

## A&S Arts and Sciences

### A&S 100 SPECIAL INTRODUCTORY COURSE: Title to be Assigned. (1-6)

This course permits the offering at the introductory level of special courses of an interdisciplinary, topical, or experimental nature. Each proposal must be approved by the Dean of the College of Arts and Sciences. A particular title may be offered at most twice under the A&S 100 number. Students may not repeat under the same title. May be repeated to a maximum of 12 credits. Prereq: Will be set by instructor.

### A&S 103 BASIC INSTRUCTION IN LESS COMMONLY TAUGHT LANGUAGES I (Subtitle required). (3-5)

This course provides elementary language instruction with an emphasis upon the spoken language of everyday use where appropriate. Writing and the elements of grammar are gradually introduced. Students may not repeat this course under the same subtitle. Prereq: Will be set by instructor.

### A&S 104 BASIC INSTRUCTION IN LESS COMMONLY TAUGHT LANGUAGES II (Subtitle required). (3-5)

A continuation of A&S 103. Students may not repeat this course under the same subtitle. Prereq: A&S 103.

### A&S 203 INTERMEDIATE INSTRUCTION IN LESS COMMONLY TAUGHT LANGUAGES I (Subtitle required). (3-5)

This course provides intermediate instruction in a less commonly taught language. Development of speaking, listening, reading, and writing skills, as appropriate, will be stressed. Students may not repeat this course under the same subtitle. Prereq: A&S 104 in the same language or permission of instructor.

### A&S 204 INTERMEDIATE INSTRUCTION IN LESS COMMONLY TAUGHT LANGUAGES II (Subtitle required). (3-5)

A continuation of A&S 203. Students may not repeat this course under the same subtitle. Prereq: A&S 203 in the same language or permission of the instructor.

### A&S 300 SPECIAL COURSE. (1-3)

Interdisciplinary, topical or experimental courses to be approved by the Dean of the College of Arts and Sciences. A particular course may be offered at most twice under the A&S 300 number, and no A&S 300 course may be given for more than three credits per semester. Open to all University students, subject to such limits or prerequisites as set by the instructor.

### A&S 500 SPECIAL COURSE (Subtitle required). (1-3)

Interdisciplinary, topical, or experimental courses to be approved by the Dean of the College of Arts and Sciences and the Dean of the Graduate School. A particular course may be offered at most twice under the A&S 500 number. Open to all university students, subject to such limitations or prerequisites as set by the instructor. Prereq: As specified by the instructor.

## A-E Art Education

### A-E 270 INTRODUCTION TO ART EDUCATION. (2)

A lecture-laboratory course investigating the theoretical, historical, psychological and sociological foundations of art education. Critical examination of individual and group activities currently offered in the elementary school art program. Lectures, curriculum design, evaluation of process and technique. Introduction to the visual arts through studio experiences. Lecture, one hour; laboratory, two hours per week. A-E 270 and A-E 272 together satisfy the state art requirement for general elementary teacher certification. Prereq: EDP 202.

### A-E 272 WORKSHOP IN DESIGN EDUCATION. (2)

Exploration and analysis of design, media and concepts with special attention to classroom application. Lecture, one hour; laboratory, two hours per week. Prereq: A-E 270.

### A-E 395 INDEPENDENT WORK: ART EDUCATION. (1-3)

Supervised individual research, practicum, and field experience leading to the development of art education curriculum theory, and teaching techniques appropriate for various populations and conditions. A learning contract will be submitted to both the department and to the office of the dean at the time of registration. May be repeated to a maximum of six credits. Prereq: Major and consent of instructor.

### A-E 399 EXPERIENTIAL EDUCATION. (1-15)

Development of personally motivated and planned projects and internships in art education and interdisciplinary program activities outside the academic classroom experience, encompassing recreation, general education, adult education, special education, state programs, and group field experiences and workshops. May be repeated to a maximum of 15 credits. (Approval of A&S dean required for more than six credits per semester.) Prereq: Recommendation of art faculty member and department chairman; completion of departmental learning agreement.

### A-E 515 INTRODUCTION TO ART THERAPY. (3)

An examination of various historical and contemporary conceptions of the therapeutic function and value of art from an art education perspective. The impact of art experience on emotional, intellectual and behavioral development and/or rehabilitation will be explored through readings, discussions, guest lectures, and lab experiences. Lecture, two hours per week; laboratory, two hours per week. Prereq: PSY 331 and major or consent of instructor.

### A-E 525 THE ELDERLY AND THE ARTS. (3)

An examination of the problems of the elderly and the possibilities of art education for older persons in various settings including nursing homes, day care and recreation centers, housing complexes, and continuing education programs. The impact of art experience on the psychological, social, and physical well-being of the older person and the initiation of quality programs in the arts will be explored through readings, lectures, demonstrations, and field experience. Lecture, two hours; laboratory, two hours.

### A-E 538 ADVANCED ARTS AND CRAFTS IN THE ELEMENTARY SCHOOL. (3)

Planned to give the elementary teacher an understanding of teaching methods involved in, and construction of, art activities which would enrich the classroom program.

### A-E 545 TOPICAL STUDIES IN ART EDUCATION (Subtitle required). (3)

Intensive study and analysis of a designated topic, issue or development in the philosophy, history, or methodology of art education in community and public school settings. May be repeated to a maximum of six credits. Prereq: Art education major or consent of the instructor.

### A-E 577 ART IN SECONDARY SCHOOLS. (3)

This course provides students with an overview of the secondary school in American education and explores the history, theory, techniques and contemporary issues of teaching art in the secondary schools. Skills in the planning of multicultural activities and the teaching and evaluation of secondary art experiences are stressed. Full class instruction, video, micro-teaching, laboratory and studio experiences are incorporated into class design. Prereq: Major in art education or consent of instructor.

### A-E 578 ART IN ELEMENTARY SCHOOLS. (3)

Study of perceptual and aesthetic awareness in children. Field and practicum experiences with methods and materials appropriate to the teaching of art in the elementary school. Multicultural activities stressed. Lesson planning, curriculum design, evaluation, teaching skills, classroom safety, multicultural activities included: lecture, demonstration, micro-teaching laboratory and studio experiences. Prereq: Major in art education, or consent of the instructor.

### A-E 579 SEMINAR IN ART EDUCATION. (2)

Inquiry into the relationship of current philosophies of art education and aesthetics; a consolidation of art education ideas with a formation of criteria for making value judgments; the development of a personal viewpoint consistent with education and art as humanistic endeavors. Prereq: Major in art education, or consent of the instructor.

### A-E 645 TOPICAL RESEARCH IN ART EDUCATION (Subtitle required). (3)

Advanced study and research of a designated topic, issue, or development in the philosophy, history, or methodology of art education in community and public school settings. May be repeated to a maximum of six credits. Prereq: Graduate standing in art education.

### A-E 695 INDEPENDENT WORK: ART EDUCATION. (1-3)

Supervised individual research, experimental practicum, and the initiation of field programs leading to the discovery and development of new knowledge in art education theory and method. A formal learning contract between student and supervising faculty member is required. May be repeated to a maximum of six credits. Prereq: Graduate standing in the department and consent of instructor.

### A-E 748 MASTER'S THESIS RESEARCH. (0)

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

## A-H Art History

**A-H 105 ANCIENT THROUGH MEDIEVAL ART. (3)**  
Survey of the development of art and architecture with primary emphasis on cultures of Egypt, Western Asia, Greece, Rome, and medieval Europe.

**A-H 106 RENAISSANCE THROUGH MODERN ART. (3)**  
Historical development of Western art and architecture from the fourteenth century through the present.

**A-H 307 ANCIENT NEAR EASTERN AND EGYPTIAN ART. (3)**  
Study of the art, architecture, and material culture of the civilizations in the ancient Near East (Mesopotamia, Assyria, Persia) and of Egypt, from Neolithic origins through the first millennium BCE. Prereq: A-H 105 recommended.

**A-H 308 AFRICAN ART. (3)**  
A study of African art: the philosophy and myths that govern the people's art productions. These philosophies and myths, in most cases, will be compared to the western point-of-view of thinking about art and art production. Prereq: A-H 106 recommended.

**A-H 312 ART OF GREECE. (3)**  
Study of the art and architecture of Greece from Mycenaean through Hellenistic times. Emphasis will be on interpreting the arts of Greece of the 5th and 4th centuries B.C. in the context of the political, social, and intellectual life of Classical Athens. Prereq: A-H 105 recommended. (Same as CLA 312.)

**A-H 313 ROMAN ART. (3)**  
Study of the art and architecture of Rome from the early Republic through the age of Constantine. Attention will focus on painting, sculpture and architecture as reflections of political, social and cultural developments in the Roman world. Prereq: A-H 105 recommended. (Same as CLA 313.)

**A-H 322 BYZANTINE ART. (3)**  
Study of the art forms of Byzantium (the Eastern Medieval Empire) from its origins in Late Antique and Early Christian art to its final demise in 1453. Emphasis on the continuity and transformation of the classical tradition and on the innovations peculiar to Byzantine art within its religious, imperial, and social context. Prereq: A-H 105 recommended.

**A-H 323 WESTERN MEDIEVAL ART. (3)**  
Examination of the art and architecture of Western Europe from the fourth through the fifteenth centuries CE (Common Era). Considers the interrelationships of art, religion, literature, politics, and other expressive forms as they shape and are shaped by the visual arts communicating the ideas of medieval patrons and artists. Prereq: A-H 105 recommended.

**A-H 334 RENAISSANCE ART. (3)**  
Study of art and architecture in Italy and Northern Europe from c. 1300-1520. Art is interpreted in the context of the social, political, and intellectual life of the Renaissance. Prereq: A-H 106 recommended.

**A-H 335 MANNERIST AND BAROQUE ART. (3)**  
Study of European art and architecture of the Mannerist and Baroque periods, with primary emphasis on Baroque. Baroque art is examined in the social, political, and intellectual contexts of individual regions to distinguish regional differences as well as cultural interrelationships. Prereq: A-H 106 recommended.

**A-H 340 MODERN ART I: 18TH AND 19TH CENTURIES. (3)**  
A study of the visual arts in the eighteenth and nineteenth centuries with emphasis on their historical and cultural background, and interdisciplinary connections in the arts and humanities, especially in Europe. Prereq: A-H 106 recommended.

**A-H 341 MODERN ART II: TWENTIETH CENTURY ART. (3)**  
Examination of the visual arts from the 1800s to the present with emphasis upon Europe and North America. Major developments in painting and sculpture (and to a lesser extent, design, architecture, film, and performance) are analyzed in their contemporary social, intellectual, and political contexts. Prereq: A-H 106 recommended.

**A-H 342 AMERICAN ART. (3)**  
A chronologically organized examination of the visual arts of the peoples of the United States from the colonial period to the present. Different genres of art, the changing roles of artists, and the emergence of art institutions and audiences for art are explored within the context of democratic public life in the United States. Prereq: A-H 106 recommended.

**A-H 343 HISTORY OF PHOTOGRAPHY. (3)**  
Chronological survey of the history of photography from its inception to the present day. Emphasis on fine art photography, the work and contributions of its practitioners, the relationship of photography to other art forms, general issues within the medium. Prereq: A-H 106 recommended.

**A-H 350 CONTEMPORARY ART. (3)**  
Through lectures, readings, discussions, and research, this course examines major issues raised in art and art criticism since 1965. Particular attention is given to the impact of social, intellectual, and technological developments upon art making and concepts of art and the artist. Prereq: A-H 106 recommended.

**A-H 399 EXPERIENTIAL EDUCATION IN ART HISTORY. (1-15)**  
A community-based or field-based experience in Art History. A formal learning contract among student, field supervisor, and supervising faculty member required. May be repeated to a maximum of 15 hours. Prereq: A-H 105 and A-H 106.

**A-H 501 MUSEUM STUDIES I: INTRODUCTION. (3)**  
An introduction to the varied types of professional activity found within the typical university or regional art museum. Intended for advanced students in arts related disciplines. Team taught in the seminar format in the University of Kentucky Art Museum by a member of the art history faculty and the UK Art Museum staff. Prereq: Junior standing.

**A-H 502 MUSEUM STUDIES II: INTERNSHIP. (3)**  
A supervised internship in a professional museum setting that builds upon Museum Studies I. The focus may be on a single aspect or several areas of museum activity: administration, curatorship, education, registration and collection management, design, development, public relations, etc. Laboratory, 10 hours per week. May be repeated to a maximum of 9 credits within different contexts. Prereq: Completion of A-H 501 with a grade of B or better.

**A-H 503 ART HISTORY THROUGH THE ART OBJECT (Subtitle required). (3)**  
Examination of original works of art on campus or in regional collections within an art historical context. The course may focus on a particular medium, class or objects, period, or artist. May be repeated up to 6 credits with different course subtitles. Prereq: Junior standing.

**A-H 525 STUDIES IN GENRES AND MEDIA (Subtitle required). (3)**  
Study of a particular genre (type of subject, such as still life) or a particular medium (type of object, such as the icon) in the history of art. May be repeated to a maximum of 6 credits when identified by a different subtitle. Prereq: Junior standing.

**A-H 526 ART AND THE ARTIST IN SOCIETY (Subtitle required). (3)**  
Art historical study of a topic or period with particular emphasis on artists and the social and cultural context of their roles in the production of visual art forms. May be repeated to a maximum of 6 credits when identified by a different subtitle. Prereq: Junior standing.

**A-H 527 ART WITHIN ITS INTERDISCIPLINARY FRAMEWORK (Subtitle required). (3)**  
Art historical study of a topic or period with particular emphasis placed on establishing the interdisciplinary connections for visual art forms. Depending on the topic, students might research in a wide variety of areas over the course of the semester, for example, literature, music, theatre, history, political science, philosophy, the classics, anthropology, etc. May be repeated to a maximum of 6 credits when identified by different subtitles. Prereq: Junior standing.

**A-H 528 TOPICAL SEMINAR IN ART HISTORY (Subtitle required). (3)**  
In-depth study of a work of art, a particular artist, an artistic period, or an iconographic or thematic study. May be repeated up to six credits with different subtitles. Prereq: Junior standing.

**A-H 555 METHODS IN ART HISTORY. (3)**  
A seminar introduction to the range of approaches scholars have historically used to study art's history (e.g., connoisseurship, formal analysis, iconography, etc.). Exact course content may vary to emphasize historiography, current methods, or the relation of critical theory to art historical practice. Prereq: Junior standing.

**A-H 592 AESTHETICS. (3)**  
Problems of method in aesthetics; major types of aesthetic theory. Aesthetic materials of the arts, in literature, music, and the space arts. Form and types of form. Meaning in the arts. Interrelations of the arts. (Same as PHI 592.)

**A-H 598 COORDINATE STUDY. (3)**

Course number for those students wishing to do advanced work on a special subject in conjunction with a regularly scheduled 300-level class not previously taken by the student. May be repeated to a maximum of six credits. Prereq: Two art history courses or consent of instructor.

**A-H 610 PROBLEMS IN ANCIENT ART. (3)**

Intensive study of a limited typological or historical problem as an introduction to the methodology of original research. Students will give evidence of knowledge of appropriate bibliography and present the results of their research in forms previously agreed upon with the instructor. May be repeated to a maximum of six credits. Prereq: Eighteen credit hours drawn from ancient history, classical languages and literatures, anthropology, and/or art history.

**A-H 620 PROBLEMS IN MEDIEVAL ART. (3)**

Research and analysis in selected topics of art history from the Late Antique-Early Christian period through the 15th century. Readings, discussion, formal presentation of research. May be repeated to a maximum of six credits. Prereq: Eighteen credits in art history or consent of instructor.

**A-H 630 PROBLEMS IN RENAISSANCE ART. (3)**

Intensive study of a topic or problem from art of the 14th through 17th centuries. Individual research as training in historical methodology and formal presentation of this research will be required. May be repeated to a maximum of six credits. Prereq: Eighteen credits in art history or consent of instructor.

**A-H 640 PROBLEMS IN MODERN ART. (3)**

Investigation of particular critical and historical problems in the visual arts from the 18th century to the present. Lectures, discussion, original research, and critiques. May be repeated to a maximum of nine credits. Prereq: Eighteen credits in art history or consent of the instructor.

**A-H 690 TOPICAL PROBLEMS IN ART HISTORY. (3)**

Investigation of special critical and historical problems crossing the customary period divisions of art history. Lectures, discussion, original research, and critiques. May be repeated to a maximum of six credits. Prereq: Eighteen credits in art history or consent of instructor.

**A-H 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**A-H 780 INDEPENDENT WORK: ART HISTORY. (1-3)**

Supervised and sustained individual research and interpretation in the history of art leading to the discovery and demonstration of new knowledge. A formal learning contract between student and supervising faculty member required. May be repeated to a maximum of six credits. Prereq: Graduate standing in the department, 18 credits in art history and consent of instructor.

**A-S Art Studio****A-S 102 VISUAL EXPLORATION I. (3)**

Introductory studio experience in two-dimensional representation and abstraction using a variety of basic drawing materials and processes. Six studio hours per week.

**A-S 103 VISUAL EXPLORATION II. (4)**

Introductory studio experience in three dimensional representation and abstraction. A variety of sculptural materials and basic shop processes will be studied. Eight studio hours per week.

**A-S 200 STUDIO I. (3)**

Studio investigation of recent ideas, values, and directions in Art introduced through a variety of traditional and nontraditional processes, materials, and methods. Nine studio hours per week. Prereq: A-S 102 and 103.

**†A-S 202 FIGURE DRAWING.****A-S 215 STUDIO II. (3)**

Continued studio experience emphasizing the descriptive and expressive function of shape and color in visual organization using two dimensional marking and shaping materials and processes. Nine studio hours per week. Prereq: A-S 102.

**A-S 255 STUDIO III. (3)**

Continued studio experience in three dimensional expression, emphasizing design and technical development, including modeling, mold making, fabrication and assemblage in a variety of materials. Nine studio hours per week. Prereq: A-S 103.

**A-S 310 PAINTING I. (3)**

Concentrated painting experience stressing enlargement of formal understanding and personal expression. Prereq: A-S 215 or consent of instructor.

**A-S 311 PAINTING II. (3)**

A continuation of A-S 310. Prereq: A-S 310 and consent of the instructor.

**A-S 320 PRINTMAKING I. (3)**

Introductory studio experience in printmaking media and procedures relevant to individual development. Nine studio hours per week. Prereq: A-S 102 or consent of instructor.

**A-S 321 PRINTMAKING II. (3)**

A continuation of A-S 320. Nine studio hours per week. Prereq: A-S 320 or consent of instructor.

**\*A-S 330 INTERMEDIATE DRAWING. (3)**

Continued studio experience in two-dimensional representation and abstraction using a variety of drawing materials and processes. When offered in the fall, emphasis will be on the human figure. When offered in the spring, course content will cover a broad range of traditional and experimental subjects including landscape, still lifes, collage, and mixing words with images. May be repeated to a maximum of six credits. Nine studio hours per week. Prereq: A-S 102 or consent of instructor.

**A-S 340 GRAPHIC DESIGN I. (3)**

Introductory studio experience in the application of visual design to graphic communication. Nine studio hours per week. Prereq: A-S 102 and A-S 103, or consent of instructor.

**A-S 341 GRAPHIC DESIGN II. (3)**

Continued exposure to the aesthetics and principles of design and their creative application in visual communication. Class projects will develop sensibilities gained in A-S 340 such as the use of type as a spatial element; selection of typefaces, hand-lettering, and graphic imagery. Mass production procedures and techniques will be introduced. Studio, nine hours per week. Prereq: A-S 340.

