 Methods of Research in Applied Psychology (3) Principles and techniques 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 levels. Emphasis on research. Required of all Ph.D. candidates. S/N only

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

5100 Developmental Psychology (3) Prereq: 3550 or Educational Psychology 2430. (Same as Educational Psychology 5100.) F, 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; societal perspectives, personal identity, application, intimacy and isolation including psychosocial and psychosexual identity and models for decisions. Term projects in clinical psychology, social work, and community and mental health professions. Prereq: Consent of instructor.

5111 Seminar in Current Issues in School Psychology (3) Historical, legal, ethical, and technological issues in practice of school psychology. Multiple instructors. (Same as Educational Psychology 5111.) S/N only.

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

5149-59-69 Practicum in School Psychology (1, 2, 2) First-year School Psychology Program practicum core course. Coreq: 5140-50-60. (Same as Educational Psychology 5149-59-69.) S/N only. 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: 5100 or equivalent and consent of instructor. May be repeated. Maximum 9 hrs.

5300 Readings and Special Problems in Psychology (1-5) May be repeated. Maximum 20 hrs. S/N only. E

5319 Field Work in School Psychology: Level 1 (2) Supervised on-the-job training in school psychology. Limited to students fully admitted to doctoral program in school psychology who are assigned to program approved field settings. Prereq: 5140-50-60 or equivalent. May be repeated. Maximum 6 hrs. (Same as Educational Psychology 5319.) S/N 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 Psychophysics 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 5230.)

5490 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 in 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.

5510 Instrumentation for Psychological Research (3)

5520 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 5500-70 or equivalent and consent of instructor.

5540 Probability Models in Psychology (4) Introduction to use of probability models in theory of binary test items, different test theory concepts, and statistical parameters, and in clinical psychology, social work, and community and mental health professions. 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.

5560 Seminar in Social Psychology (3) Prereq: 5550. May be used for credit in sociology. May be repeated. Maximum 9 hrs.

5580 Theories of Personality (3)

5581 Psychodynamic Approach to Clinical Psychology (3) Basic concepts and techniques of adult assessment, including case studies, personality assessment methods, and consent of instructor.

5582 Behavioral Approach to Clinical Psychology (3) Human development and strategies for behavior change from viewpoint of social learning theory. Discussion of normal and deviant behaviors. Prereq: Admission to doctoral program in Clinical Psychology or consent of instructor.

5583 Phenomenological Approach to Clinical Psychology (3) Normal development and psychopathology, emphasis on existential theory. Comparison of underlying assumptions of different theories. Prereq: Admission to doctoral program in Clinical Psychology or consent of instructor.

5591 Seminar in Object Relations Theory (3) European and American conceptions of normal and psychopathological development of object relations, practical significance for psychotherapy and psychoanalysis. Prereq: Admission to doctoral program in Clinical Psychology or consent of instructor.
5592 Descriptive Psychopathology (3) Diagnostic criteria of the DSM-III. Examples from written case histories and recorded interviews. Prereq: Admission to doctoral program in Clinical Psychology or consent of instructor.

5601 Dynamics of Psychopathology (3) Psycho-dynamic view of causes and symptoms of major psychoses, neuroses and adjustment disorders. Prereq: Consent of instructor. Prereq: Consent of instructor. Prereq: Consent of instructor. Prereq: Consent of instructor.

5610-20 Psychology of Learning (3, 3) Prereq: 3210 or Educational Psychology 3730. F; W

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 Neural Basis of Behavior (3) Neuroanatomy; basis and symptomatology of neurological syndromes encountered in clinical psychology. Prereq: M.A. in psychology or equivalent.

5690 Psychopharmacology (3) Review and evaluation of pharmacology as it relates to psychology. Prereq: Consent of instructor. Sp. A

5702 Community Psychology (3) Psychological aspects of research, evaluation, intervention, and planning in communities. Community ecology, systems theory, family therapy, prevention, planning of social systems, and relevance of federal policies. Prereq: Consent of instructor.

5713 Learning Modules for Techniques in Professional Psychology (1-4) Set of learning packages; each technique in an assessment, behavior therapy, child psychology, or pathology. Prereq: Consent of instructor. May be repeated. S/NC only.

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 systems. Prereq: 4710, 4719, or consent of instructor. (Same as Zoology 5760.)

5769 Advanced Techniques in Physiological Psychology (3) 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.)

5850 Child Psychological Assessment (3) Introduction: behavioral observations, interviews, objective tests, projective techniques. Prereq: 5100 and Admission to Clinical Training Program or consent of instructor.

5859 Practicum in Psychological Appraisals (2)

5860 Interpersonal Assessment (3) Focus on objective tests such as MMPI and Leary System of interpersonal diagnosis. Prereq: 5580 or equivalent and admission to Clinical Training Program or consent of instructor.

5869 Practicum in Psychological Appraisal (3) Prerequisite: Admittance to doctoral program in Clinical Psychology or consent of instructor.

5870 Projective Techniques in Assessment (3) Diagnosis of psychological disorders using case history and mental status, projective techniques. Prereq: 5601 or equivalent and admission to Clinical Training Program or consent of instructor.

5879 Practicum in Psychological Appraisals (3) Prereq: 5869.

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

5900 Theory and Practice of Consultation (3, 2) Issues in consultation, models of consulting processes, and evaluation of consulting techniques. Must be taken in sequence. Coreq: 6856-68 and consent of instructor. (Same as Educational Psychology 5950-60.) W; Sp

5909-60 Practicum in Psychological Appraisal (2, 2) Coreq: 5850-60-70. Prereq: Consent of instructor. Must be taken in sequence. Coreq: Educational Psychology 5959-69. S/NC only. W; Sp

6000 Doctoral Research and Dissertation (3-15) P/NC only. E

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

6089 Internship in Community Psychology (1-6) Supervised employment at departmentally approved internship sites. Prereq: Consent of instructor. May be repeated. Maximum 18 hrs. S/NC only.

6100 Seminar in Community Psychology (3) Evaluation, research, intervention, and systems for delivery of services in communities. Prereq: 5790.

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

6159 Practicum in Program Evaluation (3) Designing, conducting, and evaluating results of program in evaluation in school or community setting. Prereq: 6150 and consent of instructor.

6210-20 History, Systems, and Theories in Psychology (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 analysis, introduction to latent structure analysis. Prereq: 4640 and 5500.

*5310 Seminar on Motivation and Emotion (3)

*5310 Field Work in School Psychology: Level II (3) Supervised on-the-job traineeship in school psychology. Limited to students fully admitted to doctoral program in School Psychology assigned to program in school. Prereq: 5950-60. May be repeated. Maximum 6 hrs. (Same as Educational Psychology 6319.) S/NC only. F, W, Sp

*6320 Seminar in Research Method (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 Organizational Psychology (3) (Same as Management 6380.)

6385 Hypnosis and Imagery (3) Demonstration and practice of hypnotic induction methods, survey of clinical applications of hypnosis and imagery. Prereq: Consent of instructor.

6390 Seminar in Psychotherapy (2) Treatment of current case, focusing upon psychodynamics, psychopathology, and therapeutic techniques employed. Prereq: Consent of instructor.

6395 Seminar in Assessment (3) Seminar for advanced graduate students in clinical psychology to deal with current research approaches in methods of evaluating the status of individuals seeking clinical aid.


6405 Seminar in Psychopathology (3) Prereq: Consent of instructor.

6410-20-30 Psychotherapy (2, 2, 2) Theories and principles. Prereq: Consent of instructor.

6411 Seminar in Group Processes (2) Theory and practice of group therapy; communication skills. Prereq: Admission to Clinical Training Program or consent of instructor.

6412 Seminar in Inference in Psychotherapy (2) Uses of actuarial and inferential data for assessment of strategies and tactics used in psychotherapy. Prereq: Admission to Clinical Training Program or consent of instructor.

6413 Seminar in Techniques of Behavior Modification (2) Practical applications of systematic desensitization, operant conditioning, aversive conditioning, and related techniques for modification of behavior disorders. Prereq: Admission to the Clinical Psychology Program.

6414 Seminar in Marital and Family Therapy (2) Evaluating marital and family problems, methods of investigation. Psychodynamic, behavioral, and systems-theory concepts. Prereq: Admission to the Clinical Psychology Program.

6418-29-30 Psychotherapy Practicum (1, 1, 1) Coreq: 6410-20-30. May be repeated. Maximum 12 hours.

6450-60 Advanced Psychometrics (3, 3) Construction and standardization of psychological tests, questionnaires, and rating scales. Analysis of errors or measurements; item analysis, scaling, theory of errors or measurements; scaling, equating, and norms development. Prereq: 4650, 5440, and 5500. May be repeated. Maximum 9 hrs.

6491 Continuing Education in Professional 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: Professional degree in field related to mental health or consent of instructor. May be repeated. Maximum 9 hrs.

6492 Psychology Clinic Placement (1-4) Required of all students on placement by Clinical Training Program. May be repeated. Maximum 24 hrs. S/NC only.

6493 Psychology Clinic Activity (1-4) Continuation beyond 6439. May be repeated. Maximum 12 hrs. S/NC only.

6494 Field Experience in Clinical Psychology (1-4) For students who have finished internship with placement in clinical psychology in local area. May be repeated. Maximum 12 hrs. S/NC only.

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.

6510 Ethical and Professional Issues in Psychology (3) (Same as Educational and Counseling Psychology 6510.)

6550 Seminar in Advanced Social Psychology (3)

6575 Seminar in Mental Health Administration (3) Theory and problems in organization and management of mental health administration.


6669 Practicum in Organizational Development
3412 The Reformation (3) (Same as History 3412.)
3440 Religion of Primitive Peoples (3) (Same as Anthropology 3440.)
3605-06 Professional Responsibility (4, 4) (Same as Philosophy 3605-06.)
3650 Philosophy and Religion in Asia (4) (Same as Philosophy 3650.) F
3680 Buddhist Philosophy and Religion (4) (Same as Philosophy 3680.) W
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—Rant and the nineteenth century. Prereq: 9 hrs of philosophy other than logic. (Same as Philosophy 4111-12.)
4200 Classical Indian Systems of Philosophy: The Moksha Tradition (4) Basic writings and philosophical problems of the traditions of Samkhya, Yoga, and Vedanta. Prereq: 3650 or 3660. (Same as Philosophy 4200.)
4210 Topics in Ancient Israelite and Ancient Near Eastern Religions (4) Prereq: 3110-20 or consent of instructor. May be repeated. Maximum 8 hrs.
4310 Jesus and Paul Compared (4) Jesus’ teaching and activity in the context of first-century Palestine 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.
4450 Topics in American Religion (4) Prereq: One of the following: 3510, 3520, 4410, or consent of instructor. May be repeated. Maximum 8 hrs.
4540 Social and Religious Change (4) (Same as Sociology 4540.)
4610 Topics in Western Religious Thought and Institutions (4) Selected figures, issues, and institutions. Seniors and graduate students only, except by consent of department. Prereq: 3650-70-80. May be repeated. Maximum 12 hrs.
4640 Topics in Early Christianity and Hellenistic Religions (4) Selected figures, issues, and institutions. Seniors and graduate students only, except by consent of department. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.
4670 Topics in Eastern Religions (4) Selected figures, issues, and institutions. Seniors and graduate students only, except by consent of department. Prereq: 3650-80-71-72. May be repeated. Maximum 12 hrs.
4810-20 Readings and Research in Religious Studies (3-4, 3-4, 3-4)
4840 Readings in Selected Languages Related to Religious Studies (3-4) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.
4890 Sociology of Religion (4) (Same as Sociology 4890.)
5101 Foreign Study (1-12) See page 103.
5102 Off-campus Study (1-12) See page 103.
5103 Independent Study (1-12) See page 103.
5310-20 Topics in Religion and Society (4, 4)
5355 Orientation to Medical Ethics (2) (Same as Philosophy 5355.)
5385 Applied Ethical Theory (4) (Same as Philosophy 5385.)
5510-20 Topics in the History of Religion (4, 4)
5560 Topics in Afro-American History (3) (Same as History 5560.)
5610-20 Topics in Religious Thought (4, 4)
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. A 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(s) must be passed before a student can become an official candidate for the degree. This examination is to be held at the time deemed most appropriate by the student and his advisor and committee. The candidate is expected to defend the dissertation in a final oral examination.

For additional information on the program, consult page 20.

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 examination, and for upper division students desiring reading knowledge of the language. Undergraduate credit only. No credit for those having had Elementary French. No auditors. F; W; Sp; Su

4001-02-03 Introduction to Consecutive and Simultaneous French Translation (3, 3, 3) 4001—Oral translation into English; 4002—Consecutive translation to and from English; 4003—Simultaneous translation to an 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 a variety of practical subjects such as business, economics, politics, and sciences. Given mainly in language lab with additional classroom supervision by instructor. Prereq: 3430 or equivalent. Must be taken in sequence.