**A-S 350 FIBER I. (3)**

Introductory studio experience to the design and fabrication of woven and non-woven fiber art in two and three dimensions; emphasis on color, structure and related aesthetic values. Nine studio hours per week. Prereq: A-S 102 or A-S 103 or consent of instructor.

**A-S 351 FIBER II. (3)**

Continuation of A-S 350, emphasis on developing perceptual and technical skills toward increasing aesthetic involvement with woven and nonwoven fiber and fabric. Nine studio hours per week. Prereq: A-S 350 or consent of instructor.

**A-S 360 SCULPTURE I. (3)**

Concentrated sculptural experience in a variety of media emphasizing expanded understanding of material and methods. Nine studio hours per week. Prereq: A-S 255 or consent of instructor.

**A-S 361 SCULPTURE II. (3)**

A continuation of A-S 360. Nine studio hours per week. Prereq: A-S 360 or consent of instructor.

**A-S 370 CERAMICS I. (3)**

Introductory studio experience to a variety of ceramic materials and processes. Nine studio hours per week. Prereq: A-S 103 or consent of instructor.

**A-S 371 CERAMICS II. (3)**

A continuation of A-S 370. Nine studio hours per week. Prereq: A-S 370 or consent of instructor.

**A-S 380 PHOTOGRAPHY I. (3)**

A-S 380 is an introductory course in photography. Although it provides a thorough background in basic techniques that students may apply to any discipline, its primary emphasis is upon the practice of the medium as a fine art. Students receive technical instruction in camera and lens construction, exposure controls, processing of black and white negatives and prints, and presentation. Studio, nine hours per week.

**A-S 381 PHOTOGRAPHY II. (3)**

A-S 381 is a continuation of A-S 380. The emphasis is upon refining visual perception and basic photographic skills with an introduction to some of the more advanced techniques of black and white photography. Students receive technical instruction in the Zone System, archival processing, toning, and presentation. Studio, nine hours per week. Prereq: A-S 380 or consent of instructor.

**A-S 384 COLOR PHOTOGRAPHY I. (3)**

A-S 384 is an introductory course in color photography. The emphasis is upon the unique qualities of color photography relating to visual perception. Students receive technical instruction in negative and transparency film development and printing. Studio, nine hours per week. Prereq: A-S 380 or consent of instructor.

**A-S 386 NONSILVER PHOTOGRAPHY I. (3)**

A-S 386 is an introductory course in nonsilver photography. The emphasis is upon the unique qualities of nonsilver photography relating to visual perception. Students receive technical instruction in the use of orthochromatic films, half-tone separations, cyanotypes, Van Dyke brown prints, and gum-bichromate prints. Studio, nine hours per week. Prereq: A-S 380 or consent of instructor.

**A-S 390 TOPICAL STUDIES (Subtitle required). (3)**

Studio investigation of art forms, processes, and topics not specially treated in the regular studio course of study. Topics announced in schedule book for each semester. Nine studio hours per week. May be repeated to a maximum of 12 credits when identified by different course subtitles. Prereq: To be specified as appropriate when topic is identified.

**A-S 395 INDEPENDENT WORK: ART STUDIO. (1-3)**

Supervised individual work in Art Studio. A learning contract will be submitted both to the department and the office of the dean at the time of registration. May be repeated to a maximum of nine credits. Prereq: Art major, senior standing, grade-point average of 3.0 within the department and consent of instructor.

**A-S 396 WORKSHOP (Subtitle required). (1-6)**

Workshops in a variety of media dealing with supervised investigation of Art-Studio problems. Studio, 3-18 hours per week. May be repeated to a maximum of nine credits when identified by different subtitles. Prereq: Consent of instructor.

**A-S 398 COORDINATED STUDIES IN ART STUDIO. (3)**

Supervised independent study in conjunction with regularly scheduled upper-division classes. Coordinate study credits may not be attached to any upper-division course in which the student is concurrently enrolled. Studio, nine hours per week. May be repeated to a maximum of nine credits. Prereq: Art major, junior standing or above, grade-point average of 3.0 in the department.

**A-S 399 EXPERIENTIAL EDUCATION. (1-15)**

Off-campus studio experience outside the academic environment leading to significant professional growth. A formal learning contract among student, field supervisor and the department. Studio hours per week by arrangement. May be repeated to a maximum of 15 credits. Prereq: Upper division standing; written statement of objective, recommendation of a studio faculty member and the approval of the department chairperson and the Office of Experiential Education.

**A-S 490 SENIOR SEMINAR. (1)**

Readings and critical discussion relating to art. Selection, preparation, and presentation of senior exhibitions and portfolios. To be taken during student's final year of study. Two lecture hours per week. Prereq: Senior standing in Department of Art.

**A-S 510 PAINTING III. (3)**

Supervised individual development in painting. Nine studio hours per week. Prereq: A-S 311 or consent of instructor.

**A-S 511 PAINTING IV. (3)**

Continuation of A-S 510; emphasis on professional awareness and development. May be repeated to a maximum of six credits. Nine studio hours per week. Prereq: A-S 510 or consent of instructor.

**A-S 520 PRINTMAKING III. (3)**

Supervised individual development in printmaking. Nine studio hours per week. Prereq: A-S 321 or consent of instructor.

**A-S 521 PRINTMAKING IV. (3)**

Continuation of A-S 520; emphasis on professional awareness and development. May be repeated to a maximum of six credits. Nine studio hours per week. Prereq: A-S 520 or consent of instructor.

**\*A-S 530 ADVANCED DRAWING. (3)**

Supervised individual development in drawing. When offered in the Fall, emphasis will be on the human figure. When offered in the Spring, students may select from a broad range of traditional and experimental subjects. May be repeated to a maximum of six credits. Nine studio hours per week. Prereq: A-S 330 or consent of instructor.

**A-S 540 GRAPHIC DESIGN III. (3)**

The analysis of popular graphic formats and their relationship to current ideas in painting and photography, stressing experiences gained by the student in other art-studio classes. Additional emphasis on practical considerations in developing visual communication design problems from initial concept to finished artwork. Exploration of specification procedures as they relate to printing papers, typesetting, and photographic methods. Studio, nine hours per week. Prereq: Successful admission to BFA program.

**A-S 550 FIBER III. (3)**

Supervised individual development in fiber. Nine studio hours per week. Prereq: A-S 351 or consent of instructor.

**A-S 551 FIBER IV. (3)**

Continuation of A-S 550; emphasis on professional awareness and development. May be repeated to a maximum of six credits. Nine studio hours per week. Prereq: A-S 550 or consent of instructor.

**A-S 560 SCULPTURE III. (3)**

Supervised individual development in sculpture. Nine studio hours per week. Prereq: A-S 361 or consent of instructor.

**A-S 561 SCULPTURE IV. (3)**

Continuation of A-S 560; emphasis on professional awareness and development. May be repeated to a maximum of six credits. Nine studio hours per week. Prereq: A-S 560 or consent of instructor.

**A-S 570 CERAMICS III. (3)**

Supervised individual development in ceramics. Nine studio hours per week. Prereq: A-S 371 or consent of instructor.

**A-S 571 CERAMICS IV. (3)**

Continuation of A-S 570; emphasis on professional awareness and development. May be repeated to a maximum of six credits. Nine studio hours per week. Prereq: A-S 570 or consent of instructor.

**A-S 580 PHOTOGRAPHY III. (3)**

A-S 580 is a continuation of A-S 381. The emphasis is upon advanced black and white photographic processes and continued acquisition of skills for self-expression through the medium. Students receive technical instruction in the use of different photographic films, papers, and chemicals, as well as master printing processes. Studio, nine hours per week. Prereq: A-S 381 or consent of instructor.

**A-S 581 PHOTOGRAPHY IV. (3)**

A-S 581 is a continuation of A-S 580. The emphasis is upon advanced black and white photographic processes and continued acquisition of skills for self-expression through the medium. May be repeated to a maximum of six credits. Studio, nine hours per week. Prereq: A-S 580 or consent of instructor.

**A-S 584 COLOR PHOTOGRAPHY II. (3)**

A-S 584 is a continuation of A-S 384. The emphasis is upon advanced color photographic processes and continued acquisition of skills for self-expression through the medium. May be repeated to a maximum of six credits. Studio, nine hours per week. Prereq: A-S 384 or consent of instructor.

**A-S 586 NONSILVER PHOTOGRAPHY II. (3)**

A-S 586 is a continuation of A-S 386. The emphasis is upon advanced nonsilver photographic processes and continued acquisition of skills for self-expression through the various media. May be repeated to a maximum of six credits. Studio, nine hours per week. Prereq: A-S 386 or consent of instructor.

**A-S 596 WORKSHOP. (1-6)**

Workshops in a variety of media dealing with supervised investigation of advanced art studio problems. Prereq: Consent of instructor.

**A-S 610 PAINTING V. (3)**

Advanced studio investigation of current ideas in painting. Exploration of contemporary and traditional procedures, materials, and issues in a context of a group discussion and review. May be repeated to a maximum of nine credits. Prereq: Graduate standing in the department and approval of the instructor.

**A-S 611 PAINTING VI. (3)**

Continued studio investigation of current ideas in painting, with increased concentration on critical group discussions of student work and readings in contemporary art. May be repeated to a maximum of nine credits. Studio, nine hours. Prereq: A-S 610 and consent of instructor.

**A-S 620 PRINTMAKING V. (3)**

Advanced studio investigation of current ideas in printmaking. Exploration of contemporary and traditional procedures, materials, and issues. May be repeated to a maximum of nine credits. Studio, nine hours. Prereq: Graduate standing in the department and consent of the instructor.

**A-S 621 PRINTMAKING VI. (3)**

Continued advanced studio investigation of current ideas in printmaking. Increased concentration of technical and aesthetic development in preparation for entry into the professional environment. May be repeated to a maximum of nine credits. Studio, nine hours. Prereq: A-S 620.

**A-S 630 GRADUATE DRAWING. (3)**

Supervised studio course in graduate-level drawing and mixed media works on paper or other two-dimensional surfaces. Emphasis will be placed on personal style, its identification, definition and further development in the context of contemporary drawing. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: Twelve credits in upper division studio work and consent of instructor.

**A-S 650 FIBER V. (3)**

In this supervised graduate studio course in fiber, emphasis will be placed on personal style, its identification, definition, and further development in the context of major directions in the fiber arts. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: 12 credits in upper division studio work and consent of instructor.

**A-S 651 FIBER VI. (3)**

Continued advanced studio investigation of current ideas in the fiber arts. Increased concentration on technical and aesthetic development, professional readings, and group discussion. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: A-S 650.

**A-S 660 SCULPTURE V. (3)**

In this supervised studio course in graduate sculpture, emphasis will be placed on personal style, its identification, definition, and further development in the context of modern sculpture. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: 12 credits in upper division studio work and consent of instructor.

**A-S 661 SCULPTURE VI. (3)**

Continued advanced studio investigation of current ideas in sculpture. Increased concentration on technical and aesthetic development, professional readings, and group discussion. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: A-S 660.

**A-S 670 CERAMICS V. (3)**

In this supervised studio course in graduate ceramics, emphasis will be placed on personal style, its identification, definition, and further development in the context of direction in modern ceramics. Studio, nine hours per week. May be repeated to a maximum of nine credits. Prereq: 12 credits in upper division studio work and consent of instructor.

**A-S 671 CERAMICS VI. (3)**

Continued advanced studio investigation of current ideas in ceramics, increased concentration on technical and aesthetic development, professional readings, and group discussions. Studio, nine hours per week. May be repeated to a maximum of nine credits. Prereq: A-S 670.

**A-S 680 PHOTOGRAPHY V. (3)**

A-S 680 is a continuation of A-S 581. In this supervised studio course in graduate photography, emphasis will be placed on personal style, its identification, definition, and further development in the context of major directions in photography. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: A-S 581 and consent of instructor.

**A-S 681 PHOTOGRAPHY VI. (3)**

A-S 681 is a continuation of A-S 680. The emphasis will be upon continued advanced studio investigation of current ideas in photography with increased concentration on technical and aesthetic development, professional readings, and group discussion. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: A-S 680 and consent of instructor.

**A-S 710 PROBLEMS IN PAINTING. (3)**

Sustained individual projects focusing on problems and experimental work in the technical and theoretical aspects of painting. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: Twelve credits in upper division studio work and consent of instructor.

**A-S 720 PROBLEMS IN PRINTMAKING. (3)**

Sustained individual projects focusing on problems and experimental work in the technical and theoretical aspects of printmaking. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: Twelve credits in upper division studio work and consent of instructor.

**A-S 730 PROBLEMS IN DRAWING. (3)**

Sustained individual projects focusing on problems and experimental work in the technical and theoretical aspects of drawing. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: Twelve credits in upper division studio work and consent of instructor.

**A-S 740 PROBLEMS IN FIBER. (3)**

Sustained individual problems and experimental work in the technical and theoretical problems of fiber. May be repeated two times to a maximum of nine credits. Nine studio hours per week. Prereq: Twelve credits in upper division studio work and consent of instructor.

**A-S 750 PROBLEMS IN SCULPTURE. (3)**

Sustained individual problems and experimental work in the technical and theoretical problems of sculpture. May be repeated to a maximum of nine credits. Nine studio hours per week. Prereq: 12 credits in upper division studio work and consent of instructor.

**A-S 767 M.F.A. STUDIO THESIS PROJECT. (1-6)**

Independent research and preparation for the M.F.A. thesis exhibition. For the student working in a highly technical medium or process, the preparation of a correlated written thesis under close guidance will be the outcome. The student will be expected to know the standard forms for photographic records and the preparation of a professional portfolio. May be repeated to a maximum of six credits. Prereq: Normally taken during final semester for graduate study.

**A-S 770 PROBLEMS IN CERAMICS. (3)**

Sustained individual problems and experimental work in the technical and theoretical problems of ceramics. May be repeated two times for a maximum of nine credits. Nine studio hours per week. Prereq: 12 credits in upper division studio work and consent of instructor.

**A-S 779 PROBLEMS IN PHOTOGRAPHY. (3)**

A-S 779 emphasizes sustained individual problems and experimental work in the technical and theoretical problems of photography. May be repeated to a maximum of nine credits. Studio, nine hours per week. Prereq: Twelve credits in upper division studio work and consent of instructor.

**A-S 780 PROBLEMS IN DESIGN. (3)**

Sustained individual problems and experimental work in the technical and theoretical problems of design. May be repeated two times for a maximum of nine credits. Nine studio hours per week. Prereq: 12 credits in upper division studio work and consent of instructor.

**A-S 793 GRADUATE STUDIO SEMINAR. (1)**

A seminar especially for graduate students in the studio area, in all areas of concentration. Lectures, discussion and criticism will focus on current formal and aesthetic problems in the arts. Emphasis will be placed on the integration of concepts arising in the different fields in the visual arts. Required of M.F.A. candidates for three semesters. May be repeated to a total of three credits. Prereq: Graduate standing in the department.

**A-S 795 INDEPENDENT RESEARCH. (1-3)**

Advanced studio investigation of art forms, processes, and topics not specially treated in the regular curriculum. May be repeated to a maximum of nine credits. Studio, three hours per week per credit. Prereq: Twelve credits in upper division studio work and consent of instructor.

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**AAD Arts Administration**

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**#AAD 101 ARTS ADMINISTRATION PROFESSIONS. (1)**

Arts administrators will describe their organizations and their roles in managing them. Significant arts events taking place on campus, in the surrounding area, and nationally will be identified and discussed. Arts administration volunteer and internship opportunities will be examined, as will methods of identifying and pursuing employment opportunities while in school and upon graduation. May be repeated to a maximum of four credits.

**#AAD 201 INTRODUCTION TO ARTS ADMINISTRATION. (3)**

An introduction to the field of arts administration, describing the management structures and professional opportunities found in organizations such as arts centers, arts councils, community arts organizations, dance companies, museums, galleries, operas, orchestras and theatres. The type of work carried out by arts administrators is also examined through several public relations related projects.

**#AAD 310 MARKETING THE ARTS. (3)**

Provides an understanding of marketing terminology and methods, and how they apply to the strategic planning process for arts organizations. Emphasis is placed on how arts organizations define, place and price their products, how they target consumers, and what promotional channels they use throughout the course of a season or year. Prereq: AAD 201 or consent of the instructor.

**#AAD 320 FUND RAISING FOR THE ARTS. (3)**

An introduction to methods used by nonprofit arts organizations such as arts councils, museums, orchestras and theatres to raise money from sources other than selling art work or admissions to regular season events. Topics covered include raising funds from individuals, foundations, businesses and government, through such activities as annual campaigns, special events, capital campaigns, and planned giving. Prereq: AAD 201 or consent of instructor.

**#AAD 330 MANAGING ARTS ORGANIZATIONS. (3)**

Overview of business management issues and how they relate to arts organizations. Topics covered will include organizational behavior, strategic planning, personnel and budget management, arts-related legal issues, financial procedures and policies, risk management and managing information. Prereq: AAD 201 and ACC 201 or consent of instructor.

**\*AAD 402 TOPICS IN ARTS ADMINISTRATION (Subtitle required). (1-3)**

A seminar which covers topics in arts administration. Two approaches to the seminar may be taken. The first examines the management of specific types of arts organizations such as theatres, arts centers, museums, galleries, arts councils, orchestras, etc. The second examines philosophical issues related to arts management, such as the role the arts play in society, the case for and against governmental support of the arts, and censorship in the arts. May be repeated when identified by different subtitles. May be repeated to a maximum of 12 credits when identified by different subtitles. Prereq: AAD 201 or consent of instructor.

**\*AAD 499 INTERNSHIP IN ARTS ADMINISTRATION. (1-12)**

An internship with a university, community, state, regional or national arts organization, providing practical work experience related to arts administration. The internship is identified and conducted under the supervision of a faculty member. Students must file a learning contract with the College of Fine Arts. May be repeated to a maximum of twelve credits. Prereq: Junior standing; AAD 201.

**AAS African-American Studies****AAS 200 INTRODUCTION TO AFRICAN-AMERICAN STUDIES. (3)**

An interdisciplinary course which establishes the intellectual context for an examination of the African-American experience; it introduces students to the various approaches scholars use to analyze that experience. This course employs a topical framework which permits focus on issues reflecting the diversity and richness of African-American experience across geographic boundaries.

**AAS 400 SPECIAL TOPICS IN AFRICAN- AMERICAN STUDIES (Subtitle required). (3)**

Detailed investigation of a particular topic in African-American Studies, with emphasis both on content and existing research. Topics will vary from semester to semester and are announced the preceding semester. May be repeated to a maximum of six credits when identified by a different subtitle. Prereq: Twelve hours of African-American Studies minor courses, including AAS 200.

**AAS 401 INDEPENDENT READING AND RESEARCH IN AFRICAN-AMERICAN STUDIES. (3)**

For African-American Studies minors. The student pursues a course of reading and research under the guidance of a staff member, completes a major research project, and takes an examination. A written contract defining the area of study is negotiated between student and instructor at the beginning of the course. May be repeated to a maximum of six credits. Prereq: African-American Studies minor, 12 hours of African-American Studies minor courses, including AAS 200.

**ABT Agricultural Biotechnology****ABT 101 INTRODUCTION TO BIOTECHNOLOGY. (1)**

An introduction to biotechnology: historical perspectives, current applications and future directions. The course will consist of informal lectures and interactive discussions led by Biotechnology faculty and visiting professionals. The course will also orient students to the educational/career opportunities in Biotechnology and assist them in developing a focus for their individualized degree programs. Lecture, two hours per week. Prereq: First year or first semester transfer students in Agricultural Biotechnology.