4010 Masterpieces of French Literature in English Translation (3) No foreign language credit. A

4020 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 Theatrical 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 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, 2523, or equivalent. W; Sp

4250 Introduction to Descriptive Linguistics (3) Phonetics and phonemics, morphology and syntax of French, linguistic systems, and dialect geography. Application of descriptive linguistics—field linguistics, dialect study, its practical use in learning languages and in language teaching, introduction to transformational grammar. Prereq: 9 hrs of upper division English or 9 hrs of upper division courses in a modern or ancient language (exclusive of German and French) 3100-20-30 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.) F

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

4510-20-30 French Literature of the Nineteenth 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) P/NP only. 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. Intermediate course in explanation de texte. F

5101 Foreign Study (1-12) See page 103. E

5102 Off-campus Study (1-12) See page 103. E

5103 Independent Study (1-12) See page 103. E

5110-20-30 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 language skills, cultural aspects and beginning literature. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantships except those whose previous training or experience warrants their being excused by department. A

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. F

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

5450-56 Lyric Poetry of the Nineteenth Century (3, 3) 5450—German and English influences on French Romanticism and generation of the poets of le mal du siecle. 5460—Victor Hugo; the Parnassians. A

5470 Baudelaire and the Symbolists (3) Les Fleurs du mal and Petits poemes en prose with emphasis on theories of classicism and "correspondances" and Parnassian influence on Symbolist school. A

5510-20-30 Trends in Contemporary French Literature (3, 3, 3) A

5550-60 Advanced Syntax and Stylistics (3) Readings and written imitations of modern literary styles in form of compositions, sketches, and original stories. A

5570 Problems in Linguistics: Romance Language (3) Topics vary. Prereq: 4250 or consent of instructor. May be repeated. Maximum 6 hrs with consent of department. (Same as Spanish 6670.) A

5710-20 Seminar in French Literature (3, 3) Topics vary. May be repeated with consent of department. Su

5910 Literary Criticism: The Foundations of Romance Criticism (3) (Same as Spanish 5910.) A

Italian

3310 Italian Literature in English Translation (3-4) Sicilian School, Dante, Petrarch, Boccaccio, Machiavelli, Ariosto, Tasso. 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

4020 Italian Drama in English Translation (3-4) Twentieth-century theatre; operatic drama, the Grotesco, Pirandello, Di Filippo, Frati. 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

4050-60-70 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 4050-60-70.) A

4220 Petrarch (3) Prereq: 3130, 3520 or equivalent. A

4230 Boccaccio (3) Prereq: 3130, 3520 or equivalent. A

4100-20 Literature of the Rinascimento (3, 3) From Pulci to Tasso, the Quattrocento and the Cinquecento. Prereq: 3130, 3520 or equivalent. A

4530 The Modern Novel (3) Prereq: Intermediate Italian or equivalent. A

4540 The Modern Theatre (3) Prereq: Intermediate Italian or equivalent. A

4620 Contemporary Poetry (3) Prereq: Intermediate Italian or equivalent. A

4630 Contemporary Prose (3) Prereq: Intermediate Italian or equivalent. A

4760 Italian Folklore (3) Folk arts, music, traditions, rituals and lore of Italy from Middle Ages to present. (Same as Anthropology 4760.) A

5103 Independent Study (1-12) See page 103. E

5610-20-30 Readings in Italian Literature (3, 3, 3) Topics vary and may be repeated with consent of department. A

5710-20 Seminar in Italian Literature (3, 3, 3) Topics vary and may be repeated with consent of department. A
Portuguese

3510-20 Aspects of Portuguese Literature (4, 4) Prereq: Intermediate Portuguese or equivalent. Recommended for literature majors. F, W

4310-20-30 Directed Readings in Brazilian and Portuguese Literature (3, 3) May be repeated with consent of instructor. F, W, Sp

5101 Foreign Study (1-12) See page 103. E

5102 Off-campus Study (1-12) See page 103. E

5103 Independent Study (1-12) See page 103. E

Spanish

4050-60-70 Hispano-Arabic Literature and Culture (3, 3, 3) A

4110-20 Spanish Literature of the Golden Age (3, 3) The picaresque novel: Cervantes; the Comedia. A

4140 Theatrical Spanish (1-3) Performance in one of the options of a minor plan. F, W

4210 Phonetics (3) Prereq: 2130, 2520, or equivalent. F, W

4220-30 Advanced Grammar (3, 3) Prereq: 2130, 2520, or equivalent. F, W

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

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: Spanish or permission of the department. F

4420-30 Latin American Civilization (3, 3) Prereq: Intermediate Spanish or equivalent. W, Sp

4510 Special Topics in Nineteenth Century Spanish Literature (3) Prose, poetry and theatre of Spain in the nineteenth century. Genre, movement, or combination of several literary aspects. Prereq: Intermediate Spanish or equivalent. May be repeated with consent of department. Maximum 6 hrs. F

4710-20-30 Spanish Literature of the Twentieth Century (3, 3, 3) 4720—Drama. 4730—Lyric poetry. Prereq: Intermediate Spanish or equivalent. A

4810-20-30 Topical Survey of Spanish American Literature (3, 3, 3) 4810—Prose fiction: major examples of the short story and novel. 4820—Poetry: landmark figures of past and present. 4830—Drama and essay: the modern period. A

5000 Thesis (1-15) P/NP only. 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. An intensive course in explicatio de texte. F

5070-90-90 Hispano-Arabic Literature and Culture (3, 3, 3) 5070-General culture history, philosophy in Arabic Spain. 5080—Development of traditional marketplace story, or epic proce prose, into modern novel of character after invention of printing. 5090—Mutual influence of traditional Arabic poetry and popular and native Spanish choral lyric; development of classical munawshah, the colloquial zajal, and the later villancico. Readings in Arabic and Spanish. A

5101 Foreign Study (1-12) See page 103. E

5102 Off-campus Study (1-12) See page 103. E

5103 Independent Study (1-12) See page 103. E

5121 College Teaching of Romance Languages (3) Seminars, demonstrations, and practical applications of techniques and procedures for teaching and evaluating basic language skills, cultural aspects, and beginning literature. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantships except those whose previous training or experience warrants their being excused by department. F

5151-61-71 Bibliography and Methods of Research (1, 1, 1) (Same as French and Italian 5151-61-71) S/NC only. A

5211-Don Quixote (3, 3) Must be taken in sequence. A

5212-32 Golden Age Prose (3, 3) 5212—La Celestina; critical, historical. 5213—Fernando de Rojas’ life and work. Celestinque genre; Felicia de Silva’s Segunda Celestina. 5232—Guzmán de Alfarache. A

5250-60 The Generation of ’98 (3, 3) Angel Ganivet, Giner de los Rios, Baroja, Unamuno, Valle Inclán, Benavente, Azorín, Pérez de Ayala. A