**ABT 201 SCIENTIFIC METHOD IN BIOTECHNOLOGY. (1)**

A course designed to acquaint students with the common experimental methods used in agricultural biotechnology. Students will be presented with several case studies which demonstrate basic scientific reasoning and experimental strategies. The students will then use their understanding of basic scientific methods and agricultural systems to critically evaluate work from the current scientific literature. Each student will be required to provide a written and oral evaluation of a research project in some aspect of agricultural biotechnology. The class will provide the students with the basic skills needed for preparing their own research proposals. Prereq: ABT 101 and enrollment in the Agricultural Biotechnology degree program or consent of instructor.

**ABT 395 INDEPENDENT STUDY IN BIOTECHNOLOGY. (1-4)**

Independent study in biotechnology under the supervision of a faculty member. Prereq: Agricultural Biotechnology major and consent of appropriate instructor before registration.

**ABT 399 EXPERIENTIAL LEARNING IN BIOTECHNOLOGY. (1-6)**

An internship in biotechnology under the supervision of a faculty member. May be repeated to a maximum of six credits. Prereq: Consent of the instructor, chairperson for the Agricultural Biotechnology degree program and completion of a learning contract before registration.

**ABT 401 TECHNICAL WRITING AND PRESENTATIONS IN BIOTECHNOLOGY. (2)**

This course will focus on effective communication of ideas and research results in biotechnology. It will focus on both written presentations, in the form of research publications and research proposals, and oral presentations. The focus of this course is on student participation. Students will be required to provide both oral and written evaluations of research publications and proposals. The first part of the semester will focus on a dissection, evaluation, and discussion of recent Biotechnology-related research publications. Students will be required to provide both oral and written evaluations of the publications that are discussed. Next, they will discuss the aspects of successful oral presentations, including the effective use of visual aids. The middle of the semester will be spent developing a research proposal, focusing on the separate components of a proposal. The end of the semester will involve student presentations of a research proposal that they have developed. These presentations will be evaluated and discussed by the other members of the class. The goal of this course is to develop skills in the evaluation of research, to provide practice in scientific writing, to prepare Biotechnology students to write their independent study research proposals and written reports, to develop oral communication skills, and to expose students to current literature and research in Biotechnology. Lecture, discussion and oral presentations. Prereq: Agricultural Biotechnology major or consent of instructor.

**ABT 495 EXPERIMENTAL METHODS IN BIOTECHNOLOGY. (4)**

A laboratory techniques course designed to give students the technical skills and understanding necessary to critically examine biological systems at the molecular level. The course will emphasize the principles of chemistry, biochemistry and molecular biology as applied to a model system for laboratory investigations. Laboratory, nine hours per week. Prereq: BIO 150 and AGR 360, or consent of instructor.

**AC American Culture****#AC 301 TOPICS IN AMERICAN CULTURE. (3)**

A team-taught seminar on a selected topic in American Culture, emphasizing approaches to interdisciplinary study in this field and the ways that different disciplines, when integrated, better complement an understanding of the topic. Possible topics include: slavery, racism, women's rights, Native Americans, the West, the South, the city and industrialization. May be repeated to a maximum of six credits.

**#AC 401 PERSPECTIVES IN AMERICAN CULTURE. (3)**

A team-taught seminar on a selected period in American history, emphasizing how different disciplines complement and illuminate a perspective on that period. Possible periods for study: Colonial America, the Enlightenment Age in America, the Age of Jackson, Ante-bellum America, Civil War and Reconstruction, the Gilded Age, America between the Two Wars, and Contemporary America. May be repeated to a maximum of six credits. Prereq: AC 301.

**ACC Accounting****\*ACC 201 FINANCIAL ACCOUNTING I. (3)**

This course is designed to provide an introduction to financial accounting from the users' perspectives. Its primary purposes are to promote understanding of financial accounting information for decision making purposes and to focus on financial accounting's role in communicating business results. Prereq: Sophomore standing.

**\*ACC 202 MANAGERIAL USES OF ACCOUNTING INFORMATION. (3)**

An introduction to the use of accounting data within an organization to analyze and solve problems and to make planning and control decisions. This course is designed for non-accounting majors. Prereq: ACC 201 or BE 161 and BE 162.

**ACC 208 CONTEMPORARY ACCOUNTING METHODS. (3)**

An introduction to basic accounting problem-solving fundamentals using a case approach. The course covers selected problem-solving methods and decision aids, presenting them in an accounting frame of reference with emphasis on team building. Unique aspects of the interpretation and communication of accounting information are explored. Prereq: ACC 201. Enrollment priority will be given to accounting and finance majors.

**ACC 211 FINANCIAL ACCOUNTING LAB. (1)**

A laboratory-based approach to introductory financial accounting applications, with the primary focus on the accounting cycle. The primary objective is to promote an understanding of how accounting information is identified, recorded, and processed for financial reporting. Prereq: ACC 201. Enrollment priority will be given to accounting and finance majors.

**ACC 300 FINANCIAL ACCOUNTING II. (3)**

This course is designed for non-accounting majors to provide expanded study of the impact of relevant financial accounting issues on the users of financial reporting. Topics may include financial statements; income recognition; cash and receivables; inventories; operational assets; investments; intangible assets; current liabilities; long-term liabilities emphasizing leases, pensions, postretirement benefits, and bonds; financial instruments; accounting for income taxes; and owner's equity. Prereq: ACC 201 and ACC 202.

**\*ACC 301 INTERMEDIATE ACCOUNTING I. (3)**

This course is the first of a two-course financial accounting series, providing in-depth study of the accounting cycle, conceptual framework of financial accounting, valuation of balance sheet accounts, recognition of revenues, matching of expenses, and the reporting of the financial condition, operating results, and cash flows of an entity. Prereq: ACC 201 with a grade of B or higher, ACC 208, and ACC 211.

**\*ACC 302 INTERMEDIATE ACCOUNTING II. (4)**

This course is the second of a two-course financial accounting series, providing an in-depth study of the accounting cycle, conceptual framework of financial accounting, valuation of balance sheet accounts, recognition of revenues, matching of expenses, and the reporting of the financial condition, operating results, and cash flows of an entity. Lecture/discussion, three hours; laboratory, three hours per week. Prereq: ACC 301 and ACC 308.

**\*ACC 308 COST MANAGEMENT. (4)**

Traditional and contemporary concepts and techniques that provide accounting information for management decision making at both strategic and operational levels. Topics include the costing of products and services; project and activity analysis; planning and control methods; and performance measurement. Lecture/discussion, three hours; laboratory, three hours per week. Prereq: ACC 208.

**\*ACC 324 ACCOUNTING INFORMATION SYSTEMS. (3)**

This course focuses on two major components of accounting information systems: conceptual models and physical implementation. Accounting systems are studied from an accounting cycles perspective, emphasizing the nature and relevance of accounting internal controls and the relationship of accounting systems to the functional areas of accounting. Using contemporary information technology, students analyze, design, and implement accounting systems along with relevant internal control structures. Prereq: ACC 301 and ACC 308.

**ACC 395 INDIVIDUAL WORK IN ACCOUNTING. (1-6)**

Students confer individually with the instructor. Written paper usually expected and filed in chairperson's office. May be repeated to a maximum of six credits. Prereq: GPA of 3.0 in major, approval of instructor and chairperson.

**ACC 399 INTERNSHIP IN ACCOUNTING. (1)**

A course designed for undergraduate accounting students who, through the Accounting Internship Director, have secured full-time, salaried, career-related positions under the supervision of a sponsoring employer. Enrollment in the course constitutes full-time status. Course may be taken on a pass-fail basis only and for no more than two consecutive semesters, repeated to a maximum of three credits. Prereq: Junior standing in accounting and approval of the Accounting Internship Director.

**ACC 401G ACCOUNTING THEORY. (3)**

An investigation into earlier attempts to develop a coordinated statement of accounting theory; a critical examination of selected current accounting practices; and discussion of recent developments in accounting research. Prereq: ACC 301.

**\*ACC 403 AUDITING. (3)**

This course examines the attest function in accounting. Emphasis is placed on audit standards and objectives, including the evaluation of internal control structures for the purpose of determining relevant auditing procedures. Prereq: ACC 302 and ACC 324.

**\*ACC 407 CONCEPTS OF INCOME TAXATION. (3)**

A study of the federal income tax structure with emphasis upon the conceptual foundations of taxation relating to the three types of taxpayers: businesses, individuals, and estates and trusts. Prereq: Junior standing and ACC 202 or ACC 208.

**\*ACC 410 NOT-FOR-PROFIT AND REGULATORY ACCOUNTING. (3)**

The requirements of adequate accounting systems for various governmental units, including the recording of usual transactions and the form and content of reports. Prereq: ACC 302.

**ACC 503 ADVANCED AUDITING. (3)**

A case-oriented study of current practices in public accounting including applications of statistical sampling, computer-assisted auditing and official promulgations issued by the AICPA. This course also examines professional, ethical standards, professional liability and SEC reporting requirements. Students are expected to analyze actual case data; prepare written reports; and orally present and defend those reports. Prereq: ACC 403G.

**\*ACC 507 ADVANCED TOPICS IN TAXATION. (3)**

A study of advanced topics in taxation, including a more in-depth study of corporations, partnerships, estates and trusts, and individuals. Prereq: ACC 407.

**\*ACC 508 CONTROLLERSHIP. (3)**

A comprehensive study of the controller's objectives, responsibilities, functions, organizational roles, etc. Prereq: ACC 308.

**\*ACC 516 ADVANCED TOPICS IN FINANCIAL REPORTING. (3)**

A comprehensive study of financial accounting and reporting issues involving business combinations, partnerships, foreign currency transactions, not-for-profit accounting and other current accounting issues. Prereq: ACC 302.

**ACC 524 ADVANCED ACCOUNTING INFORMATION SYSTEMS. (3)**

The course covers the design of accounting systems and subsystems to implement effective planning and control for a variety of business decision-making problems. Case analysis and class projects are used to accomplish the course objectives. The microcomputer is integrated in the course through a vigorous overview of existing hardware and software technology. Widely used microcomputer applications software, including database management, spreadsheet, statistical analysis, and others, is introduced and used to accomplish course objectives. Prereq: ACC 302, 324, and 403G.

**ACC 601 RESEARCH IN ACCOUNTING THEORY. (3)**

Critical examination of accounting concepts and standards. Study of current problems and contemporary developments reflected in accounting literature and reports. Prereq: Consent of instructor.

**ACC 603 ATTEST FUNCTION. (3)**

A critical examination of contemporary professional attestation theory and practice including a comprehensive review of AICPA audit case studies, statements on audit procedure, and their application in simulated business situations. Prereq: ACC 403G or consent of instructor.

**ACC 608 ADVANCED MANAGERIAL ACCOUNTING. (3)**

Accounting procedures for the evaluation of performance in business, including the analysis of revenues and costs by projects and responsibilities and the use of budget cost studies and rates of return. Prereq: ACC 408G.

**ACC 610 NOT-FOR-PROFIT AND REGULATORY ACCOUNTING. (3)**  
A study of the contemporary issues in the area of not-for-profit and regulatory accounting. Prereq: ACC 410G or consent of instructor.

**ACC 611 PROFESSIONAL ISSUES IN ACCOUNTING. (3)**  
The course involves a study of issues currently impacting the accounting profession, such as regulatory agencies, standard-setting organizations, and the legal framework within which the profession functions. Prereq: 24 hours of accounting. Open only to students in the Professional Program (5-Year Program) in their fifth year or consent of instructor.

**ACC 617 INCOME TAX DEVELOPMENT. (3)**  
A theoretical and historical approach to the study of federal income taxation with emphasis upon the public finance, legal, and accounting aspects of its development. Consideration will be given to tax research and planning as well as to the critical appraisal of the current law and proposals for its revision. Prereq: ACC 417G or consent of instructor.

**ACC 619 INDEPENDENT STUDY IN ACCOUNTING. (1-3)**  
Designed for students undertaking special studies to be conducted in regular consultation with the instructor. Prereq: Consent of instructor.

**ACC 624 ACCOUNTAMETRICS. (3)**  
A study of the techniques and methods available to measure and evaluate the response of sub-systems to stimuli within the total systems concept. Both the analytical and computer simulation approaches are used to displace uncertainty associated with typical business problems in which the data are generated by the accounting system. A knowledge of FORTRAN is advisable. Prereq: Six hours of accounting and ECO 391 or equivalent.

**ACC 627 CORPORATE TAXATION. (3)**  
A detailed study of the income taxation of corporations and shareholders. Prereq: ACC 417G or consent of instructor.

**ACC 628 FINANCIAL/MANAGERIAL ACCOUNTING. (3)**  
A study of the application of accounting information and services in the recognition or solution of management problems in business. Prereq: Graduate standing, ACC 202 or its equivalent, MA 123 or its equivalent.

**ACC 637 TAXATION OF PARTNERSHIPS AND PARTNERS. (3)**  
A detailed study of the income taxation of partnerships and partners. Prereq: ACC 417G or consent of instructor.

**ACC 647 TAXATION OF ESTATES, GIFTS, AND TRUSTS. (3)**  
A detailed study of the income taxation of estates, gifts, and trusts. This course will include both the estate and gift transfer taxes as well as the income taxation of trusts under Subchapter J. Prereq: ACC 417G or consent of instructor.

**ACC 700 SEMINAR IN ACCOUNTANCY. (3)**  
An overview of accounting and accounting research, team-taught by the graduate faculty. Current developments are addressed, to include research issues in the functional areas of attestation, decision-making, financial and not-for-profit reporting, systems applications, and taxation. Prereq: Doctoral student status.

**ACC 701 SEMINAR IN FINANCIAL ACCOUNTING. (3)**  
A study of financial accounting history and contemporary problems in financial accounting. Prereq: Consent of instructor.

**ACC 708 SEMINAR IN MANAGEMENT ACCOUNTING. (3)**  
A study of contemporary literature in the field of management accounting, with emphasis on the need for additional research into uses of techniques and concepts. Prereq: Consent of instructor.

**ACC 795 INDEPENDENT STUDY IN ACCOUNTING. (1-6)**  
Designed for students undertaking special studies to be conducted in regular consultation with instructor. Class hours by appointment. Prereq: Consent of instructor.

## AEC Agricultural Economics

**AEC 201 INTRODUCTION TO FARM AND NATURAL RESOURCE FINANCE. (3)**  
This course provides an introduction to basic concepts used in financial analysis that can be applied to farms and small agriculturally-related businesses. It provides an overview of basic financial statements and their role in business planning. These tools will be applied to case studies of farms, agribusiness, and forestry firms. Prereq: MA 123 and ECO 201 or ECO 202 or GEN 101.

**AEC 300 TOPICS IN AGRICULTURAL ECONOMICS (Subtitle required). (1-3)**  
Study in special topics in agricultural economics. May be repeated under a different subtitle to a maximum of 6 credits. A course may be offered twice under a given subtitle. Lecture, 1-3 hours; laboratory, 0-6 hours per week. Prereq: GEN 101, ECO 201.

**AEC 302 AGRICULTURAL MANAGEMENT PRINCIPLES. (4)**  
A comprehensive study of economic principles and management tools useful in farm and agribusiness decision making. Utilizes a systems approach to the planning, implementation and control of the agricultural business. Specific attention to application of management and decision theory, economic principles used in decision making, and risk management strategies. Emphasis on planning the future course of the business, acquiring and managing the necessary resources, and establishing physical and financial control over the business. Lab incorporates microeconomic applications of management principles developed in lectures. Prereq: GEN 101, ECO 201.

**AEC 303 MICROECONOMIC CONCEPTS IN AGRICULTURAL ECONOMICS. (3)**  
Emphasis on the development of theoretical models of production and consumption economics and application of these models to problems. The importance of concepts of marginality to managers and consumers is emphasized. Role of risk and uncertainty in resource allocation is outlined. Prereq: GEN 101, ECO 201, MA 123 or 113.

**AEC 304 MACROECONOMIC CONCEPTS IN AGRICULTURAL ECONOMICS. (3)**  
This course addresses the concern that U.S. farmers and the food industry are increasingly affected by macroeconomic forces and general conditions in the national economy. Interdependencies between agriculture, farm size, rural economic well-being and key macroeconomic variables including interest rates, foreign exchange rates and the rate of inflation will be examined. Prereq: GEN 101, ECO 202.

**AEC 305 FOOD AND AGRICULTURAL MARKETING PRINCIPLES. (3)**  
Analysis of the market's role in determining prices and coordinating productive activities in the food and agricultural systems. Prereq: GEN 101, ECO 201.

**AEC 309 INTERNATIONAL AGRICULTURE, WORLD FOOD NEEDS AND U.S. TRADE IN AGRICULTURAL PRODUCTS. (3)**  
Present and projected world food/population balance by geographic regions; food production and world trade in agricultural products with an emphasis upon the implications for U.S. agriculture; an introduction to agricultural development problems of the less developed nations of Latin America, Africa, and Asia. Prereq: GEN 101 or equivalent.

**\*AEC 311 LIVESTOCK AND MEAT MARKETING. (1)**  
Provides students with a comprehensive look at the unique characteristics of the marketing system for livestock. Problems in both the feeder animal sector and the fed animal sector will be considered. Lecture, three hours per week for one-third of the semester. Prereq: AEC 305.

**\*AEC 312 DAIRY MARKETING. (1)**  
A comprehensive analysis of the unique characteristics of the marketing system for milk and milk products with emphasis on pricing at the farm level, the role of producer cooperatives and government policy and regulations. Lecture, three hours per week for one-third of the semester. Prereq: AEC 305.

**\*AEC 313 TOBACCO MARKETING. (1)**  
Analysis of the structure of the production and marketing system for tobacco including institutions and public regulation. Application of marketing methods and principles to tobacco. Lecture, three hours per week for one-third of the semester. Prereq: AEC 305.

**\*AEC 314 GRAIN MARKETING. (1)**  
Study of production and utilization of grain by areas of the world, the marketing systems for grain, and the application of economic and marketing principles to the pricing and movement of grain. Prereq: AEC 305, AEC 321.

**\*AEC 315 FARM SUPPLY MARKETING. (1)**  
A comprehensive analysis of the unique characteristics of the marketing system for farm supplies. Special attention is given to the structure of national and local markets, competitive behavior and pricing strategies, product quality and labeling, and logistics characteristics of various product lines. Prereq: AEC 305.

**\*AEC 321 AGRICULTURAL FUTURES MARKETS. (3)**  
The mechanics, theory, and practical application of hedging as related to agricultural commodities. The historical development of futures markets, functions of the futures markets, and the role of the speculator will also be explored. Prereq: AEC 305.



**AEC 324 AGRICULTURAL LAW. (3)**  
A study of legislation, administrative regulations, constitutions and court cases that have economic ramifications on agricultural and rural life. Prereq: GEN 101.

**AEC 341 AGRICULTURAL CREDIT INSTITUTIONS. (1)**  
Designed to teach applications of key segments of macro agricultural finance. The course primarily examines credit needs in agriculture and the institutions that are capable of supplying agricultural credit. Various credit instruments are identified and examined. Prereq: GEN 101.

**AEC 399 EXPERIENTIAL LEARNING IN AGRICULTURAL ECONOMICS. (1-6)**  
A field or community-based experience in the application of economics to agricultural and rural problems. May be repeated; a maximum of six credits allowed. Pass-fail only. Prereq: GEN 101, nine hours in agricultural economics or economics, and permission of instructor, department chairperson, and completion of learning agreement prior to registration.