5270 The Contemporary Novel (3) Civil War and post-Civil War period. A

5310 Directed Readings (3) E

5311-21 Special Topics in Spanish or Spanish American Literature (3, 3) May be repeated. A

5340 Problems in Hispanic Culture (3) Prevaling social, political, artistic, literary and ideological conditions and patterns of any area or period within Spanish or Latin American culture. May be repeated with consent of department. Maximum 6 hrs. A

5550-60 The Golden Age Theatre (3, 3) 5550—Introduction to Spanish Theatre, Lope and Tirso. 5560—Castro, Alarcon, Moreto and Calderon. A

5610 Spanish American Prose to 1900 (3) Novel, chronicle, essay. A

5611-21 Spanish American Lyric Poetry (3, 3) A

5620-30 The Modern Novel in Spanish America (3, 3) A

5631 Spanish American Essay (3) A

5632 The Spanish American Short Story (3) Short story as major literary genre in Spanish America. Reading and criticism of works such as Dario, Quiroga, Borges, Areneoa, and Ruffo. A

5633 Twentieth-century Latin American Theatre and Film (3) Readings from works of Carlos, Sotomarzo, Rodolfo Usigli, Conrado Gale Roxlo, Roberto Coss, Rene Marques and Sebastian Salazar Bondy. Presentation of films as adaptations of classics such as Doña Bárbara, Los de abajo and Don Segundo Sombra as works by a generation of filmmakers. A

5640 Latin American Women Writers (3) Feminine point of view, modern image of woman, male-female relationships and society as context for woman’s destiny. Readings from poetry and fiction, including such authors as Alfonsoa Storni, Delima Agustini, Gabriela Mistral, Silvina Ocampo, Silvina Bullrich, Silvina Ocampo and Rosario Castellanos. A

5650-60 Advanced Syntax and Stylistics (3, 3) Readings and written imitations of modern literary styles in compositions, sketches, and original stories. A

5670 Problems in Linguistics: Romance Languages (3) (Same as French 5670) A

5810-20 Spanish Lyric Poetry (3, 3) A

5910 Literary Criticism: The Foundations of Romance Criticism (3) (Same as French 5910) A

6000 Doctoral Research and Dissertation (3-15) P/NP only. E

6210-20-30 Seminar in Spanish Literature (3, 3) Topics vary in field of Peninsular Literature. May be repeated with consent of department. A

6310-20-30 Seminar in Latin American Literature (3, 3) Topics vary. May be repeated with consent of department. A

Russian

See German

Sociology

MAJOR

DEGREES

Sociology

MAJORS

Ph.D.

Professors:

J. A. Black, Ph.D. Iowa; D. J. Champion, Ph.D. Purdue; L. Eberle, Ph.D. Pennsylvania; D. Hastings, Ph.D. Massachusetts; N. Shover, Ph.D. Illinois; S. Wallace, Ph.D. Minnesota.

Associate Professors:


Assistant Professors:


For a full statement of departmental requirements, students are referred to the Departmental Graduate Manual.

All registration for 3000- and 4000-level courses requires the consent of the instructor.

THE MASTER'S PROGRAM

The department offers both a thesis and non-thesis option for a Master's degree. For information concerning the Master's degree with thesis, see the General Requirements on page 19. Those interested in the non-thesis option should obtain details from the department.

THE DOCTORAL PROGRAM

General requirements for the degree of Doctor of Philosophy are described on page 20. Additional specific requirements for the degree of Doctor of Philosophy in Sociology include:

1. A minimum of 108 credit hours following the Bachelor's degree, exclusive of credits for the Master's thesis, is required. Of this number, 36 hours shall be allocated to doctoral research and dissertation. A maximum of 12 hours credit outside the major may be taken in related fields, with the approval of the student's committee.

Exclusive of doctoral research and dissertation at least one-half of all credits shall be in courses numbered 5000 or 6000.

2. A written comprehensive examination covering sociological theory, research methodology, and two other areas in sociology must be passed prior to admission to candidacy. This examination must be passed not later than one academic year before the date on which the degree is granted.

3. No later than one month before granting of the degree, the candidate will be required to defend an oral thesis or dissertation.
pass an oral examination on the doctoral dissertation. A candidate will be expected to show a thorough knowledge of sociological theory and methodology related to the research.

4303 Sociology and Law (4) General treatment of social origins and consequences of law and legal process. Emphasis is placed on problems of law and social change, and on structure and functioning of legal sanctions. Some attention is paid to law and law-like phenomena in formal organizations and primitive societies.

4110 Population Problems (4) Demographic factors and social structure; trends in fertility, mortality, population growth, migration, distribution, and composition; population policy.

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.

4160 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.

4310 Criminology (4)

4320 Urban Ecology (4) Examination of public, private, collective, and individual space. Classical school of ecology, its neoclassical reviewers, social area analysis, and cognitive symbolic ecology emphasized.

4410 Educational Sociology (3) (Same as Curriculum and Instruction 4410.)

4530 Community Organization (4) Structure; function; linkages; change and development and important community studies are reviewed and discussed. Emphasis on sociological analysis, not on 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 bureaucraticization process, division of labor, delegation of authority, channelled communication under a system of rationality.

4820 American Minority Groups (4) Minority groups and social structure in American society; analysis of intergroup relations and attention given to both past and present relationships of selected groups to broader society.

4930 Social Movements (4) Development, organization, and function of social movements; attention is given to the ideology, leadership and organization of political, religious and other types of social movements.

4940 Sociology of Religion (4) Interrelationship of society, culture, and religion. (Same as Religious Studies 4940.) A

5000 Thesis (1-15) P/NP only. 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/NP only. E

5010 Professional Seminar (1) Limited to sociology graduate teaching assistants or graduate assistants. May be repeated. Maximum 4 hrs. S/NP only. W, Sp

5210 Introduction to Sociological Theory (3) F

5230 Seminar in Sociology of Medicine (3) May be repeated with different instructors. Maximum 8 hrs.

5300 Methods of Sociological Research I (3) Assumptions and foundations of sociological research strategies and techniques.

5310 Seminar in Methods of Sociological Research (3) Major methodological issues in sociology: scaling techniques; reliability, validity, sampling, and qualitative methodology.

5320-30 Social Statistics (3, 3) General survey of parametric and nonparametric procedures in analysis of sociological data; assumptions underlying procedures and their applications. Must be taken in sequence. F; W

5360-60 Analytical Sociology in the Social Sciences I, II (3, 3) Topics include multiple regression, analysis of variance, analysis of covariance, ordinal and nominal measures of association, sampling, significance tests, and confidence limits. Extensive use of social science computing packages.