**\*AEC 410 INTERNATIONAL TRADE AND AGRICULTURAL MARKETING. (3)**  
A study of institutional, economic and cultural factors that influence aggregate agricultural trade and exports of individual agribusinesses. Macro issues of agricultural trade policies are examined along with elements of international marketing for agricultural products. Prereq: AEC 305.

**\*AEC 422 AGRIBUSINESS MANAGEMENT. (3)**  
Examines and analyzes decision-making tools and problem-solving techniques available to agribusiness managers. Provides learning experience in addressing contemporary economic, marketing and management issues through case study analyses, selected readings and computerized business simulations. Prereq: AEC 305 and MGT 301.

**AEC 425 TIMBER MANAGEMENT. (4)**  
The principles of sustained yield timber management, organization of the forest area, management objectives, timber valuation, regulation of the cut, and timber management plans. Lecture, three hours; laboratory, two hours. Prereq: MA 162, FOR 201, and Summer Camp (FOR 375, 376, 377, 378, and 379), or consent of instructor. (Same as FOR 425.)

**AEC 441G AGRICULTURAL FINANCIAL MANAGEMENT. (3)**  
Applies micro agricultural finance to farm and other agricultural business firms. Reviews elementary mathematics of finance and the objectives of financial management. Uses financial statements, cash flow analysis, financial leverage and other elements in applying the theory of capital investment for making management decisions. Prereq: ACC 201, ECO 201, FIN 300.

**AEC 445G INTRODUCTION TO RESOURCE AND ENVIRONMENTAL ECONOMICS. (3)**  
Economic analysis of the problems of assuring resource availability and environmental quality. Theoretical concepts and empirical tools for evaluating resource and environmental policy. Prereq: ECO 201, or consent of instructor.

**AEC 471 INTERNATIONAL ECONOMICS. (3)**  
The basic exchange model is the most important topic in this course. The exchange model is used to illustrate the gains from trade, the role of opportunity costs, and the properties of relative prices. Production considerations, the concept of comparative advantage, and the resulting factor rewards are introduced. Trade distortions are introduced and studied from the point of view of protectionism and its consequences. Fixed and flexible exchange rates and the concept of balance of payments are also covered. Prereq: ECO 202 or equivalent. (Same as ECO 471.)

**AEC 479 PUBLIC ECONOMICS. (3)**  
An application of economic analysis to the study of the role of government. Emphasis is on the reasons for and the effects of government intervention in the economy. Topics covered include: market failure, public goods and externalities, welfare policy, voting and public choice, taxation, public debt and cost-benefit analysis. Prereq: ECO 202 or equivalent. (Same as ECO 479.)

**AEC 483 REGIONAL ECONOMICS. (3)**  
This course presents an economic approach to the study of regions. The emphasis is on the role of spatial relationships in economic activity. Topics considered include market area analysis, location theory, economic base and input-output analysis as well as regional economic development. Prereq: ECO 202.

**AEC 502 ADVANCED FARM MANAGEMENT. (3)**  
Integration of production and business management principles through planning and analysis for application in the management of commercial farms. The case farm approach is utilized for the application of management techniques. Prereq: AEC 302.

**AEC 516 RURAL REAL ESTATE APPRAISAL. (3)**  
The theory, principles and procedures that a professional appraiser uses in appraising the fair market value of rural real estate. Field trips are included to apply procedures and techniques. As three to four field trips are taken, no courses should be scheduled after this one on Tuesday and Thursday. Prereq: AEC 302 or consent of instructor.

**\*AEC 531 AGRICULTURAL PRICE ANALYSIS. (3)**  
Price behavior of agricultural products and inputs including factors affecting supply and demand for individual products, supply-price relationships and the relationship of agricultural prices to the general price level. Prereq: AEC 305 and STA 291.

**\*AEC 532 AGRICULTURAL AND FOOD POLICY. (3)**  
This course surveys a variety of current public policies that influence the agricultural and rural economies. Students are exposed to the conflicting views of those concerned with food and agricultural policy issues in an international economy. Economic principles are used to evaluate alternatives in terms of the general welfare of society. Prereq: AEC 305.

**AEC 580 SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS. (1-3)**  
Directed independent study of a selected problem. May be repeated to a maximum of six credits. Prereq: Consent of instructor and chairperson of department.

**AEC 590 INTRODUCTION TO QUANTITATIVE ECONOMICS I. (3)**  
An introduction to mathematical approaches to economic theory. Emphasis on linear models, constrained optimization, and techniques used in comparative statics. Prereq: ECO 488G; MA 113; or consent of instructor. (Same as ECO 590.)

**AEC 606 ADVANCED AGRICULTURAL MARKETING. (3)**  
A critical examination of objectives and results of various types of research in market organization, marketing functions, price analysis, markets over time, space and form, market information, commodity promotion programs, quality standards, and macro-economic linkages to marketing. Prereq or concur: AEC 590 and ECO 660.

**AEC 610 INTERNATIONAL TRADE IN AGRICULTURAL PRODUCTS. (3)**  
This course analytically examines current empirical research in the area of agricultural trade. Prereq: ECO 660, AEC 624 and ECO 671.

**AEC 620 ADVANCED PRODUCTION ECONOMICS I. (3)**  
An advanced treatment of production economics with emphasis on flexible product and factor price situations, factor demand functions, multiple product production, and poly-periodic production theory. Prereq: ECO 660.

**AEC 624 ADVANCED QUANTITATIVE METHODS IN AGRICULTURAL ECONOMICS. (3)**  
This course uses statistical tools to model agricultural and economic systems. Subjects covered include: (1) the classical linear regression model, (2) statistical hypotheses tests, and (3) estimation techniques for single and simultaneous equation models. Prereq: ECO 488G and STA 570.

**AEC 626 AGRICULTURE AND ECONOMIC DEVELOPMENT. (3)**  
Analytical consideration of the role of agriculture in economic development in relation to overall development strategy at various stages of growth. Theoretical and policy issues of particular relevance to the agricultural development in underdeveloped agrarian economies with various resource, social, political and economic systems. Prereq: ECO 473G or consent of instructor. (Same as ECO 674.)

**AEC 627 PROJECT ANALYSIS FOR RURAL DEVELOPMENT. (3)**  
A study of the theory and practice of planning and analyzing public sector investments in the agricultural sector in the third world. Among the methods covered are economic analysis, financial analysis, PERT and critical path analysis. Case studies are utilized to teach methods. Prereq: ECO 660.

**AEC 640 ADVANCED AGRICULTURAL POLICY. (3)**  
This course focuses on development of a framework to analyze alternate paradigms of the political economy. The framework focuses on the role of institutions that modify behavior of decision makers. Agricultural and food policies are evaluated in terms of the efficient use of resources and the general welfare of society. Prereq: ECO 660.

**AEC 645 NATURAL RESOURCE ECONOMICS. (3)**  
Economic analysis of natural resource use and environmental issues. Discussion of criteria for public decision making, welfare economics, market failure, benefit-cost analysis, and benefit estimation, as applied to natural resources and the environment. Prereq: ECO 590 and ECO 660.

**AEC 646 INTERTEMPORAL ALLOCATION OF NATURAL RESOURCES.** (3)

This course teaches the application of economic theory to the analysis of solutions for current and prospective natural resource problems. Such understanding will be geared toward fashioning, selecting and implementing planning associated with land, water, air, biological and other natural resources and conservation of the natural environment in serving the needs and desires of citizens. Prereq: ECO 660 and AEC 590.

**AEC 650 ADVANCED AGRICULTURAL PRICES.** (3)

Advanced study of agricultural price behavior by the application of economic theory and statistical analysis. Prereq: AEC 624 and ECO 660.

**#AEC 653 LOCAL ECONOMIC DEVELOPMENT.** (3)

The course develops the capacity to employ the theories, practices and philosophies of economic development as applied to local areas. The primary geographic focus of the course is the rural south-east of the United States, but examples will be drawn from rural areas in other developed countries. Prereq: Graduate status in agricultural economics, public administration, economics, or consent of instructor. (Same as PA 653.)

**AEC 661 PROGRAMMING MODELS IN AGRICULTURAL ECONOMICS.** (3)

A study of some programming models useful in agricultural economics; includes an examination of the structure of the models themselves, economic interpretation of their components and their use in research in agricultural economics. Prereq: MA 416G and either AEC 620 or ECO 660.

**AEC 691 STRUCTURE OF U.S. AGRICULTURE.** (3)

This seminar will analyze the structural transformation of U.S. agriculture in the 19th and 20th centuries in the context of sociological theory. Emphasis is given to key historical transitions, changing social relations of production and state policy. Such emphases provide a framework for understanding the historical roots and future prospects for the socioeconomic problems confronting contemporary U.S. agriculture. Prereq: Graduate standing in sociology/agricultural economics or consent of instructor. (Same as SOC 691.)

**AEC 748 MASTER'S THESIS RESEARCH.** (0)

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**AEC 749 DISSERTATION RESEARCH.** (0)

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**AEC 768 RESIDENCE CREDIT FOR MASTER'S DEGREE.** (1-6)

May be repeated to a maximum of 12 hours. Prereq: Consent of adviser and chairperson of department.

**AEC 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE.** (0-12)

May be repeated indefinitely. Prereq: Consent of adviser and chairperson of department.

**AEC 780 SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS.** (1-3)

Open to graduate students who have the necessary training and ability to conduct research on a selected problem. May be repeated three times for a total of nine credits. Prereq: Consent of instructor and departmental chairperson.

**AEC 796 SEMINAR (Subtitle required).** (3)

An extended original investigation of a specific topic designed to give students experience in methods of research and an intensive study of a particular subject in the field of agricultural economics. May be repeated to a maximum of six credits under different subtitles. Prereq: Ph.D. applicant or candidate.

**AED Agricultural Education****AED 210 INTRODUCTION TO VOCATIONAL EDUCATION.** (3)

The history, status, philosophy, and objectives of vocational education in relation to general education. (Same as HEE 210.)

**AED 362 PRACTICUM IN VOCATIONAL EDUCATION, AGRICULTURAL COMMUNICATIONS, AND LEADERSHIP.** (3)

Supervised experiences in schools, businesses and agencies. Required of all Agricultural Education, Communications, Leadership and Home Economics Education majors. Includes observation, participation, experience, field trips, inspection of programs and professional organizations. May be repeated to a maximum of nine credits. Prereq: Junior standing. (Same as AGC/HEE/SOC 362.)

**AED 501 PRACTICUM IN VOCATIONAL EDUCATION.** (1-12)

Planned and supervised practicum in teaching, extension, governmental agencies, etc. Requires the integration of observation skills, development and use of objectives, using instructional strategies, developing effective interpersonal skills, using appropriate communication skills, developing a portfolio, selecting instructional materials, and evaluating instruction. Regularly scheduled seminars included as an integral part of course. May be repeated to a maximum of 12 credits. Prereq or concur: HEE/AED 586 or consent of instructor. (Same as HEE 501.)

**AED 535 PRINCIPLES AND PHILOSOPHY OF VOCATIONAL EDUCATION.** (3)

Study is made of philosophy, accepted principles, and legislation affecting programs in vocational education. (Same as HEE 535.)

**AED 580 METHODS OF TEACHING VOCATIONAL EDUCATION I.** (3)

Development of teacher competency in methods of teaching with emphasis on the problem-solving procedure and use of demonstrations, field trips, and audiovisual materials; evaluation of teaching-learning principles, studies of facilities and instructional materials needed in a vocational education program. Prereq: Permission of instructor. (Same as HEE 580.)

**AED 586 METHODS IN TEACHING VOCATIONAL EDUCATION II.** (3)

A study of teaching methods, curriculum development, basic skills integration, utilization of resources, working with special needs students, and professional responsibilities of the vocational education teacher. Prereq: Consent of instructor. (Same as HEE 586.)

**AED 590 PROBLEMS IN VOCATIONAL EDUCATION.** (3)

Problems in teaching vocational education for high school students and adults. May be repeated twice for a maximum of nine credits. Prereq: Permission of instructor. (Same as HEE 590.)

**AED 670 ADVANCED METHODS IN TEACHING VOCATIONAL EDUCATION.** (3)

The principles of method applied to teaching in the field of vocational education. Prereq: Experience in teaching vocational education. (Same as HEE 670.)

**AED 671 YOUTH ORGANIZATIONS IN VOCATIONAL EDUCATION.** (3)

A study of the underlying philosophy and principles for organizing and advising youth organizations in vocational education. Emphasis to be placed on activities which will enrich and motivate the instructional programs and which will develop leadership, cooperation and citizenship. (Same as HEE 671.)

**AED 672 CURRICULUM CONSTRUCTION IN VOCATIONAL EDUCATION.** (3)

A study of the principles of curriculum building with an emphasis on development of curriculum in home economics and agriculture education from middle school to adult levels. (Same as HEE 672.)

**AED 678 SELECTING TEACHING MATERIALS.** (3)

Selection and organization of specific references and other instructional materials to be used in teaching an area of vocational education. (Same as HEE 678.)

**AED 679 ADULT EDUCATION IN VOCATIONAL EDUCATION.** (3)

Preparation for teaching adult classes in vocational education including organization of classes, development of curriculum, and methods of teaching. (Same as HEE 679.)

**AED 680 DIRECTING EXPERIENCE PROGRAMS IN VOCATIONAL EDUCATION.** (3)

Directing experience programs including projects, activities, internships, and co-op education. Such areas as setting standards, planning, supervision, records, and evaluation will be discussed. (Same as HEE 680.)

**AED 684 CURRENT TRENDS IN VOCATIONAL EDUCATION.** (3)

Class work in current trends and significant developments in vocational education. May be repeated to a maximum of nine credits. (Same as HEE 684.)

**AED 686 EVALUATION IN VOCATIONAL EDUCATION.** (3)

A course to acquaint teachers of vocational education with techniques used in measuring attainment in vocational education in middle and high school, college, and adult education. Prereq: Teaching experience. (Same as HEE 686.)

**AED 694 THE ADMINISTRATION OF VOCATIONAL EDUCATION. (3)**

A course designed for superintendents, high school principals, and other administrators. Its purpose is to train for administering and supervising vocational education in schools. (Same as HEE 694.)

**AED 695 SPECIAL PROBLEMS IN VOCATIONAL EDUCATION. (3)**

An independent work course for students interested in vocational education. Students make individual investigations and report on special problems. (Same as HEE 695.)

**AED 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours. (Same as HEE 768.)

**AED 779 SEMINAR IN VOCATIONAL EDUCATION. (1-3)**

A critical study of selected problems in vocational education. The course is open only to students with experience in the field. May be repeated to a maximum of nine credits. (Same as HEE 779.)

**AED 789 INDEPENDENT WORK IN VOCATIONAL EDUCATION. (1-3)**

An independent work course for students who have completed a minimum of 12 semester hours of graduate work, one-half of which must have been in vocational education. May be repeated to a maximum of nine credits. (Same as HEE 789.)

**AED 799 RESEARCH IN VOCATIONAL EDUCATION. (1-3)**

Individual research of importance to vocational education. May be repeated to a maximum of nine credits. (Same as HEE 799.)

**AEN Agricultural Engineering****AEN 102 INTRODUCTION TO BIOSYSTEMS ENGINEERING. (1)**

An introduction to the engineering of food and fibers, production, and processing systems. Professionalism and the engineering approach to problem solving will be emphasized.

**AEN 103 BASIC PRINCIPLES OF SURVEYING. (2)**

General use of surveying equipment, development of topographic maps, layout of engineering systems, earthwork computations, and introduction to boundary surveys for Agriculture students. This course is not available for credit to persons who have received credit in another introductory surveying course. Lecture, one hour; laboratory, three hours. Prereq: A course in trigonometry, enrollment in the College of Agriculture and/or consent of instructor.

**AEN 202 BIOSYSTEMS ENGINEERING PROBLEMS. (2)**

Introduction to biosystems engineering; engineering problem solving; computer applications and structured programming; probability; statistics. Emphasis on application of these skills to biosystems applications. Lecture, two hours; laboratory, one hour per week. Prereq: MA 113 and sophomore standing; prereq or coreq: CS 221.

**AEN 220 FARM TRACTORS AND ENGINES. (3)**

Principles of selection and application of farm tractors and engines. Operating principles of internal combustion engines including carburetion, fuel injection, ignition, and lubrication. Power transmission application and efficiency are considered. Lecture, two hours per week; laboratory, two hours per week.

**AEN 252 FARM SHOP. (3)**

Wood and metal work, including blueprint reading, oxyacetylene and arc welding, power woodworking tools, soldering and pipe work. Lecture, one hour; laboratory, four hours. Prereq: Major in agricultural education or consent of instructor.

**AEN 301 MICROELECTRONIC APPLICATIONS IN BIOSYSTEMS ENGINEERING. (2)**

An introduction to the use of digital electronics and integrated circuits in solving agricultural engineering problems. Digital circuits, microprocessor concepts, computer interfacing, transducers, signal conditioning and control applications are discussed. Lecture, one hour; laboratory, two hours per week. Prereq: EE 307 or consent of instructor.

**AEN 302 ANALYTICAL AND NUMERICAL METHODS FOR BIOSYSTEMS. (3)**

An introduction to engineering problems encountered in agricultural and biological engineering systems. Introduction of psychrometrics; emphasis is on the solution of case studies using computer simulation and analysis, statistical methods and numerical techniques. Topics of current relevance used and case studies. Prereq: Junior standing, CS 221; prereq or concur: MA 214.

**AEN 308 ENGINEERING PROPERTIES OF BIOLOGICAL MATERIALS. (3)**

Physical properties of agricultural materials and food products as related to engineering design for handling, storage, and processing. Prereq: EM 302, EM 303 and engineering standing.

**AEN 340 PRINCIPLES OF FOOD ENGINEERING. (4)**

The functional requirements and principles of operation of systems for the handling and processing of food and agricultural products. Lecture, three hours; laboratory, two hours per week. Prereq: Junior standing and completion of mathematics requirement in Food Science curriculum.

**AEN 343 FLUID MECHANICS OF BIOSYSTEMS. (3)**

Principles of fluid dynamics as applied to biosystems; Newtonian and non-Newtonian fluid flow processes; theory and application of pumps and low pressure fans; flow measuring devices and techniques. Prereq: ME 330 or CE 341 and engineering standing.

**AEN 400 SENIOR SEMINAR IN AGRICULTURAL ENGINEERING. (1)**

A course for senior students in agricultural engineering with emphasis on oral communications skills. Students will do literature searches on topics related to the agricultural engineering profession and present oral and written reports. Prereq: COM 199 and senior standing in agricultural engineering.

**AEN 401 DESIGN IN AGRICULTURAL ENGINEERING. (4)**

A course for senior students in agricultural engineering with emphasis on the engineering design process and effective oral communication. Creative involvement of students is required in solving open-ended problems where previously learned engineering principles culminate to produce actual designs which are appropriate to the profession of agricultural engineering. Lecture, two hours per week; laboratory, four hours per week. Prereq: Senior standing in agricultural engineering program and consent of instructor.

**AEN 402 DYNAMICS OF BIOLOGICAL SYSTEMS. (3)**

Energy capture and flow in biological systems; application of mathematical and simulation techniques to the analysis of biosystems. Topics include: study of the principle methods of energy capture in living organisms, population dynamics of living systems, energy flows in the biosphere, cellular chemical reactions, reaction kinetics, absorption and transfer processes, and growth dynamics. Topics are examined and modeled from an engineering standpoint. Prereq: ME 220 or equivalent or consent of instructor.

**AEN 406G PHYSICS OF PLANT AND ANIMAL ENVIRONMENT. (3)**

A study of the thermal, moisture, light and gaseous components of plant and animal environment with emphasis on interactions between these biological systems and their environment. Lecture, two hours; laboratory, two hours. Prereq: ME 325, engineering standing or consent of instructor.

**AEN 407 ECONOMIC ANALYSIS OF BIOSYSTEMS. (2)**

The financial and managerial aspects of biosystems in evaluating design alternatives to biosystems. Typical topics included are: concepts of present and future value, techniques of managerial economics, and biosystem design analysis in the evaluation of alternatives. Retirement/replacement policies and risk analysis. Prereq: Engineering standing.

**AEN 417G DESIGN OF MACHINE SYSTEMS. (3)**

A study of the operational characteristics and design features associated with production and processing equipment for food and fiber products and an introduction to conceptualization, analysis and design of these systems. Lecture, two hours; laboratory, two hours per week. Prereq: EM 313, ME 330, engineering standing or consent of instructor.

**AEN 435G WASTE MANAGEMENT FOR BIOSYSTEMS. (3)**

A study of the characteristics; treatment and utilization principles; and analysis and design of systems for managing waste from the production and processing of food and fiber. Lecture, two hours; laboratory, three hours per week. Prereq: MA 214 and BIO 108.

**AEN 438G FUNDAMENTALS OF GROUNDWATER HYDROLOGY. (3)**

The first course in the physics of saturated flow in porous media. Topics include groundwater occurrence, Darcian flow, well hydraulics, flow nets and layered systems flow. The basic concepts of pollutant movement and unsaturated flow are introduced and case studies are analyzed. Prereq: ME 330 or CE 341 or consent of instructor. (Same as CE 460.)

**AEN 450 SPECIAL PROBLEMS. (1-3)**

An intensive study of some phases of agricultural engineering in which the student is particularly interested. Approval of the instructor is required. May be repeated to a maximum of six credits.

**#AEN 461G BIOMETEOROLOGY. (3)**

An introduction to the impact and relationship of the atmosphere on living organisms. Emphasis on the practical application of meteorology to everyday problems within the biosphere. Weather analysis, interpretation, psychometrics of the atmosphere, and the impact of weather and climate on animals, plants and man are discussed. Lecture, two hours; laboratory, two hours per week. Prereq: BIO 150 and STA 291 or consent of instructor.

**#AEN 462 RESIDENTIAL AND COMMERCIAL IRRIGATION DESIGN. (3)**

The utilization of hydraulic principles in the design, assimilation, installation and operation of residential and commercial irrigation systems in applications which emphasize water conservation, nutrient management and environmental protection. Lecture, two hours; laboratory, two hours per week. Prereq: Consent of instructor.

**#AEN 463G AGRICULTURAL SAFETY AND HEALTH. (3)**

The course provides a comprehensive overview of major safety and health hazards in agricultural production and an overview of the basic approaches for the prevention and control of agricultural injuries and illnesses. The course is oriented toward upper class and graduate students. Prereq: AEN 220, AEN 252, and junior standing or consent of instructor.

**AEN 480G HEATING, VENTILATING AND AIR-CONDITIONING. (3)**

An introductory course emphasizing the engineering systems aspects of thermal environmental design. Principles and applications of building energy requirements and thermal comfort criteria. Prereq: ME 325 and engineering standing or consent of instructor. (Same as ME 480G.)

**AEN 513 SOIL DYNAMICS IN TILLAGE AND TRACTION. (3)**

A course for advanced undergraduate and graduate students which presents the principles of dynamic soil-machine interaction. The performance characteristics of tractive devices are presented along with the corresponding soil compliance. Soil response to mechanical disturbance or tillage is also presented. Lecture, two hours; laboratory, two hours per week. Prereq: EM 313, AEN 417G.

**AEN 515 FLUID POWER SYSTEMS. (3)**

Analysis and design of fluid power systems used in agricultural, industrial and processing equipment. Selected topics to include: positive displacement components, control devices, actuators, fluid transmission and system dynamics. Lecture, two hours; laboratory, two hours per week. Prereq: ME 330, ME 340 and engineering standing or consent of the instructor.

**AEN 536 FLUVIAL HYDRAULICS. (3)**

Rainfall physics, principles of erosion on upland areas and construction sites, stable channel design in alluvial material, mechanics of sediment transport, river mechanics, reservoir sedimentation. Prereq: CE 461G, ME 330 and engineering standing. (Same as CE 546.)

**AEN 537 IRRIGATION AND DRAINAGE ENGINEERING. (3)**

Planning and design of irrigation system; sprinkler, traveling gun, center pivot, trickle, subirrigation and residential and commercial irrigating; pumps; water quality treatment and supply; ponds and wells; principles of water movement and plant-soil relationships; surface and subsurface drainage. Prereq: ME 330 or CE 341 or consent of instructor.

**AEN 545 ENGINEERING HYDRAULICS. (3)**

Analysis of flow in closed conduits and natural and artificial open channels. Design of hydraulic structures. Prereq: CE 341, CE 441 and engineering standing. (Same as CE 549.)

**AEN 549 FOOD AND BIOPROCESS ENGINEERING. (3)**

An analysis of the most common unit operations utilized in the processing of food products. The principles of heat and mass transfer and reaction kinetics associated with processing operations will be used in defining process systems for drying, evaporation, refrigeration, freezing, fermentation, etc. Prereq: ME 325 or equivalent.

**AEN 556 SOLID AND HAZARDOUS WASTE MANAGEMENT. (3)**

Study of the generation and management of solid and hazardous wastes. Application of engineering principles to the collection, transport, processing, resource recovery and ultimate disposal of these wastes. Prereq: CE 471G, CE 521 or consent of instructor and engineering standing. (Same as CE 556.)

**AEN 569 WATER RESOURCES SYSTEM DESIGN. (4)**

Application of principles of hydrology, hydraulics, and environmental engineering in the planning, design, and analysis of a comprehensive water resource project. Emphasis on basic ideas and their application to the practical design of water supply, distribution, collection and treatment facilities. Written and oral presentation of student projects will be required. Lecture, three hours; laboratory, three hours per week. Prereq: CE 451, 461G, 549 and engineering standing. (Same as CE 569.)

**AEN 599 TOPICS IN AGRICULTURAL ENGINEERING. (2-3)**

A detailed investigation of a topic of current significance in agricultural engineering such as: design of small earth dams, vacuum dehydration systems, small particle mechanics, environmental control in green houses, sprinkler irrigation, energy conversion in agriculture, bio-simulation. May be repeated to a maximum of six credits, but only three credits can be earned under the same title. A particular topic may be offered at most twice under the AEN 599 number. Prereq: Variable; given when topic identified.

**AEN 618 ADVANCED PLANT, SOIL AND MACHINERY RELATIONSHIPS. (3)**

A consideration of fundamental concepts of energy and materials in the identification and mensuration of parameters needed in the development of new machines for agriculture. Lecture, two hours; laboratory, two hours. Prereq: AEN 417G and 505.

**#AEN 625 TOPICS IN ADVANCED ENVIRONMENT CONTROL AND ANALYSIS (Subtitle required). (3)**

A study of current research in environment control and analysis of agricultural, commercial and residential structures. May be repeated three times for a maximum of nine credits, but not more than three credits may be earned under a particular topic. Prereq: Senior course in environment control and HVAC, AEN/ME 480G, or consent of instructor.

**AEN 638 GROUNDWATER HYDROLOGY. (3)**

The equations of saturated and unsaturated groundwater flow, the formulation of boundary value problems, and some analytical methods of solution. Solutions using Fourier series, solutions involving the Fourier transform and the Fourier sine and cosine transforms. The Boltzman transformation, development of the Philip solution for horizontal and vertical flow. Mathematical statement of the saturated and unsaturated groundwater pollution problem and some analytical methods of solution. The semigroup solution of the resulting evolution equation, examples of solutions using the Laplace transform and the Fourier transform, more complex solutions in two-dimensional and three-dimensional domains, solutions for distributed sources in time and in space, solutions for time-varied boundary conditions. Prereq: MA 214, CE 461G or equivalent. (Same as CE 660.)

**AEN 642 OPEN CHANNEL FLOW. (3)**

The hydraulics of free surface flow including such topics as uniform flow, varied flow, unsteady flow, the hydraulic jump flow transitions, spillways and channel delivery. Prereq: CE 341. (Same as CE 642.)

**AEN 648 ENERGY AND MASS TRANSFER IN AGRICULTURAL PROCESSING. (3)**

A comprehensive and in-depth study of the principles of energy and mass transfer as they apply to the processing of agricultural and biological materials. Prereq: AEN 548 or consent of instructor.

**AEN 653 WATER QUALITY IN SURFACE WATERS. (3)**

Water quality requirements for various beneficial uses. Analysis of dispersion, advection, evaporation, natural aeration, biological oxidation and photosynthesis; their effects on the physical, chemical and biological quality of waters in streams, lakes, reservoirs, estuaries and other surface waters. Eutrophication. Prereq: MA 214 and CE 451, or consent of instructor. (Same as CE 653.)

**AEN 658 INSTRUMENTATION FOR ENGINEERING RESEARCH. (3)**

Instrumentation and measuring system characteristics; transducers for engineering measurements; and data acquisition and analysis. Lecture, two hours; laboratory, two hours per week. Prereq: Consent of instructor.

**AEN 660 SIMILITUDE IN ENGINEERING. (3)**

An advanced approach to engineering problems through the theory of similitude and its application to models. The use of geometrically similar, distorted and dissimilar models will be discussed. Prereq: Graduate standing.

**AEN 665 WATER RESOURCES SYSTEMS. (3)**

Application of systems analysis, mathematic modeling, and optimization in water resources management and design. Solution of engineering problems found in water supply, water quality, urban drainage, and river basin development and management by use of linear, nonlinear, and dynamic programming models. Prereq or concur: CE 421 and CE 569 or consent of instructor. (Same as CE 665.)

**AEN 667 STORMWATER MODELING.** (3)  
Introduction to deterministic and parametric modeling approaches for mathematically simulating stormwater runoff and quality. Emphasis on modeling concepts and model formulation. Analysis of deterministic component models and their linkage. Formulation of existing parametric models. Presentation of methods for parameter optimization and regionalization. Demonstration of linkage between the two approaches with illustrative examples. Prereq: CE 341 and CE 461G, or consent of instructor. (Same as CE 667).

**AEN 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**AEN 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**AEN 750 SPECIAL PROBLEMS IN AGRICULTURAL ENGINEERING.** (1-3)  
Independent work on selected research problems in one of the various fields of biosystems and agricultural engineering. Consultation and laboratory by appointment. May be repeated three times for a maximum of nine credits. Prereq: Approval of chairperson of department.

**AEN 768 RESIDENCE CREDIT FOR MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.

**AEN 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.

**AEN 775 SEMINAR.** (0)  
Weekly meetings with members of the staff for reports and discussions on research and current trends and practices in agricultural engineering. May be repeated twice. One class hour.

**AEN 795 THESIS.** (0)  
May be repeated twice.

## AGC Agricultural Education, Communication, Leadership, and Home Economics Education

**AGC 320 SURVEY OF AGRICULTURE AND CONSUMER MEDIA.** (3)  
An exploration of the social, political, and economic factors that influence how agricultural producers and consumers receive information through the media. In addition, the course will analyze how the general mass media cover agricultural and consumer topics. (Same as HES 320.)

**AGC 362 PRACTICUM IN VOCATIONAL EDUCATION, AGRICULTURAL COMMUNICATIONS, AND LEADERSHIP.** (3)  
Supervised experiences in schools, businesses and agencies. Required of all Agricultural Education, Communications, Leadership and Home Economics Education majors. Includes observation, participation, experience, field trips, inspection of programs and professional organizations. May be repeated to a maximum of nine credits. Prereq: Junior standing. (Same as AED/HEE/SOC 362.)

**AGC 395 SPECIAL PROBLEMS IN AGRICULTURAL COMMUNICATIONS.** (1-3)  
Directed independent study of a selected problem in the field of agricultural communications. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**AGC 399 EXPERIENTIAL LEARNING IN AGRICULTURAL COMMUNICATIONS.** (1-3)  
A field-based learning experience, under faculty supervision, in the application of communications techniques to agricultural issues. May be repeated to a maximum of three credits. Offered on a pass/fail basis only. Prereq: Consent of instructor and completion of learning contract.

**AGC 400 AGRICULTURAL COMMUNICATIONS CAMPAIGNS.** (3)  
Exploration of communications campaigns and strategies in the agricultural sector. Students will learn how to plan and enact communications campaigns centered on agricultural issues and audiences.

**AGC 450 TOPICS IN AGRICULTURAL COMMUNICATIONS (Subtitle required).** (3)  
Special topics or experimental courses in agricultural communications. Particular title may be offered twice at most under this course number. Students may not repeat under same title. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**AGC 490 SEMINAR IN AGRICULTURAL COMMUNICATIONS.** (3)  
A capstone course for seniors in agricultural communications. Presentations, research papers, outside speakers, and career guidance will be significant course components. Prereq: AGC 320 and AGC 400 and senior standing; or consent of instructor.

## AGR Agronomy

**AGR 360 GENETICS.** (3)  
The basic principles of heredity as currently understood from evidence accumulated in classical, cytogenetic, molecular, and quantitative genetic experiments. Emphasis is placed on a thorough understanding of genetic principles and the relationship of genetics to all biological disciplines. Prereq: Six credits in biological sciences and one course in general chemistry. (Same as ASC/ENT 360.)

**AGR 367 SOIL AND WATER ANALYSIS LABORATORY.** (3)  
Introductory laboratory emphasizing fundamental principles in soil science and water quality. Will provide hands-on experience in soil-water research and the written communication of acquired knowledge. Lecture 1.5 hours, laboratory three hours per week. Prereq: PLS 366 or approval of instructor.

**†AGR 370 ENVIRONMENT, FOOD PRODUCTION AND SOCIETY IN THE U.S.**

**AGR 395 SPECIAL PROBLEMS IN AGRONOMY.** (1-4)  
May be repeated for a maximum of nine credits. Prereq: Consent of appropriate instructor before registration.

**AGR 399 EXPERIENTIAL LEARNING IN AGRONOMY.** (1-6)  
A field-based learning experience in agronomy under the supervision of a faculty member. May be repeated for a maximum of six credits.

**AGR 404 INTEGRATED WEED MANAGEMENT.** (4)  
A study of weed management concepts based on the integration of weed biology and ecology data with cultural, biological, and herbicidal control. Lecture, three hours; laboratory, two hours. Prereq: PLS 386.

**AGR 408 TOBACCO.** (3)  
History, botany, pathology, entomology, breeding, and culture of tobacco with special emphasis on burley. Prereq: PLS 386 or consent of instructor.

**AGR 412 GRAIN CROPS.** (3)  
Study of the grain crops of the world with respect to adaptation, production, management and use. Prereq: PLS 386 or consent of instructor.

**AGR 450G BIOGEOCHEMISTRY.** (3)  
A course emphasizing the physical, chemical, and biochemical make-up of soil/water systems and the information required to predict chemical fate in the environment. Emphasis is placed on the relationships describing mineral solubility, sorption and exchange reactions, redox reactions, volatility, and biochemical cycling. Prereq: CHE 105, 107, 115; two semesters of college biology. (Same as NRC 450G.)

**AGR 460 INTRODUCTION TO MOLECULAR GENETICS.** (2)  
Molecular genetics is the study of the biochemical basis of heredity and focuses on the structure and expression of DNA at the molecular and cellular level. The course will provide a detailed understanding of the biochemical events involved in replication, prokaryotic and eukaryotic transcription, and translation of DNA, as well as RNA processing, recombination, and the theoretical underpinnings of genetic engineering. Prereq: AGR 360 or BIO 404G or consent of instructor. (Same as ENT 460.)

**AGR 461 INTRODUCTION TO POPULATION GENETICS.** (2)  
This survey course examines the population dynamics and equilibria of genes in nuclei, chloroplasts and mitochondria. Emphasis will be on biological relevance (in plants, animals, and micro-organisms), but some theoretical derivations will also be introduced. Prereq: AGR 360 (or equivalent) and one course in probability/statistics. (Same as BIO/ENT/FOR 461.)

**AGR 468G SOIL USE AND MANAGEMENT.** (3)  
The application of principles related to soils and their management in planning the utilization of land and associated resources. Lecture and discussion. Prereq: PLS 366 or consent of instructor.

- AGR 470G FERTILIZERS AND SOIL FERTILITY. (3)**  
Sources and manufacture of fertilizer materials; soil reaction of elements essential for plant growth; effective use of fertilizers for various soil situations. Prereq: PLS 366 and PLS 386 or consent of instructor.
- \*AGR 477G LAND TREATMENT OF WASTE. (3)**  
Resource management with emphasis on principles and methods of soil application of wastes (agricultural, industrial, and municipal). Topics include chemical and biological systems; soil and plant management; development, monitoring, and record keeping. Prereq: PLS 366. (Same as NRC 477G.)
- AGR 501 RECLAMATION OF DISTURBED LAND. (3)**  
Development of concepts, principles, and an understanding of the problems associated with restoring the productivity of soils disturbed by surface mining of coal as well as a limited discussion of reclamation of other types of disturbed soils. One all-day field trip is required. Prereq: PLS 366.
- AGR 502 ECOLOGY OF ECONOMIC PLANTS. (3)**  
Study of the physical environment (radiation, temperature, precipitation, and evapotranspiration) in which crops are grown and the effect of the environment on crop growth and yield. Both micro- and macro-climatic relationships are considered.
- AGR 510 FORAGE MANAGEMENT AND UTILIZATION. (4)**  
Critical study of grassland plants and the biological and physical factors operative in utilization of natural and cultivated grasslands by domestic animals. Lecture, three hours; laboratory, two hours. Prereq: PLS 386, or consent of instructor.
- AGR 515 TURF MANAGEMENT. (3)**  
A study of the selection, culture, and management of certain turf species used for home lawns, golf courses, athletic fields, and highway slopes. Lecture, two hours; laboratory, two hours. Prereq: BIO 106 and PLS 366. (Same as HOR 515.)
- AGR 556 SEED TECHNOLOGY. (3)**  
Changes occurring during reproductive development, seed germination and seed deterioration; principles of seed production for forage and grain crops; technical aspects of conditioning, testing, storage and marketing of genetically pure crop seed. Lecture, two hours; laboratory, four hours for 12 weeks. Prereq: PLS 386 or consent of instructor.
- AGR 560 SOIL-PLANT RELATIONSHIPS. (3)**  
The soil-plant system with emphasis on the soil as an environment for plant roots; nutrient requirements of plants; and nutrient behavior in soils. Prereq: AGR 470G or equivalent, or consent of instructor.
- AGR 564 FOREST SOILS. (3)**  
The physical, chemical and biological properties of soils as they relate to forest tree growth and the forest community. A study of the genesis, morphology, classification and utilization of soils for forestry. Three class hours per week with occasional extended field trips. Prereq: PLS 366 and AGR 367 and consent of instructor. (Same as FOR 564.)
- AGR 566 SOIL MICROBIOLOGY. (3)**  
The nature and biochemical activities of soil microflora; their significance in soil genesis and structure and their role in soil fertility. Prereq: PLS 366 or an introductory microbiology course or consent of instructor.
- AGR 567 METHODS IN SOIL MICROBIOLOGY. (1)**  
Methods in Soil Microbiology will be a laboratory course dedicated to introducing upper division students to the methods and techniques used by microbiologists and other soil scientists to examine organisms, interactions, and processes in soil systems. Laboratory, three hours per week. Prereq: PLS 366 or introductory microbiology course.
- AGR 573 SOIL MORPHOLOGY AND CLASSIFICATION. (3)**  
Study of concepts of soil horizons, soil profiles and soilscapes; morphological, physical, chemical and mineralogical parameters useful in their characterization. Soil forming factors and processes. Basic principles of soil classification. Characterization of selected Kentucky soils and their placement in the modern system; practical field problems in soil identification, characterization and classification. Lecture, two hours; laboratory, three hours per week. Prereq: PLS 366 and AGR 367 or consent of instructor.
- AGR 575 SOIL PHYSICS. (2)**  
Physical properties of soils and their relationship to chemical, mineralogical, and biological soil properties and to plant growth. Prereq: PLS 366 and AGR 367 and consent of instructor.
- AGR 576 LABORATORY IN SOIL PHYSICS. (1)**  
Laboratory experiences for the purpose of increasing an understanding of the principles of soil physical measurements and their relationships to chemical, mineralogical and biological soil properties. Laboratory, two hours. Prereq: AGR 575 or concurrent.