5470 Foundations of Social Psychology (3) Current and classical theoretical perspective in social psychology. May be used for credit in psychology.

5480 Foundations of Social Conflict and Change (3)

5510 Delinquency and the Social Structure (3) Critical assessment of contemporary theories of delinquency, research findings related to them, and their implications for formal strategies of control and rehabilitation.

5520 Crime, Law, and Social Control (3)

5650 Demographic Techniques (3) Life, table, standard rates, and survey techniques of population analysis. A

5660 Seminar in Community (3)

5680 Historical Demography (3) Family reconstitution, aggregate analyses, examining documents containing information on population. Research findings on historical patterns of change in fertility, mortality, and migration and different types of family structure. A

5710 Seminar in Collective Behavior and Social Movements (3) A

5720 Social Interaction (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. Maximum 6 hrs.

5740 Seminar in Social Attitudes (3)

5810 Seminar in Race and Culture (3) Critical examination of theoretical and conceptual approaches in study of intergroup relations. A

5830 Social Differentiation and Stratification (3) Various sources of differentiation in society, their relation to conflict in society, and their relationship to class structure in society.

5840 Seminar in Occupations (3) Occupations and their relation to individual and society, technology and occupations; unequal rewards and occupations; social organization and occupations.

5850 Seminar in Occupations (3) Continuation from material in Sociology 5840; interface between occupations and settings in which they are performed.

5870 Social Organization (3) Structure and function of human groups, with special attention to voluntary associations and administrative organizations.

5880 Seminar in Research Problems in Intergroup Relations (3) Research techniques and problems as encountered in race and intergroup relations are explored; actual field research projects are performed.

5880 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) P/NP only. E

6050 Seminar on Methods of Social Research (3) Experimental research projects. (Same as Psychology 6050.)

6220 Sociological Theory I (3) Prereq: 5410 or consent of instructor.

6230 Sociological Theory II (3) Prereq: 5410 or consent of instructor.

6330-40 Survey Design and Analysis (3, 3) Application of general principles of sampling and special applications. Prereq: 5260 or consent of instructor. A

6350 Field Research (3) Prereq: 5300-10 or consent of instructor.

6360 Field Research Practicum (3)

6410 Tutorials in Advanced Topics (3) Individual instruction. Prereq: Consent of department. 6410 and 6420 may be repeated in any combination for a maximum of 15 hrs.

6420 Special Topics (3) Topic of special interest or student-initiated courses which will not be regularly offered. Prereq: Consent of instructor. 6410 and 6420 may be repeated in any combination for a maximum of 15 hrs.

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; approach to theoretical and methodological issues encountered in studying law. A

6640 Seminar in Environmental Sociology (3)

6650 Urban and Regional Sociology (3) Prereq: Consent of instructor.

6660 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. Prereq: 5650 or consent of instructor.

6670 Theory and Methods of Human Ecology (3) Theoretical perspective and research techniques of human ecology applied to selected research sites. Prereq: Consent of instructor.

6680 Theory and Research in Human Migration (3) Prereq: 5650 or consent of instructor.

6690 Population Theory (3) Mathematical, ordinal, population, and selected variables. Prereq: 5650 or consent of instructor. A

6730 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: 5470 or consent of instructor.

6740 Formal Organization (3) Major formal organizational theories; bureaucracy; functions of theoretical models of organizations; major organizational variables; organizational authority patterns, communication in formal organizations. Prereq: 5470 or consent of instructor.

6750 Formal Organization (3) Organizations, organizational change and effect of technology; social consequences of automation; stratification and organization; organizations and community interrelatedness. Prereq: 5740 or consent of instructor.

6780 Mass Behavior (3) Prereq: 5470 or consent of instructor.

6790 Socialization (3) Process to learn cognitive systems and forms of behavior of social world. Ex-
amination of main currents in socialization theory and research. Prereq: 5470 or consent of instructor. May be repeated with different instructors. Maximum 6 hrs.

5820 Political Sociology (3) Political system from societal, organizational, and group perspectives.

5830 Seminar in Class and Status (3) Classic and recent studies of class and status. Methods used in research and current position of theory. Prereq 5480 or consent of instructor.

5840-50 Social Change (3, 3) Major theories, methods and research.

5880 Seminar on Community Power (3) Analysis of theories and methods used in studying social power in communities. Prereq: 5480 or consent of instructor.

Spanish

See Romance Languages

Special Programs

5010 Perspectives in the Liberal Arts (3) Seminar on role of liberal arts in education from historical and regional perspectives.

5030 Inquiry in the Liberal Arts (3) Seminar on nature of evidence in social sciences, natural sciences, and humanities and fine arts to provide overview of research and issues pertinent to disciplinary focus.

5030 Learning in the Liberal Arts (3) Seminar on creative approaches to promoting liberal learning environment in classroom, incorporating use of Great Books, critical thinking and creative problem-solving processes, values sensitivity, and other components.

Speech and Hearing Sciences

See Audiology and Speech Pathology

Speech and Theatre

MAJOR SPEECH AND THEATRE

DEGREE

M.A.

M.F.A.

Professors:

P. Garvey (Head), M.A. Cambridge; R. M. Cohran; R. C. Field, M.A. Miami (Ohio); J. F. Fields (Emeritus), M.A. Ohio State; J. Harris, Ed.D. Tennessee; H. W. Harehaw, Ph.D. Pittsburgh; R. R. Mashburn, Ph.D. Florida State; P. L. Soper (Emeritus), Ph.D. Cornell; G. A. Yeomans, Ph.D. Louisiana State.

Associate Professors:


Assistant Professors:

R. S. Ambler, Ph.D. Ohio State; L. J. DeCuir, M.F.A. Tulane; E. Hamptons, Ph.D. International College (Los Angeles).

The Department of Speech and Theatre offers the Master of Arts degree in Speech and Theatre with area concentrations in speech communication (oral), interpretation, and interpretive techniques of directing, and directing. F, W

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 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.

MASTER 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 30 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 in projects in public speaking.

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, 40 of which must be at the 5000 level or above, are required for the Master of Fine Arts degree in Theatre. The 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 60 hours in order to earn the degree, but no student should require more than two years to finish the program. Ten to 12 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.

REQUIREMENTS FOR SECOND MASTER'S DEGREE

Students admitted to the MFA program who have already earned a Master's or a doctoral degree may apply up to 15 credit hours from the previous graduate program to the MFA degree, with approval of the student's committee, the Dean of the College of Liberal Arts, the Dean for Graduate Studies and/or the Vice Chancellor for Graduate Studies and Research.

Any such credits applied from a previous graduate program would be from courses that are directly related to the student's MFA curriculum, and must have been earned within the time limits (6 years) established for completion of the MFA degree.

Speech

4222 Advanced Argumentation and Debate (4) Prereq: 2331 or consent of instructor. Sp

4461 Quantitative Research Methods in Speech Communication (4) Desigining experiments; planning field studies; using statistical analysis.

4541 Rhetorical Theory and Criticism (4) Survey of Western rhetorical theory; contemporary approaches to criticism of public address. Recommended: 1211.

4550 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

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

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 theories of human communication, emphasizing similarities and differences of communication processes in interpersonal, intrapersonal, and mass communications systems. F

5210 Topics in Group and Interpersonal Communication (5) May be repeated. Maximum 9 hrs.

5220 Quantitative Projects in Speech Communication (5) May be repeated. Maximum 9 hrs.

5440 Organizational Communication (3) May be repeated. Maximum 9 hrs.

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) Philoso- phy and methods of directing curricular and extra-curricular forensic activities in high schools and colleges: competitive and noncompetitive approaches to directing debate, oral interpretation and public speaking events. (Same as Curriculum and Instruction 5911) Sp

Speech and Theatre

4640 Group Performances of Literature (4) Oral interpretative techniques of chor al reading, readers theatre and chamber theatre. F, W

5000 Thesis (1-15) P/NP only. E

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

5110 Introduction to Graduate Research in Speech and Theatre (3) F

5120 Directed Reading and Research (3) May be repeated. Maximum 9 hrs.

5160 Theory and Technique in Oral Interpretation (4) Literary, psychological, and aesthetic approaches to collection, adaptation, and oral

Theatre
3214-15 Technical Theatre (4, 4) Special techniques in scenic, property, and costume construction; stage management; problems in basic technical theatre practice. Prereq: 2211-21, or consent of instructor. Must be taken in sequence. Graduate credit available to Theatre M.F.A. students only.

3221-22 Introduction to Scene Design (4, 4) 3221—Problems in stage design with reference to space, time, movement, scale, and style; rudiments of rendering and groundplan preparation. 3222—Play interpretation through scenic means; setting as environment for dramatic action, rudiments of model-making. Must be taken in sequence. Graduate credit available to Theatre M.F.A. students only.

3252-54 History of the Theatre (4, 4, 4) Drama in performance with particular emphasis on theatre architecture, scene design, and acting styles. 3252—Antiquity to the Renaissance. 3253—The European Theatre, 1650-1850. 3254—Modern Theatre. Graduate credit available to Theatre M.F.A. students only.

3262-63 History of American Theatre (2, 3) Development of theatre as social institution in American life—3262—from its beginnings to 1900. 3263—from 1900 to present. Graduate credit available to Theatre M.F.A. students only.

3321-22 Introduction to Lighting Design (4, 4) Mechanics of stage lighting, elementary theory; problems in basic lighting practice. Prereq: 2211-21 and consent of instructor. Must be taken in sequence. Graduate credit available to Theatre M.F.A. students only.

3511-12 Introduction to Costume Design (4, 4) Costume as an expression of character on stage; the application of costume history to specific design projects. Prereq: 2231 or consent of instructor. Graduate credit available to Theatre M.F.A. students only.

4133-34 Special Problems in Acting (3, 3) Advanced exercises in voice and movement; preparation of major role under performance conditions. Prereq: 3121-22 and consent of instructor. F, W

4214-15 Advanced Technical Theatre (4, 4) Advanced technical theatre management; advanced scenery and property construction; stage management; problems in basic technical theatre practice. Prereq: 3351-22 and consent of instructor. Must be taken in sequence. W, Sp.

4241-42 Advanced Scene Design (4, 4) 4241—Descriptive drawing as an approach to three-dimensional design; theatrical graphic standards and preparation of scenic drawings. 4242—Perception of surface color; construction of spatial illusion through color with reference to rendering, scene painting, and the elevation of painter’s elevations. Must be taken in sequence. Prereq: 2211-21, 3221-22 and consent of instructor. W, Sp.

4341-42 Advanced Lighting Design (4, 4) Relationship of light to setting in creating stage environment. Prereq: 3351-22 and consent of instructor. Must be taken in sequence. F, W

4441-42 Advanced Play Directing (4, 4) Problems of play interpretation; directing period plays; preparation of plays for public performance. Prereq: 3451-52 and consent of instructor. Must be taken in sequence. F, W

4541-42 Advanced Theatre Costume Design (4, 4) Advanced problems in costume design and construction; pattern drafting; draping. Prereq: 3511 or 3512. 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 M.F.A. students only. M.S., Ph.D.

5214 Special Problems in Technical Theatre (4) Theatrical technical direction. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

5241 Studies in Scene Design (4) Advanced scene design techniques and approaches to design for complex dramas and varied dramatic forms. May be repeated. Maximum 8 hrs.

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

5341 Studies in Lighting Design (4) Scene design techniques and approaches to design for complex dramas and varied dramatic forms. May be repeated. Maximum 8 hrs.

5551 Costume Design and Production (4) Practic-al application and production of costume designs for the stage. Prereq: 2231, 3511, 3512. 4541, 4542 and/or consent of instructor. May be repeated. Maximum 8 hrs.

5620 Projects in Lighting Design (3) May be repeated. Maximum 9 hrs. E.

5630 Projects in Play Directing (3) May be repeated. Maximum 9 hrs. E.

5640 Projects in Scene Design (3) May be repeated. Maximum 9 hrs. E.

5650 Projects in Costume Design (3) Problems of play interpretation and theatrical costume design centralizing around individual projects. Students will design costumes for complex plays for public performance. May be repeated. Maximum 9 hrs. E.

5660 Projects in Technical Theatre (3) Problems of set design, interpretation, and execution. E.

5670-71-72-73-74-75 Master Class in Acting (5, 5, 5, 5, 5, 5) Available to Theatre M.F.A. students only.

5680-81-82 Design and Technical Theatre Seminar (1-8, 1-6, 1-6) Available to Theatre M.F.A. students only. May be repeated. Maximum 6 hrs.


5912 Play Production in Secondary Schools (4) Principles and methods for directing high school dramatic programs. (Same as Curriculum and Instruction 5912.) Su.


Speech Pathology
See Audiology and Speech Pathology.

Zoology
MAJOR DEGREES Zoology

M.S., Ph.D.