- AGR 581 CHEMICAL ANALYSIS OF SOILS AND PLANTS. (4)**  
Laboratory emphasis on instrumental methods and techniques used in quantitative and qualitative chemical analysis of soil and plant materials and relation of these analyses to physical, chemical and biological systems. Lecture, one hour; discussion, one hour; laboratory, four hours. Prereq: PLS 366 or equivalent, or consent of instructor.
- AGR 597 SPECIAL TOPICS IN PLANT AND SOIL SCIENCE (Subtitle required). (1-3)**  
Special topical or experimental courses in crop science, soil science or related areas of horticulture, or plant physiology for graduate and advanced undergraduate students. Special subtitle required and must be approved by the chair of Agronomy or Horticulture. A particular subtitle may be offered twice under AGR 597. Students may not repeat under the same subtitle. Prereq: Permission of instructor. (Same as HOR 597.)
- AGR 599 SPECIAL PROBLEMS IN AGRONOMY. (1-4)**  
May be repeated for a maximum of nine credits. Prereq: Consent of instructor.
- AGR 601 SPECIAL TOPICS IN MOLECULAR AND CELLULAR GENETICS. (1)**  
Each semester five distinguished scientists visit the UK campus to deliver a series of three formal lectures each and participate in numerous informal contacts with graduate students. The emphasis is on the presentation of the most current advances (often unpublished) in selected topics in molecular and cellular genetics. May be repeated to a maximum of six credits. (Same as BCH/BIO/MI/PPA 601.)
- AGR 602 PRINCIPLES OF YIELD PHYSIOLOGY. (3)**  
Critical study of the physiological factors and processes involved in determining economic yield in grain crops. The focus will be on factors operating at the whole plant and plant community level as opposed to physiological processes at the cellular or subcellular level. A logical, analytical description of the process of economic yield production by grain crops will be developed and related to historical changes in crop yields and the potential for increasing yields in the future. Prereq: PLS 386 and BIO 430G or consent of instructor.
- AGR 619 CYTOGENETICS. (4)**  
Classical, biochemical and molecular studies of the structure and function of eukaryotic chromosomes. Emphasis is placed on the effects of variation in chromosome type, structure and number on Mendelian genetics and in plant and animal breeding. Lecture, three hours; laboratory, two hours. Prereq: ASC/AGR 360 or BIO 404G. (Same as BIO 619.)
- AGR 620 PLANT MOLECULAR BIOLOGY. (3)**  
This course is intended to be a treatment of current concepts of plant molecular biology. It will be a literature-based course, supplemented by handouts and reading lists. The course will deal as much as is possible with topics that are unique to plants. Current aspects of molecular biology that are relevant to the course content will be covered in the first part of the course; however, these lectures will not be a review of topics that should have been retained from introductory genetics and biochemistry courses. Also, they will not be a substitute for a molecular biology course. Prereq: One semester of undergraduate genetics and biochemistry or consent of instructor. (Same as BIO 620.)
- AGR 622 PHYSIOLOGY OF PLANTS I. (3)**  
A physiological/biochemical treatment of central topics in modern plant physiology. Topics will include: plant-cell biology, ion transport, water and translocation, respiration and photosynthesis. Prereq: BIO 430G or equivalent or consent of coordinator. Prereq or concur: BCH 501. (Same as BIO/FOR/HOR 622.)
- AGR 623 PHYSIOLOGY OF PLANTS II. (3)**  
A physiological/biochemical treatment of central topics in modern plant physiology. Topics will include: plant hormones, an introduction to plant biotechnology, senescence and abscission, stress physiology, phytochrome-photomorphogenesis-phototropism nitrogen and sulfur metabolism. Prereq: BIO 430G or equivalent, and BCH 501 or consent of course coordinator. (Same as BIO/FOR/HOR 623.)
- AGR 630 EXPERIMENTAL TECHNIQUES IN PLANT PHYSIOLOGY. (3)**  
Presentation of theory and experimental application of methods for studying plant metabolism and cell biology. Techniques presented include: UV/Vis spectrophotometry, gel electrophoresis, TLC, GLC, HPLC, use of radioisotopes, gel filtration, isolation and characterization of organelles, mRNA isolation. Prereq: BIO 430G or equivalent or consent of instructor. (Same as BIO 630.)
- AGR 650 SOIL-PLANT RELATIONSHIPS. (3)**  
An advanced course on the relationships between media and the root systems of plants growing therein. Prereq: AGR 366, BIO 430G (or equivalent), or consent of instructor. (Same as HOR 650.)

**AGR 657 SEED BIOLOGY. (3)**  
Structure, development and function during plant reproductive development and seed ontogeny, including fertilization, embryogeny and endosperm development, seed formation, maturation, germination, dormancy and deterioration. Prereq: AGR 360, BIO 440G or consent of instructor. (Same as HOR 657.)

**AGR 658 ADVANCED WEED SCIENCE. (4)**  
Taxonomical, ecological, physiological, chemical and biochemical aspects of cultural and chemical weed control, and herbicide toxicity and selectivity. Prereq: AGR 404 or equivalent, one plant physiology course, one biochemistry course or consent of instructor.

**AGR 660 ADVANCED SOIL BIOLOGY. (2)**  
A critical evaluation of the current research status in selected aspects of soil biology. Prereq: AGR 566 or consent of instructor.

**AGR 664 PLANT BREEDING I. (3)**  
The application of advanced genetic principles to plant improvement. An in-depth study of existing plant breeding procedures and their applications and consideration of new techniques that can be applied to plant breeding and crop improvement. Prereq: STA 570 or consent of instructor; ASC 562 recommended.

**AGR 671 SOIL CHEMISTRY. (4)**  
A study of the chemical characteristics of the soil and of the more important chemical processes in the soil. Lecture and discussion, three hours; laboratory, two hours. Prereq: AGR 470G, 581; CHE 442G, or consent of instructor.

**AGR 676 QUANTITATIVE INHERITANCE IN PLANT POPULATIONS. (3)**  
After a brief review of population genetics theory, the course is divided into two sections which cover methods of estimating genetic variances and selection methods in population improvement. The course will focus on handling and interpretation of actual data sets through data analysis and discussion of current literature. Prereq: STA 570, STA 671, STA 672, and ASC 662. (Same as STA 676.)

**AGR 697 SPECIAL TOPICS IN AGRONOMY (Subtitle required). (1-3)**  
Special topical or experimental courses in crop science, soil science or related areas of agronomy for advanced graduate students. Special title required and must be approved by the chairperson of the Department of Agronomy. A particular title may be offered twice at most under AGR 697. Students may not repeat under the same title. May be repeated to a maximum of six hours. Prereq: Will be set by instructor.

**AGR 712 ADVANCED SOIL FERTILITY. (4)**  
An integration of the effects of soil, climate, species and management on the nutrition and dry matter accumulation of plants. Lecture, three hours; laboratory, two hours per week. Prereq: AGR 470G or AGR 560 or consent of instructor.

**AGR 721 PEDOGENIC PROCESSES. (4)**  
Soil forming factors and their interrelationships as related to development and distribution of soils. Processes of rock and mineral weathering with associated soil formation. Genesis and stability of soil clay minerals. Common methods used for pedological investigations. Basic principles and concepts of the present soil classification system and relationships between pedogenic processes and class criteria employed by soil taxonomy. Lecture, three hours; laboratory, two hours per week. Prereq: AGR 573 or consent of instructor.

**AGR 732 MINERAL NUTRITION OF PLANTS. (3)**  
Discussion of accumulation, translocation, and utilization of mineral elements by higher plants. Emphasis will be placed on the relationships between these processes and plant metabolism. Prereq: BIO 430G or equivalent; BCH 501 or consent of instructor. (Same as BIO/HOR 732.)

**AGR 741 CLAY MINERALOGY. (3)**  
A comprehensive study of the crystal structures of clay minerals commonly found in soils and sediments. Lecture and discussion, three hours. Prereq: GLY 260 or consent of instructor. (Same as GLY 741.)

**AGR 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**AGR 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of qualifying exams.

**AGR 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**AGR 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

**AGR 772 PLANT AND SOIL SCIENCE SEMINAR. (1)**  
Reports and discussion of problems and research in crops, soils, horticultural science and plant physiology. May be repeated three times for a maximum of four credits. (Same as HOR 772.)

**AGR 773 SEMINAR IN PLANT PHYSIOLOGY. (1)**  
Reports and discussions on various topics in plant physiology. May be repeated for a maximum of eight credits. (Same as BIO 773.)

**AGR 799 RESEARCH IN AGRONOMY. (1-4)**  
May be repeated for a maximum of 12 credits. Prereq: Consent of instructor.

### Botany Courses

(May be used for agricultural credit, subject to the approval of adviser.)

**BIO 430G PLANT PHYSIOLOGY. (3)**  
See course description under Biology.

**BIO 619 CYTOGENETICS. (4)**  
See course description under Biology.

## AHP Allied Health Professions

**AHP 840 ETHICS IN HEALTH PRACTICE. (2)**  
A study of selected ethical issues that arise in the practice of health professionals. The health professional's obligations to patients, colleagues, employing institutions, and the community will be considered, and relevant case studies will be analyzed.

**AHP 841 ALLIED HEALTH PRACTICUM: THE CONTEXT OF HEALTH CARE PRACTICE. (3)**  
An interdisciplinary course designed to increase students' ability to interact with health professionals in their practice. Emphasis is on problem-solving, roles/responsibilities of health professionals, communication (interpersonal, team, and interprofessional), and organizational dynamics. Lectures, workshops, and small group and practicum activities, both on and off campus, will be included. Lecture, one hour; laboratory, two hours; and field practicum, four hours per week. Required for Allied Health Professions baccalaureate students. Prereq: Admission to a CAHP professional program or consent of instructor.

## ANA Anatomy And Neurobiology

**ANA 206 BASIC HUMAN ANATOMY. (3)**  
The structure of the human body will be examined at various levels: cellular, tissue and organ system. The gross anatomical arrangement of the body will be studied in a system-by-system format relating structure to function. A regional review will then place the various systems into relationship with one another. This course was specifically designed for students in the pre-pharmacy program and as such places a major emphasis on the components and organization of the central nervous system. Prereq: Introductory biology/zoology.

**ANA 299 FUNCTIONAL HUMAN ANATOMY. (3)**  
The basic concepts of systemic and regional human anatomy are presented. This course correlates certain fundamentals of human embryology and developmental malformations with human anatomy. All organ systems are covered and certain functional and clinical implications are presented. Course utilizes a lecture format with textbook reading assignments and some visual materials (TV tapes and projection slides). Prereq: Introductory courses in biology or zoology.

**ANA 395 INDEPENDENT RESEARCH IN ANATOMY AND NEUROBIOLOGY. (1-3)**  
Independent research with faculty members. May be repeated to a maximum of 12 credits. Laboratory, three to nine hours per week. Prereq: Biology or psychology majors with sophomore, junior, or senior standing and consent of a faculty member.

**ANA 396 CURRENT TOPICS IN NEUROBIOLOGY. (1)**  
Senior course with reading in current topics in neurobiology. Prereq: Biology or psychology majors with sophomore, junior, or senior standing and consent of a faculty member.

**ANA 503 INDEPENDENT WORK IN ANATOMY. (3)**

Reading and laboratory work in a defined area of anatomy are carried out under the direct supervision of one staff member. Hours of discussion and laboratory work by individual arrangement. May be repeated to a maximum of 12 credits. Prereq: An introductory course in biology, zoology, or botany and consent of instructor.

**ANA 511 INTRODUCTION TO HUMAN ANATOMY. (5)**

The principles of organization of the human body are presented. Gross anatomy lectures initially follow a systemic plan. This is succeeded by a regional presentation. Several methods of studying anatomy are utilized. These include radiology, palpation of living structures, and the demonstration of prosected fresh and fixed materials. Prereq: Some background in biology, including one or more such courses as biology, zoology, botany, comparative anatomy or embryology, and enrollment in the College of Medicine or a graduate program in the biomedical sciences. In addition, students from graduate programs outside of anatomy must obtain the consent of the course director before registration.

**ANA 512 MICROSCOPY AND ULTRASTRUCTURE. (4)**

The organization of cells, tissues and organs are presented through lectures and in the laboratory, through the microscopic study of histological sections and illustrations. Prereq: Some background in biology, including one or more such courses as biology, zoology, botany, histological techniques, comparative anatomy or embryology and enrollment in the College of Medicine or a graduate program in the biomedical sciences. In addition, students from graduate programs outside of anatomy must obtain the consent of the course director before registration.

**ANA 513 DEVELOPMENTAL ANATOMY. (2)**

Human development is presented through lectures, visual aids, and occasional laboratory demonstrations in conjunction with laboratory exercises in ANA 511. The course deals entirely with intrauterine development, and includes some discussion of common abnormalities. Prereq: ANA 511, which may be taken concurrently, and enrollment in the College of Medicine or a graduate program in the biomedical sciences. In addition, students from graduate programs outside of anatomy must obtain the consent of the course director before registration.

**ANA 516 ANATOMY OF THE NERVOUS SYSTEM. (3)**

The gross and microscopic structure of the central and peripheral nervous systems and their blood supply will be studied. The course will include the functional interpretation of anatomical structures and clinical correlations. Lecture, two hours; laboratory, two hours. Prereq: ANA 511, 512, 513; PGY 511; and enrollment in the College of Medicine or a graduate program in the biomedical sciences. In addition, students from graduate programs outside of anatomy must obtain the consent of the course director before registration.

**ANA 529 CONCEPTS OF MORPHOLOGY. (2)**

The objective of this course is to present concepts of morphology as they concern cells, tissues, or organs, systems and/or regions of the human body. Necessarily, the history of the development of ideas about the selected topic will be surveyed. Inherent also in the presentation of concepts of structure will be the presentation of controversies which have resulted from differing methods and interpretations. Lecture, four hours. Course material will be presented in lectures, seminars, laboratory, through selected readings or a combination of these instructional methods. May be repeated to a maximum of four hours. Prereq: Advanced work in biological sciences and consent of the instructor.

**ANA 530 COMBINED HISTOLOGY AND SPECIAL ORAL MICROANATOMY. (5)**

An analysis of the histological structure and organization of the human body, including an especially detailed treatment of the tissues and organs related to the oral cavity. Prereq: Admission to the College of Dentistry or some background in biology and consent of instructor.

**ANA 532 SYSTEMIC HUMAN ANATOMY. (2)**

A presentation at the gross-anatomical level of the structure and organization of the several organ systems that constitute the human body. Prereq: Admission to the College of Dentistry.

**ANA 534 ANATOMY OF THE HUMAN HEAD AND NECK. (3)**

The detailed regional anatomy of the human head and neck is studied by various techniques, the most important of which is dissection. Emphasis is placed on the anatomical relationships with each region. Lecture, two hours; laboratory, six hours. Prereq: Admission to the College of Dentistry.

**ANA 536 HUMAN EMBRYOLOGY, AN ABBREVIATED COURSE. (1)**

A concise presentation of developmental mechanisms, early development of the embryo, and subsequent development of selected systems and regions of the body. Lecture, one hour. Prereq: Admission to the College of Dentistry.

**ANA 538 HUMAN NEUROANATOMY, AN ABBREVIATED COURSE. (1)**

A concise presentation of the functional organization of the human nervous system. Lecture, two hours. Prereq: Admission to the College of Dentistry.

**ANA 600 SEMINAR IN ANATOMY. (1)**

A weekly seminar devoted to presentation and discussion of classic and new research in the field. May be repeated to a maximum of four credits. Prereq: Admission to the anatomy graduate program or permission of the course director.

**ANA 605 PRINCIPLES OF NEUROBIOLOGY. (4)**

The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of neurobiology. Areas covered will include neuronal and glial cell biology, neurotransmitters, signaling mechanisms, neuroanatomy, and neuronal development. The course is designed to provide a brief overview of each of the areas and introduce students to current research questions. The course will consist of lectures and informal presentations in a 'Journal Club' format. The course will be interdisciplinary and will be of interest to graduate students in anatomy, biology, biochemistry, immunology, pharmacy, pharmacology, physiology, psychology and toxicology and to neurology and neurosurgery residents. Prereq: Introductory biochemistry course, or equivalent, and/or consent of instructor. (Same as BCH/NEU/PGY/PHA 605.)

**ANA 606 MECHANISMS OF NEUROLOGIC DISEASE. (4)**

The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of current problems and controversies in neurobiology and clinical neurology. The course will cover a variety of illnesses including epilepsy, neurodegenerative diseases, stroke, psychiatric illness, pain, diseases of immune origin, motor dysfunction and inherited disorders. Prereq: ANA/BCH/NEU/PGY/PHA 605 or consent of instructor. (Same as NEU/PHA 606.)

**ANA 612 BIOLOGY OF AGING. (3)**

A multidisciplinary discussion of how the process of aging affects biological systems. Coverage will be quite broad and includes topics such as subcellular and cellular aging, genetics, immunology, anatomy and physiology, animal model of aging, etc. Prereq: Enrollment in a graduate program of a biomedical science department or consent of instructor. (Same as BIO/GRN 612.)

**ANA 618 MOLECULAR NEUROBIOLOGY. (4)**

This course provides knowledge base and analytical skills in the field of molecular neurobiology. An in-depth introduction to current technologies, their rationale and limitations, will be the focus to address normal brain function and neuropathological conditions. Prereq: BCH 501, 502, NEU 605, or consent of instructor. (Same as BIO/MI/PGY 618.)

**ANA 629 TECHNIQUES OF ANATOMICAL RESEARCH. (2)**

The objective of this course is the familiarization of students with research techniques in anatomy. The relationship will be tutorial. Students will work under the direction of given staff members for determined periods of time, usually on a problem. The exact length of time will depend upon the student's purposes, progress and the techniques. The problem may be new research or a repetition of previous work. May be repeated to a maximum of four hours. Prereq: Previous senior college or graduate level work in biology and consent of instructor.

**ANA 631 ADVANCED HUMAN ANATOMY. (3-5)**

The objective of this course is to meet individual student needs for increased knowledge in particular areas of gross human morphology. Investigations of problems involving gross morphology will be carried out. One or several defined areas of the body will be studied in considerable detail by dissection, by intensive use of the pertinent literature, by the use of visual aids, prosected materials and other appropriate learning aids. Prereq: A background in gross human anatomy equivalent to a medical school course in regional anatomy and consent of course director and/or Director of Graduate Studies in Anatomy and Neurobiology.

**ANA 633 ADVANCED DEVELOPMENTAL ANATOMY. (2-5)**

This is a detailed study of intra-uterine development, both normal and abnormal, usually arranged as a tutorial or small seminar series. Enrollment limited to 10 students. Prereq: ANA 511 or 811 and ANA 513 or their equivalents; or consent of instructor.



**ANA 636 ADVANCED NEUROANATOMY. (3-5)**

The objectives include specific and detailed correlation of microscopic and ultrastructural morphology of structures in the nervous system with function of these structures. Emphasis will be placed on structure-function relationships, neurotransmitters, chemical constituents of the nervous system, neuronal as well as non-neuronal cells, plasticity of the nervous system and developmental biology. The detailed content and emphasis will depend on both the background and goals of the students. Depending on number of credits a student registers for, and the topic and course orientation, laboratory work, library work, written and/or oral presentations may be a course requirement. Prereq: ANA 511, 512, 513, 516, or equivalents, or consent of instructor.

**ANA 638 DEVELOPMENTAL NEUROBIOLOGY. (3)**

An explanation of the processes which contribute to the development of the nervous system. Neurophysiological, cell biological and molecular approaches to cell differentiation, neuronal pathfinding and synapse formation and stabilization will be explored and discussed. Examples will be drawn from both vertebrate and invertebrate preparations. Prereq: BIO 535 or consent of instructor. (Same as BIO/PGY/PSY 638.)

**ANA 662 ULTRASTRUCTURAL ANATOMY. (2-5)**

The objectives of this course are to advance the students' knowledge of the submicroscopic structure of cells and tissues. Correlation of intra- and extracellular morphology and function will be emphasized. Students will do detailed laboratory work in the techniques of electron microscopy. Depending on the number of credits a student registers for, and the topic and course orientation, laboratory work, library work, written and/or oral presentations may be a course requirement. Prereq: ANA 512, previous work in microscopy including histology or cytology, or equivalents, and consent of instructor.

**ANA 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**ANA 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**ANA 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**ANA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**ANA 790 RESEARCH IN ANATOMY. (1-12)**

Individualized laboratory and research experience under the supervision of a faculty member. May be repeated to a maximum of 12 credits. Prereq: Consent of the instructor.

**\*ANA 801 HISTOLOGY FOR PHYSICAL THERAPY STUDENTS. (1)**

A survey of selected basic and specialized mammalian tissues most commonly involved in diseases treated by physical therapists. The course provides information required for understanding the cellular mechanisms behind the various diseases and the rationale for subsequent treatment. Prereq: Admission to the College of Allied Health.

**ANA 802 NEUROANATOMY FOR PHYSICAL THERAPY STUDENTS. (2)**

A concise account of the functional anatomy of the central nervous system. The anatomical organization is correlated with physiological activity. Emphasis is placed upon the morphological basis for progressively higher levels of control of activity from the simple reflex to voluntary motor activities controlled by the cerebral cortex. This type of knowledge is required for proper understanding and performance of physical therapy technicians in the treatment of medical and surgical disease.

**ANA 811 HUMAN ANATOMY FOR ALLIED HEALTH PROFESSIONS. (5)**

A dissection-based gross anatomy course designed to present the principles of the human body in a regional format with special emphasis on functional/clinical anatomical relationships. Prereq: Enrollment in either the PAS or PT programs of the College of Allied Health Professions or a graduate program in the biomedical sciences. Students from graduate programs outside of Anatomy and Neurobiology must obtain the consent of the course director before registration.

**ANA 813 DEVELOPMENTAL ANATOMY FOR PHYSICAL THERAPY STUDENTS. (1)**

The course of intrauterine somatic development is presented through class discussions, visual aids, and occasional laboratory demonstrations in conjunction with ANA 811. This course should not be elected by a student desiring a detailed review of prenatal human development. Prereq: ANA 811, which may be taken concurrently, or consent of instructor.

**ANA 815 FIRST-YEAR ELECTIVE, ANATOMY. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Anatomy and Neurobiology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**ANA 825 SECOND-YEAR ELECTIVE, ANATOMY. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Anatomy and Neurobiology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**ANA 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his/her fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or by the permission of the Student Progress and Promotions Committee.

**Approved electives:****ANA 850 APPLIED HUMAN ANATOMY****ANA 851 RESEARCH IN ANATOMY****ANS Anesthesiology****ANS 815 FIRST-YEAR ELECTIVE, ANESTHESIOLOGY. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Anesthesiology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**ANS 825 SECOND-YEAR ELECTIVE, ANESTHESIOLOGY. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Anesthesiology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**ANS 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:****ANS 850 CLINICAL CLERKSHIP IN EMANESTHESIOLOGY****ANS 851 INTENSIVE CARE UNIT****ANS 852 RESEARCH IN ANESTHESIOLOGY****ANS 853 CLINICAL CLERKSHIP IN PAIN MANAGEMENT****ANS 890 ANESTHESIOLOGY OFF-SITE**

## ANT Anthropology

**ANT 120 INTRODUCTION TO PHYSICAL ANTHROPOLOGY. (3)**  
Introduction to physical anthropology. Includes topics on human evolution, human "racial" (population) variation, primate behavior, and human genetics. The role of culture in affecting human evolution and human biology is considered.

**ANT 121 INTRODUCTION TO CULTURAL ANTHROPOLOGY. (3)**  
The study of variations in beliefs, behaviors and institutions of different peoples. Acquaints the student with a knowledge of how anthropological concepts and knowledge are used to understand and appreciate cultural diversity.

**ANT 130 INTRODUCTION TO COMPARATIVE RELIGION. (3)**  
Comparative study of major world and selected regional religions with emphasis on analysis of belief, ritual, artistic expression and social organization. Eastern and Western religions are considered. (Same as RS 130.)

**ANT 160 TRIBAL PEOPLES IN THE MODERN WORLD. (3)**  
An introduction to the society, culture, and beliefs of preliterate and tribal peoples, emphasizing both traditional culture patterns and adaptations to the modern world. The course will feature extended description of a single tribal people among whom the instructor has lived and worked.

**ANT 161 THE WORLD OF PEASANTS. (3)**  
An introduction to the society, culture, and beliefs of peasant farmers and pastoralists, emphasizing both traditional cultural patterns and adaptations to the modern world. The course will feature extended description of a single peasant people among whom the instructor has lived and worked.

**ANT 221 NATIVE PEOPLE OF NORTH AMERICA. (3)**  
A survey of the aboriginal Indian cultures of North America, and of the impact of four centuries of British, French, Spanish, and Russian contact on the Indian communities. The course will include consideration of the status of Indians in present-day North America.

**ANT 232 MODERN HUMAN VARIATION. (3)**  
A survey of the principal aspects of human variation within and between populations. Attention is focused upon the concepts of race, racial mixture, human ecology, and human biology.

**ANT 235 FOOD AND CULTURE. (3)**  
Examines the way values and behaviors related to food production and consumption are shaped by the physical and cultural environment. Data are drawn from non-Western and Western cultures. Implications of cultural factors for contemporary issues in nutrition are discussed.

**ANT 240 INTRODUCTION TO ARCHAEOLOGY. (3)**  
Introduces the theories, techniques, and strategies used by archaeologists to recover and interpret information about past cultures.

**ANT 241 ORIGINS OF OLD WORLD CIVILIZATION. (3)**  
A survey of cultural developments in the Old World from the earliest times to the beginning stages of civilization.

**ANT 242 ORIGINS OF NEW WORLD CIVILIZATION. (3)**  
Survey of the origin and growth of prehistoric American Indian cultures as revealed by archaeological data. Prereq: ANT 120, 121.

**ANT 255 HUMAN SEXUALITY IN CROSS-CULTURAL PERSPECTIVE. (3)**  
The study of human sexuality in evolutionary and cross-cultural perspective; considers gender identity, sexual response, cultural rules and norms concerning sexual behavior and the social organization of sexual behavior. Prereq: ANT 120 or ANT 121 or PSY 100 or SOC 101.

**ANT 312 COMPARATIVE CIVILIZATIONS. (3)**  
Comparison of a number of the high civilizations of the ancient, medieval, and modern worlds, including both Old World and New World civilizations. The course will stress both similarities and differences in their historical development and cultural achievements.

**ANT 320 ANDEAN CIVILIZATION. (3)**  
A study of the Inca and other pre-Hispanic civilizations of highland South America in terms of their origins, their development, and their material, social, and intellectual achievements.

**ANT 322 AZTEC AND MAYA CIVILIZATION. (3)**  
The course provides a study of the Aztec, Maya and related cultures of the New World. It provides a detailed discussion of pre-Columbian subsistence practices, economy, religion and politics by tracing the development of Mesoamerican civilization from its earliest beginnings to the Spanish conquest.

**ANT 323 PEOPLES OF THE PACIFIC ISLANDS. (3)**  
A consideration of the various cultures of the Pacific Islands. Attention will be given to both traditional cultural features and the responses of contemporary Pacific societies to economic, political, and social influences from industrialized countries. Prereq: ANT 121.

**ANT 325 PEOPLES OF INNER ASIA. (3)**  
A study of the pastoral nomadic societies and the oasis communities of central Russia, China, and Tibet, emphasizing their traditional culture patterns, their role in history, and their adaptation to the modern conditions of Russian and Chinese rule.

**ANT 326 PEOPLES OF EAST ASIA. (3)**  
A survey of the societies and cultures of China, Japan, and Korea as revealed through anthropological studies of peasant communities, urban elites, and tribal minorities.

**ANT 327 CIVILIZATION AND CULTURE OF INDIA. (3)**  
Considers the content and interrelationships between India's religious and philosophical tradition and the structure and organization of rural village life in historic, demographic and geographic context.

**ANT 332 HUMAN EVOLUTION. (3)**  
Basic concepts and theory of evolution will be reviewed and applied to the study of fossil man. The evidence for the evolution of man and his primate relatives will be studied, with attention paid to alternate interpretations of the data. Prereq: ANT 120 or BIO 150.

**ANT 338 PEOPLES OF THE NEAR EAST. (3)**  
A survey of past and present cultural adaptations in the Near East and North Africa, stressing the interplay of different ethnic and religious groups and the relationships between nomads, peasant farmers, and town dwellers.

**ANT 350 TOPICS IN ANTHROPOLOGY (Subtitle required). (3)**  
Discussion, reading and writing focusing on specific topics in anthropology. May be repeated to a maximum of nine credits under different subtitle. Prereq: ANT 120 or ANT 121.

**ANT 354 THE FAMILY IN CROSS-CULTURAL PERSPECTIVE. (3)**  
This course approaches the study of the family from a comparative perspective, emphasizing cross-cultural variability in the structure and function of family. Kinship, household formation, sex roles, and socialization are examined in the context of the family, as well as patterns of interaction, personality formation, and family pathology. Prereq: Introductory social science course. (Same as FAM/SOC/SW 354.)

**ANT 399 FIELD BASED/COMMUNITY BASED EDUCATION IN ANTHROPOLOGY. (1-15)**  
A community-based or field-based experience in Anthropology under the supervision of a faculty member. May be repeated to a maximum of 15 credits. Pass-fail only. Prereq: Permission of instructor and departmental chairperson; completion of departmental learning agreement.

**ANT 401 GENDER ROLES IN CROSS-CULTURAL PERSPECTIVE. (3)**  
Explores the theoretical and substantive basis for contemporary thinking about gender from an anthropological perspective. Gender content is explored in several cultures representing all levels of sociocultural complexity. Prereq: ANT 121 or consent of instructor.

**ANT 420 CONTEMPORARY LATIN AMERICAN CULTURES. (3)**  
Detailed survey of societies and cultures of contemporary Latin America, utilizing contributions from anthropological research. Prereq: Introductory social science course.

**ANT 425 DIMENSIONS OF AGING. (3)**  
Analysis of demographic and institutional patterns, social roles, psychological and physiological changes, and social policies and programs associated with aging. Prereq: Six hours of social science or permission of instructor. (Same as SOC/PSY 425.)

**ANT 428G CONTEMPORARY CULTURES AND SOCIETIES IN SOUTHEAST ASIA. (3)**  
A descriptive and analytical consideration of representative cultures from insular and mainland Southeast Asia in terms of their social, political, economic and religious organization. The history of the cultural contacts of Southeast Asia with India, China, Europe and the Islamic tradition will be discussed. Prereq: ANT 120, 121 or consent of instructor.

**ANT 431G CULTURES AND SOCIETIES OF SUB-SAHARAN AFRICA. (3)**

A survey of indigenous societies and cultures of Africa south of the Sahara, with special attention to their adaptation of colonialism and post-colonial national development. Prereq: ANT 121, or consent of instructor.

**ANT 470G REGIONAL AMERICAN ETHNOGRAPHY. (3)**

The ethnography of a selected North American or South American culture area or group. Both historical and contemporary cultures will be considered, e.g., Appalachia, Northwest Coast Indians, Urban American, etc. May be repeated to a maximum of six credits. Prereq: ANT 121 or consent of instructor.

**ANT 490 INTRODUCTION TO ANTHROPOLOGICAL RESEARCH. (3)**

Introduction to anthropological research methodology and techniques in ethnology, biological anthropology and archaeology.

**ANT 505 ETHNOHISTORY OF THE NATIVE AMERICAN SOUTHEAST. (3)**

This course employs the methodology of ethnohistory, which asks ethnographic questions of historical evidence, to study Native peoples of the Southeastern U.S. from prehistoric times to the present. (Same as HIS 505.)

**ANT 510 HISTORY OF ANTHROPOLOGICAL THEORY. (3)**

Traces the development of anthropological ideas and practices from their origins in the prescientific era through the Renaissance and Enlightenment, and their synthesis into a comparative natural science of man in the 19th and 20th centuries. Particular schools and trends in 20th century anthropology are discussed in detail. Prereq: Nine hours of cultural anthropology or consent of instructor.

**ANT 515 PHONOLOGICAL ANALYSIS. (3)**

An investigation of speech-sounds and systems of speech-sounds. Articulatory phonetics, analysis of phonological systems, phonological theories. Includes fieldwork on the phonology of a non-Indo-European language; within a given academic year, the same language serves as the basis for fieldwork in ANT/ENG/LIN 515 and ANT/ENG/LIN 516. Prereq: ENG/LIN 211 or equivalent. (Same as ENG/LIN 515.)

**ANT 516 GRAMMATICAL ANALYSIS. (3)**

Emphasis on the systematic interrelationships of morphemes within words and sentences. Practical training in the writing of grammars and exposure to various theories of grammatical description. Includes fieldwork on the morphology and syntax of a non-Indo-European language; within a given academic year, the same language serves as the basis for fieldwork in ANT/ENG/LIN 515 and ANT/ENG/LIN 516. Prereq: ENG/LIN 211 or equivalent. (Same as ENG/LIN 516.)

**ANT 519 HISTORICAL LINGUISTICS. (3)**

Language change; reconstruction of linguistic systems, language classification; comparative linguistics; temporal, spatial, and social context of language change. Prereq: ANT 215, ENG/LIN 211, or ENG 414G; or equivalent. (Same as LIN 519.)

**ANT 523 HUMAN VARIATION IN EVOLUTIONARY PERSPECTIVES. (3)**

Examines biological diversity within and between human populations today from the perspective of evolutionary theory and human ecology. Topics covered will include growth and development, diet and nutrition, demography, ecology of disease.

**ANT 525 APPLIED ANTHROPOLOGY. (3)**

Principles of policy research and intervention in cultural anthropology with attention to the theoretical and ethical basis of such research and intervention. Intervention techniques considered include research and development anthropology, action anthropology, community development, community advocacy anthropology and culture brokerage. Prereq: Nine hours of cultural anthropology or consent of instructor.

**ANT 526 PSYCHOLOGICAL ANTHROPOLOGY. (3)**

Explores the interrelations of culture, social structure, and individual psychology. The historical development of theory treating the relationships between culture and personality, as well as recent theory are emphasized. Prereq: Nine hours of cultural anthropology and PSY 100, or consent of instructor.

**ANT 527 CHILDREN AND FAMILY IN APPALACHIA. (3)**

Exploration of family life and the socialization of children in the Appalachian Southern Highlands from both an historical and a contemporary comparative perspective. Prereq: Six hours of social sciences or consent of the instructor. (Same as FAM 550.)

**ANT 529 SURVEY OF MEDICAL ANTHROPOLOGY. (3)**

A cross-cultural survey of health, disease, and healing in folk, primitive, and modern pluralistic societies. Biocultural and ethnomedical approaches in medical anthropology. Prereq: Nine hours of anthropology or consent of instructor. (Same as BSC 529.)

**ANT 532 POLITICAL ANTHROPOLOGY. (3)**

The course examines political systems, process, and action in formal and informal arenas. Emphasis is put on cross-cultural variation, and evolutionary processes in political systems in contemporary as well as historical perspectives. Prereq: Nine hours of cultural anthropology or consent of instructor.

**ANT 533 SOCIAL ORGANIZATION. (3)**

Comparative perspectives in social organization in non-western societies. The course examines systems of kinship, marriage, family, community, community organizations and voluntary associations in the ethnographic record as well as theoretical approaches to structure and change. Prereq: Nine hours of cultural anthropology or sociology or consent of instructor. (Same as SOC 533.)

**ANT 534 THE SOUTHERN APPALACHIANS: A SOCIOLOGICAL INTERPRETATION. (3)**

A sociological interpretation of the Southern Appalachians, emphasizing the great diversity—social, cultural, economic—in the various parts of this area by study of the major institutions, value orientations, and social and cultural changes affecting both the whole area and its sections. Prereq: Six hours of social science or consent of instructor. (Same as SOC 534.)

**ANT 538 ECONOMIC ANTHROPOLOGY. (3)**

History of the development of various theoretical approaches to the cross-cultural study of economic systems and inquiry into the relationships existing between economy and the other systems within a society. Prereq: Nine hours of cultural anthropology or consent of instructor.

**ANT 539 AGING IN CROSS-CULTURAL PERSPECTIVE. (3)**

A systematic examination of the ways in which aging and the aged are dealt with in cultures around the world with an emphasis on non-western cultures. Comparative examination of theories of aging in developing and industrial societies. Prereq: Nine hours of cultural anthropology or consent of instructor.

**ANT 541 ARCHAEOLOGICAL METHOD AND THEORY. (3)**

Examines the concepts, aims and methodology of archaeology as a scientific discipline within the social sciences. Attention given to the basic principles and recent advances of archaeological fieldwork and post-field analysis. Prereq: ANT 240 and six hours of cultural anthropology or archaeology courses, or consent of instructor.

**ANT 542 NORTH AMERICAN ARCHAEOLOGY. (3)**

Origin and growth of prehistoric American Indian cultures north of Mexico as revealed by archaeological data. Prereq: ANT 240 and six hours of archaeology or cultural anthropology, or consent of instructor.

**ANT 543 CULTURAL RESOURCE MANAGEMENT. (3)**

Introduction to the theory and practice of culture/resource management as it has developed in the historic preservation movement in the United States. The history of preservation is covered along with the development of the contemporary legal tools. The implications of these for the field evaluation of sites is presented.

**ANT 545 INTRODUCTION TO HISTORICAL ARCHAEOLOGY. (3)**

Historical archaeology applies archaeological methods and techniques to the remains of societies having written histories. The course introduces students to the history and theoretical development of the discipline, and to the variety of the data sources used by historical archaeologists. Particular attention is given to the ways in which historical archaeologists use material culture to address research issues of interest in anthropology, history, and other relevant disciplines.