Professors: J. H. Abel (Head), Ph.D. Brown, R. M. Bagby, Ph.D. Illinois; D. L. Buning, Ph.D. Oklahoma State; J. G. Carlson* (Emeritus), Ph.D. Pennsylvania; J. C. Daniel, Jr., Ph.D. Colorado; D. A. Etner, Ph.D. Minnesota; B. Hochman, Ph.D. California (Berkeley); T. G. Howley, Ph.D. Wisconsin; K. W. Jeon, Ph.D. London (England); J. R. Kennedy, Ph.D. Iowa; J. N. Liles, Ph.D. Ohio State; L. E. Roth, Ph.D. Chicago; C. A. Shivers, Ph.D. Michigan State; J. L. Tanner (Emeritus), Ph.D.; D. Cornell; H. G. Welch, Ph.D. Florida; G. L. Whitson, Ph.D. Iowa.

Associate Professors: K. D. Burnham, Ph.D. Iowa; A. C. Eichert, Ph.D. Kansas; D. J. Fox, Ph.D. Johns Hopkins; M. A. Handler, Ph.D. Kansas State; J. A. MacCabe, Ph.D. California; M. L. Pan, Ph.D. Pennsylvania; S. L. Pitman, Ph.D. New Mexico State; S. E. Reicher, Ph.D. Wisconsin; C. A. Shivers, Ph.D. Georgia; D. A. Etnier, Ph.D. Wisconsin; H. G. Welch, Ph.D. California; L. E. Roth, Ph.D. Michigan State; J. L. Stiles, Ph.D. Arkansas; J. A. Zimba, Ph.D. Indiana.

Assistant Professors: T. T. Chen, Ph.D. Florida; L. D. Etkin, Ph.D. Indiana; M. A. Greenberg, Ph.D. Rutgers; 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, ecology, cell biology and molecular biology, zoology, physiology, and neurobiology, and reproductive and developmental biology. Requirements for admission: Applicants for graduate study are expected to have a background no less extensive than that required of undergraduates. This department 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 hours; (2) upper division division zoology, 18 quarter hours; (3) chemistry, two years including 12 quarter hours of general inorganic; (4) mathematics, 9 quarter hours including differential and integral calculus; (5) physics, 12 quarter hours. Graduate Record Examination scores (Verbal, Quantitative and Advanced Biology); and (7) a grade point average of 3.0 out of 4.0. Otherwise superior students, deficient in one or more of the above requirements, may be admitted at the discretion of the Graduate Affairs Committee.

A course in biostatistics is required of all candidates for an advanced degree in Zoology.

All aspirants for advanced degrees in Zoology must exhibit competency in six areas of zoology as determined by a qualifying examination. The student will continue in the program during the fall quarter of the first year and may repeat the 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 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 sizable amount of literature relevant to the major field of study. The student has the option of demonstrating a reading knowledge of this foreign language by (a) passing the official reading examination given by the language department or (b) earning at least a B in the third quarter of a language course. This requirement for the first language must be fulfilled before the student can take the comprehensive examination.

The student's faculty committee may require of 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. W


3110 General Entomology (5) Introduction to insects: basic structure, development, behavior; classification of insects 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 (except insects) with emphasis on ecology and behavior. Prereq: Biology 3130. 3 hrs and 2 labs. W

3220 Physiology of Reproduction (3) (Same as Animal Science 3220.) F, Sp

3230 Histology (4) Study of animal tissues. Prereq: Biology 3120. 2 hrs and 2 labs. F, Sp

3410 Bioethics (3) Relationship between biological discoveries and societal and ethical values. Open discussion of selected dilemmas arising from new knowledge about medicine, behavior, resources, and technology. Sp

4007-417 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 from both invertebrates and vertebrates. Prereq: 3090. 2 hrs and 2 labs. W

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. E

4190 Mammalogy (4) Classification, evolution, distribution, reproduction, populations, and behavior. 2 hrs and 2 labs or field periods. F

4200 Ichthyology (5) Classification, collection and identification, distribution, life histories, and economic importance of fishes. Prereq: Consent of instructor. 2 hrs and 2 labs or field periods. F

4210 Cell Physiology (5) Development of modern concepts in cell physiology from point of view of information in animal which examines kinetics and integration of cellular activities. Prereq: Cell biology, or anatomy and 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; intraspecific relations; problems and methods. Prereq: Biology 3130. 2 hrs and 2 labs. F

4250 Environmental Physiology (4) Physiological mechanisms in animal kingdom and relationships to animal ecology and to survival of animals in diverse environments. Prereq: Biology 3120-30, 2 yrs chemistry.

4259 Comparative Animal Physiology Laboratory (1) Coreq: 4250. W
5740 Physiological Ecology of Animals (2) Adaptive physiological responses of animals to natural changes in or extremes of physical and biotic environment. Emphasis on terrestrial vertebrates. Term paper including review of assigned topic with emphasis on creative development of special aspect. 1.2-hr lec. Su

5750 Physiological Ethology (3) Behavioral endocrinology and neurology from ethological perspective; reciprocal relationships of physiology and behavior in natural context. Prereq: Consent of instructor, or Psychology/Zoology 4720, or undergraduate course in physiology. W

5760 General Vertebrate Neuroanatomy (3) (Same as Psychology 5760.)

5790 Transport of Ions Across Epithelia (4) Operational principles and methods needed to study electrical and kinetic properties of epithelia and electrically excitable tissues. Quantitative methods of measuring ion fluxes and flux ratios. Prereq: Two upper-division physiology courses, graduate standing, or consent of instructor. Recommended prereq: Chemistry 3810.

5820 Methods of Taxonomy (4) Classification of animals; rules of nomenclature; problems in priority; preparation of keys, descriptions, and figures. Prereq: Consent of instructor. W

5840 Aquatic Insects (4) Taxonomy and biology of aquatic insects, emphasis on immature forms. 2 hrs. and 2 labs. Sp

5860 Geographic Distribution of Animals (4) Distribution patterns of vertebrate and invertebrate animals in all major habitats. Prereq: Consent of instructor.

6000 Doctoral Research and Dissertation (3-15) P/NP only. E

6110 Advanced Topics in Cell and Molecular Biology (1-3) Readings and discussions of recent advances in cell biology. Prereq: Biology 3120 and consent of instructor. May be repeated with consent of department. Maximum 12 hrs.