**ANT 550 SYMBOLS AND CULTURE. (3)**

Examines the way in which symbolic systems create the meanings through which we experience life. The course will explore symbols and symboling behavior from a humanistic perspective, and will present examples of non-Western symbolic systems. Prereq: ANT 121 or consent of instructor.

**ANT 551 BIOARCHAEOLOGY. (3)**

Human osteology (the study of the human skeletal system) within the context of anthropological archaeology. Identification of the bones of the human skeleton with additional information on growth and development, morphological variations, and skeletal responses to biophysical stress (malnutrition, disease, and physical activity patterns). The analysis of human remains from archaeological contexts will be covered in detail.

**ANT 552 PREHISTORIC FOODWAYS. (3)**

This seminar focuses on methodological and theoretical approaches to the study of subsistence practices in prehistoric and historic societies, through analysis of the archaeological record. Students will be introduced to materials and methods in bioarchaeology, archeobotany, zooarchaeology, and to the ethnographic literature on foodways.

**ANT 555 EASTERN NORTH AMERICAN ARCHAEOLOGY. (3)**

Detailed analysis of prehistoric cultures of eastern United States with emphasis on interpretation of prehistory in Ohio River Valley. Prereq: ANT 120, 121, and 442G or consent of instructor. Prereq: ANT 240 and six hours of archaeology or cultural anthropology, or consent of instructor.

**ANT 580 TOPICS IN ANTHROPOLOGY. (3)**

Selected topics of theoretical or methodological importance in anthropology, with special attention to topics of contemporary relevance. Refer to Schedule of Classes for topics. May be repeated to a maximum of six credits.

**ANT 581 INDEPENDENT WORK IN ANTHROPOLOGY. (1-4)**

May be repeated three times to a maximum of 12 credits. Prereq: Major and a standing of 3.0 in the department.

**ANT 582 SENIOR INTEGRATIVE SEMINAR. (3)**

Seminar focusing on current issues in anthropology. Purpose is to provide a format in which advanced undergraduates can integrate knowledge acquired in previous anthropological course work and evaluate the contribution of the different anthropological subdisciplines to understanding contemporary problems. Emphasis placed on oral and written communication. Prereq: Major in anthropology; senior standing.

**ANT 585 FIELD LABORATORY IN ARCHAEOLOGICAL RESEARCH. (3-6)**

Practical supervised training in-field in archaeological research methods and techniques, problem analysis, field laboratory procedures, recording methods. Laboratory, 20 to 40 hours per week. May be repeated to a maximum of 12 credits. Prereq: Consent of instructor.

**ANT 600 PRACTICUM IN TEACHING ANTHROPOLOGY. (1)**

Guided practical experience in teaching, supplemented with group discussions of teaching practice and selected reading on lecture technique, course development, test writing and other skills for participation in the professoriate. May be repeated to a maximum of three credits. Prereq: Graduate status in anthropology or consent of instructor.

**ANT 601 INTRODUCTORY SEMINAR IN ETHNOGRAPHY. (3)**

A critical examination of key writings in ethnography, focusing on issues of data gathering, analysis and interpretation of results, and disciplinary significance. This seminar is a requirement for the advanced degree in anthropology. Prereq: Admission to the anthropology graduate program; ANT 510 and ANT 533 or equivalents; consent of instructor.

**ANT 602 INTRODUCTORY SEMINAR IN CULTURE DYNAMICS. (3)**

An in-depth discussion of the theory and method of the various approaches to the study of long-term culture change in past and present societies. This course stresses interdisciplinary problem-oriented research on a specific theme of culture change. Emphasis also is placed on the development of writing skills, oral presentations, professional standards or performance in research and communication, and critical thinking. Prereq: Admission to the Anthropology graduate program and ANT 601; consent of instructor.

**ANT 620 TOPICS AND METHODS OF EVALUATION. (3)**

An examination of a subset of evaluation methods, topics, and problems. An introductory course in the area with minimal emphasis on quantitative methods. The course is designed to: provide a perspective from which evaluation studies may be viewed; and, to provide experiences for those who will learn from or conduct evaluations. Prereq: Consent of instructor, and a basic course in statistics or research. (Same as EDP/EPE 620/SOC 622.)

**ANT 621 ADVANCED TOPICS AND METHODS OF EVALUATION. (3)**

An advanced course in evaluation methods and techniques with an emphasis on quantitative methodology. State of the art ideas and methods of conducting evaluation studies and analyzing data from those studies are presented. The course is designed primarily for those who are conducting or will conduct evaluation studies. Prereq: A basic course in statistics or its equivalent; EDP/EPE 620/SOC 622; and consent of instructor. (Same as EDP/EPE 621.)

**ANT 637 SOCIOCULTURAL DIMENSIONS OF ECONOMIC DEVELOPMENT. (3)**

Examination of social, cultural and economic conditions in lesser developed countries. Discussion of the various socioeconomic and cultural theories of change and developments, and of alternative policies for the world of the future. Considers the possible roles for social scientists in policy formulation and application. Prereq: Six graduate credits in social sciences or consent of instructor. (Same as SOC 637.)

**ANT 638 FOOD SYSTEMS AND AGRARIAN CHANGE. (3)**

An examination of the way in which the organization of food procurement, distribution, and consumption in developing countries has affected and been affected by agrarian change. Prereq: Consent of instructor. (Same as SOC 638.)

**ANT 640 SCIENCE, AGRICULTURE, AND DEVELOPMENT. (3)**

An in-depth examination of the interrelations between science, agriculture, and development. Both domestic and international issues are explored. Prereq: Graduate standing in the social or agricultural sciences. (Same as SOC 640.)

**ANT 641 GENDER ISSUES IN DEVELOPMENT. (3)**

An examination of gender issues in domestic and international development. Prereq: Graduate standing in the social or agricultural sciences or permission of the instructor. (Same as SOC 641).

**ANT 650 THEORY IN ARCHAEOLOGY. (3)**

This seminar examines the development of archaeological theory with specific emphasis on the discipline of anthropological archaeology in the New World. Particular schools and trends in contemporary archaeological theory are discussed in detail. Prereq: ANT 541 or consent of instructor.

**ANT 651 ARCHAEOLOGICAL DATA ANALYSIS. (3)**

This course examines the manipulations of archaeological data that follow fieldwork. These procedures, usually consisting of data processing and classification, are often undertaken in the field as data are being gathered. Data organization and analysis are the basic goals of this course. May be repeated to a maximum of six credits. Prereq: ANT 541 or consent of instructor.

**ANT 652 DEMOGRAPHIC ARCHAEOLOGY. (3)**

A seminar which examines the theory and methodology used by archaeologists to study population aggregates ranging from individual households to regional populations. Particular emphasis given to theoretical perspectives which integrate ecological, social and spatial analyses of population data. Prereq: ANT 541 or consent of instructor.

**ANT 653 PREHISTORIC ECONOMICS. (3)**

This seminar examines the theory and methodology used by archaeologists to study and reconstruct the economic structure of past societies. Discussion examines forms of subsistence and craft production and systems of resource distribution and exchange. Prereq: ANT 541 or consent of instructor.

**ANT 654 ARCHAEOLOGY OF POLITICAL SYSTEMS. (3)**

This course is designed to study the archaeology of political systems. The goals are to discuss the major trends, concepts, and perspectives in researching event and process in the evolution of political organization and social integration. A corollary goal is to examine the empirical evidence for, and archaeological correlates of, political evolution. It is not intended as a comprehensive coverage of all theories about past political systems, or as a survey of the rise and development of political forms in complex societies around the world. Prereq: ANT 541, ANT 602 or consent of instructor.

**ANT 660 ETHNOGRAPHIC RESEARCH METHODS. (3)**

Cultural anthropology research techniques including key informant and ethnosemantic interviewing, participant observation, field note preparation and coding, survey methods, photography, mapping, rapid assessment procedures and other specialized techniques are discussed and practiced. Ethical responsibilities of anthropologists reviewed. Prereq: Major or graduate standing in a social science, or consent of instructor.

**ANT 661 ETHNOGRAPHIC DATA ANALYSIS. (3)**

A practical, learning-by-doing approach to the analysis of qualitative and quantitative ethnographic data. Students will work with ethnographic field notes, life histories, ethnographic survey data, and other results of field research. Prereq: ANT 660 and a statistics course.

**ANT 662 RESEARCH DESIGN. (3)**

Seminar discussion and guided individual student research covering the relationship between theory, methods, and reality; how to better design anthropological inquiry. Prereq: One year of graduate work in a behavioral science field and consent of instructor.

**ANT 664 CULTURAL ISSUES IN MENTAL ILLNESS. (3)**

An in-depth discussion of theory and method of the various approaches to cultural and social factors in the etiology, distribution, and treatment of mental illness. Data from non-Western and Western cultures are examined. Prereq: Enrollment in graduate program in anthropology, sociology, psychology, educational and counseling psychology, or consent of instructor. (Same as BSC/PSY 664.)

**ANT 684 FARMING SYSTEMS RESEARCH METHODS. (3)**

A critical analysis of the concepts, methods, and practices of farming systems research. Design and carry out an FSR project. Prereq: Graduate standing in the social or agricultural sciences. (Same as SOC 684.)

**ANT 691 CULTURAL RESOURCE MANAGEMENT CLERKSHIP. (1-3)**

Practical experience in aspects of the cultural resource management process are provided through a one-semester rotation of work in the Office of State Archaeology (OSA), Museum of Anthropology (UKMA), and the program for Cultural Resource Assessment (PCRA). Students are assigned tasks at each work assignment rotation during the semester and are evaluated on the basis of work performance and a journal summary of this experience by a committee of their supervisors. Prereq: Graduate standing in anthropology or consent of instructor.

**ANT 720 SEMINAR IN CULTURAL ANTHROPOLOGY. (3)**

Intensive examination of selected topics of theoretical and/or methodological interest in cultural anthropology. Possible topics include religion, kinship and marriage, political systems, law, economic systems, modernization, urbanization, cross-cultural methodology, and others. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**ANT 725 SEMINAR IN APPLIED ANTHROPOLOGY. (3)**

Seminar discussion and individual or group research in the applications of social anthropology theory and methods to the solution of institutional, community, regional or national problems. Attention will be given to ethics, to the role attributes of the applied anthropologist, and to the history of applied anthropology. Prereq: ANT 525 or consent of instructor.

**ANT 731 ADVANCED SEMINAR IN SOCIAL AND POLITICAL DYNAMICS. (3)**

Theoretical frameworks for the analysis of political systems and processes. The seminar explores politics as action and systemic process in contemporary, prehistoric, and historical contexts. Students are expected to formulate research questions and discuss current theory in a critical fashion. Prereq: ANT 601 and 602 or consent of instructor.

**ANT 732 ADVANCED SEMINAR IN ECOLOGICAL ANTHROPOLOGY. (3)**

A study of interrelationship among populations, organization, environment, technology and symbols. The course focuses on recent anthropological contributions to the understanding of ecological relationships both now and in the past, including how people exploit the environment and how resource exploitation results in environmental change. Prereq: Completion of ANT 601 and ANT 602 or consent of instructor.

**ANT 733 ADVANCED SEMINAR IN SYMBOLS AND MEANING. (3)**

Advanced seminar in the development of anthropological approaches to cultural meaning in actions, thought, and language from the 1960s. Includes the social structural approach to symbolism and ritual, cognitive approaches to meaning, the anthropology of experience and expression, interpretive and post-modern approaches, and topical applications of these approaches. Prereq: ANT 601 and 602 or consent of instructor.

**ANT 734 ADVANCED SEMINAR IN ECONOMIC ANTHROPOLOGY. (3)**

Theoretical frameworks for the analysis of economic systems and processes. The seminar explores the interaction between economic phenomena and other aspects of social and political organization both as action, structure, and systemic process in contemporary, prehistoric, and historical contexts. Students are expected to formulate research questions and discuss current theory in a critical fashion. Prereq: ANT 601 and 602 (ANT 538 is recommended) or consent of instructor.

**ANT 735 ADVANCED SEMINAR IN PRACTICE AND ACTION. (3)**

Comparative analysis of various modes of social action including action research, advocacy, cultural action, and participatory action research. Foundations in social theory considered. Prereq: Admission to graduate program in anthropology or consent of instructor.

**ANT 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**ANT 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**ANT 750 GRADUATE FIELD STUDY IN ANTHROPOLOGY. (1-6)**

Field research as part of a long-range anthropological research program for graduate interns training under direct faculty supervision. Provides student with experience conducting scientific research as research team member. Report required. Laboratory, three hours to full time. Prereq: Appropriate language fluency; preparatory area study plus consent of instructor.

**ANT 765 ADVANCED SEMINAR IN MEDICAL ANTHROPOLOGY. (3)**

(1) Advanced history and theory of medical anthropology; (2) research design, field work, analysis of data in medical anthropology. Prereq: ANT 529 or equivalent, or consent of instructor. (Same as BSC 765.)

**ANT 767 PRACTICUM IN APPLIED ANTHROPOLOGY. (1-6)**

Practical field experience in which the student applies the theory and method of social anthropology to the solution of a problem defined by the student in consultation with a community or a public or private service agency. Required of all doctoral students in Applied Anthropology. Prereq: Consent of instructor.

**ANT 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**ANT 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**ANT 770 TOPICAL SEMINAR: (Subtitle required). (3)**

Intensive work in particular fields of anthropology. May be repeated four times. Prereq: Graduate standing.

**ANT 774 BEHAVIORAL AND ECOLOGICAL ASPECTS OF HUMAN NUTRITION. (3)**

This course will examine the social ecology of human nutrition using the evolutionary perspective. It will apply the concepts and principles of social science to the study of human nutrition. The course serves also as an introduction to nutritional anthropology. Discussions will focus on the origins of the human diet; human dietary adaptation to diverse ecological and technological situations; social, cultural, behavioral and ecological factors that influence dietary choices in primitive, peasant, modernizing and contemporary societies; and methodological issues in studying food habits and assessing nutritional status. Among the topics that may be addressed are: social, cultural, and psychological factors involved in eating disorders; infant feeding cross-culturally; causes of malnutrition in the Third World as well as in developed countries; ethnic variation in food ideology and food habits; issues in the applicability of anthropometric measures to diverse populations and culturally appropriate approaches to nutritional change. Prereq: Consent of instructor. (Same as BSC 774.)

**ANT 776 SEMINAR IN DEPENDENCY BEHAVIOR. (3)**

The course is designed to explore theories of dependency behavior by examining the concept of dependency as it can be applied to the study of various phenomena including alcohol use and abuse; dependence on other psychoactive substances; institutional dependency; dependency in work settings; and poverty and welfare. Prereq: Consent of instructor. (Same as SOC/PSY/BSC 776.)

**ANT 790 RESEARCH PROBLEMS IN ANTHROPOLOGY. (1-6)**

Intensive study in the fields of physical anthropology, archaeology and ethnology with qualified staff members. May be repeated to a maximum of nine credits. Prereq: Admission into the graduate program.

**APP Appalachian Studies**

**APP 200 INTRODUCTION TO APPALACHIAN STUDIES. (3)**

A multidisciplinary introduction to Appalachian culture, history and society. Examines how Appalachia came to be viewed as a distinct region; looks at its place in American life.

**ARC Architecture**

**ARCHITECTURAL STUDIO SEQUENCE**

**ARC 825 DRAWING STUDIO I. (1)**

Focuses on the rigors of observational drawing. Structure, contour, line, and color are explored through study of the human body with attention to their application to the architectural experience. Studio, three hours per week. Prereq: Admission to the College.

**ARC 826 DRAWING STUDIO II. (1)**

A continuation of Drawing Studio I with further development of the themes of two-dimensional representation integral to the architectural experience. Studio, three hours per week. Prereq: ARC 825.

**\*ARC 827 RE-PRESENTATION. (2)**

A review of the 20th century tectonic themes through readings and visual analyses and an interpretation and re-presentation of these themes looking toward new plastic expressions. Prereq: ARC 860.

**ARC 860 TECHNICS AND KINEMATICS I. (2)**

Full-scale, three-dimensional construction, investigations of two-dimensional expression, analysis of texts, and writing as the means to explore theoretical constructs. Lecture, one hour; studio, two hours per week. Prereq: Admission to the College.

**ARC 861 BASIC ARCHITECTURAL DESIGN I. (4)**

Exploration of varieties of architectural experiences through tectonics and individual experimentation. Studio, eight hours per week. Prereq: Admission to the College of Architecture.

**ARC 862 BASIC ARCHITECTURAL DESIGN II. (4)**

A continuation of Basic Architectural Design I with further exploration of tectonics and experimentation as vehicles for the creation of architectural experiences. Studio, eight hours per week. Prereq: ARC 861 with at least a grade of C.

**ARC 863 ARCHITECTURAL DESIGN STUDIO I: MODERN SPACE. (6)**

Offers the student an understanding of architectural language based on the new hypotheses about space proposed by Cubism and Neoplasticism. Projects explore their aesthetic and poetic possibilities, with an emphasis on coherence in space, structure, and program. Studio, twelve hours per week. Prereq: ARC 862 with at least a grade of C.

**ARC 864 ARCHITECTURAL DESIGN STUDIO II: SINGLE AND MULTIPLE OBJECTS. (6)**

Extends the consideration of the issues related to the isolated object to that object upon its multiplication, introduces the issues of site and context, and focuses attention on strategies to obtain thematic unity in a manner that enables the student to develop an architectural language. Studio, twelve hours per week. Prereq: ARC 863 with at least a grade of C.

**ARC 865 ARCHITECTURAL DESIGN STUDIO III: CONTEXT. (6)**

Emphasizes the problems of site and context and the way they influence the specificity of the object as well as the programmatic strategies. Studio, 12 hours per week. Prereq: ARC 864 with at least a grade of C.

**ARC 866 ARCHITECTURAL DESIGN STUDIO IV: TRANSFORMATION AT THE LARGE SCALE. (6)**

Explores the relationship between one type of unit and another, between a type of unit and a series, between the aggregation of a series and the structural integrity and unity of a building, and between a building's image, scale, and context. Studio, 12 hours per week. Prereq: ARC 865 with at least a grade of C.

**ARC 867 ARCHITECTURAL DESIGN STUDIO V: COMPLEX PROGRAM IN COMPLEX CONTEXT. (6)**

Explores the dialogue between the functional requirements of a complex program and its context through a consideration of the program and the constraints of the site and a detailed development of a portion of the project. Studio, twelve hours per week. Prereq: ARC 866 with at least a grade of C.

**ARC 868 ARCHITECTURAL DESIGN STUDIO VI: A PIECE OF THE CITY. (6)**

Confronts the problem of the design of public space in the urban and/or suburban fabric of the city and explores the transformation of a fragment of the city through a socially responsive project. Studio, twelve hours per week. Prereq: ARC 867 with at least a grade of C.

**ARC 869 ARCHITECTURAL DESIGN STUDIO VII: READING THE OBJECT. (6)**

Presents the theme of an object with restrained scale in order to permit the evaluation and refinement of the knowledge, methods of design, and skill at the student's disposal after four years of study. Studio, twelve hours per week. Prereq: ARC 868 with at least a grade of C.

**ARC 870 ARCHITECTURAL DESIGN STUDIO VIII: RECAPITULATION. (6)**

A continuation of the evaluation and refinement of knowledge, methods of design, and skills, which was begun in ARC 869 with the opportunity for independent investigation. Studio, twelve hours per week. Prereq: ARC 869 with at least a grade of C.

**ARC 901 ARCHITECTURAL DESIGN THESIS (6