6210 Seminar in Physiology (2) Two physiology courses or consent of instructor. May be repeated. Maximum 6 hrs.

6310 Seminar in Cytology (2) May be repeated. Maximum 6 hrs.

6350 Seminar in Developmental Biology (2) Internal regulation in differentiating cell. Prereq: 3050, 4050; Biochemistry 4110-20. W

6510 Seminar in Genetics (2) Prereq: General genetics. May be repeated. Maximum 6 hrs. F

6610 Seminar in Ornithology (2) Prereq: 4300. May be repeated. Maximum 6 hrs.

6650 Seminar in Aquatic Biology (2) Prereq: Any 2 of 4200, 4680, Botany 5061, or consent of instructor. May be repeated. Maximum 6 hrs. F, W, Sp

6710 Seminar in Ecology (2) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. W

6810 Seminar in Entomology (2) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. Sp

6910 Seminar in Radiation Biology (2) Prereq: 5610, 5620. May be repeated. Maximum 6 hrs. (Same as Radiation Biology 6910.)
Robert L. Summitt, Dean

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 campus 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.

### College of Medicine-Knoxville

#### Department of Medical Biology/Memorial Research Center

**Professors:**
- W. R. Farkas (Acting Chairman), Ph.D., Duke; J. E. Fuhr (Director), Ph.D., St. John’s; C. C. Congdon (Emeritus), M.D., Michigan; J. B. Jones, D.V.M., Illinois; R. D. Large, M.D., Washington (St. Louis); C. E. Loizzo, M.D., Buenos Aires (Argentina); T. P. McDonald, Ph.D., Tennessee; E. A. Machado, M.D., Buenos Aires (Argentina); J. C. Packer, Jr., M.D., Medical College (Virginia); P. W. Wigler, M.D., California (Berkeley); C. J. Wust, Ph.D., Indiana (Bloomington).

**Associate Professors:**
- J. P. Chen, Ph.D., Pennsylvania State; P. B. Coulston, Ph.D., Illinois; E. W. Fuscus, Ph.D., Tennessee; W. T. Hanna, M.D., Ain-Shams (Egypt); A. T. Ichiki, Ph.D., California (Los Angeles); K. D. Lin, M.D., National Taiwan; E. C. Schroeder, D.V.M., Michigan State.

**Assistant Professors:**
- R. C. Switzer, III, Ph.D., Michigan State.

The Department of Medical Biology of The University of Tennessee College of Medicine-Knoxville 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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>4210</td>
<td>Introduction to the Study of Cancer</td>
<td>3</td>
<td>Biology 3110-20 or consent of instructor. Sp</td>
</tr>
<tr>
<td>4310</td>
<td>Introduction to Hematology</td>
<td>4</td>
<td>Pathophysiology of blood and blood forming systems. Lectures, classroom discussion, and case reports surveying the major topics of oncology. Prereq: Biochemistry 4110-20 or consent of instructor. Sp</td>
</tr>
<tr>
<td>4320</td>
<td>Special Topics in Hematology</td>
<td>1-3</td>
<td>Special topics in hematology. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. F, W, Sp</td>
</tr>
<tr>
<td>4430</td>
<td>Clinical Genetics</td>
<td>3</td>
<td>Human genetic disorders, case presentations. Prereq: General biology and general genetics background or consent of instructor. Sp</td>
</tr>
<tr>
<td>5000</td>
<td>Thesis</td>
<td>1-15</td>
<td>P/NP only. E</td>
</tr>
<tr>
<td>5080</td>
<td>Graduate Research Participation</td>
<td>3</td>
<td>Advanced research techniques studied while conducting individual biomedical research projects under supervision of faculty. Prereq: Consent of instructor. Open to all graduate students. May be repeated with consent. Maximum 9 hrs. S/NC only. E</td>
</tr>
<tr>
<td>5220</td>
<td>Special Topics in Cancer</td>
<td>1-3</td>
<td>Special topics in oncology. Prereq: 4210 and consent of instructor. May be repeated. Maximum 9 hrs. F, W, Sp</td>
</tr>
<tr>
<td>5220</td>
<td>Special Topics in Hematology</td>
<td>1-3</td>
<td>Special topics in clinical hematology. Prereq: 4310 and consent of instructor. May be repeated. Maximum 9 hrs. F, W, Sp</td>
</tr>
<tr>
<td>5410</td>
<td>Molecular Basis for Metabolic Disease</td>
<td>5</td>
<td>Metabolic disorders of humans and animals. Emphasis on molecular mechanisms in inborn errors of metabolism, toxic reactions, and deficiency states.</td>
</tr>
</tbody>
</table>
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 or educators 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 successfully complete of the equivalent of an upper division major in Nursing as part of the M.S.N. program.
3. If the number of qualified applicants exceeds the number that can be accommodated, preference will be given to applicants:
   a. whose undergraduate GPA is 3.0 or higher;
   b. who have had at least two years of full-time clinical practice experience following completion of a baccalaureate nursing program;
   c. who are Tennessee residents;
   d. who are currently employed in underserved health service areas and who can demonstrate their commitment to return to those areas following completion of the program;
   e. who are currently employed as nurse educators in programs preparing registered nurses; or
   f. who are currently employed as directors of nursing service.
4. Ordinarily one year of full-time clinical practice experience should be completed prior to applying for admission to the program.

DEGREE REQUIREMENTS
1. Students must complete 60 quarter hours of graduate level course work with a cumulative GPA of 3.0 or better.
2. The 60 credit hours must include the following components:
   - Core requirement: 23 hrs
   - Clinical concentration option: 20 hrs
   - Role preparation 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 6 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, parent-child nursing or community mental health nursing as their clinical concentration option. Students selecting the primary care nursing option must complete 5450, 5460, 5580. Students selecting the secondary/tertiary care nursing option must complete 5120-30 and 5310. Students selecting the parent-child nursing option must complete 5220, 5255, and either 5230 or 5245. 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 role preparation option in teaching or advanced clinical practice. Students selecting the teaching option must complete 6 hours of graduate level courses in education and 5630. Students selecting the advanced clinical practice option must complete 5560 and 5660 if their clinical option is primary care, 5320 and 5340 if their clinical option is secondary care, 5520 and 5540 if their clinical option is community mental health, or 5265 and 5270 if their clinical option is parent-child nursing. Except for electives, all courses taken in other colleges must be approved in advance by the student's faculty advisor.
8. Students whose baccalaureate degrees are not in nursing must complete the equivalent of a baccalaureate nursing major by taking or challenging a series of undergraduate nursing courses as determined by each student's major 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 graduate level (with a cumulative GPA of 3.0) degrees. For the latter up to 15 hours may be applied to the second Master's degree, with approval of the student's committee, Dean of the College, Dean for Graduate Studies and/or Vice Chancellor for Graduate Studies and Research.

Any hours so applied would be from courses in the first degree program that are directly relevant to the second. Hours from the first program to be applied to the second shall have been earned within the time limits (six years) established for the second.

Reduction of hour requirements, when appropriate, will not be used to reduce the residency requirements of the second Master's degree.
2. The 45 to 60 hours must include the following components: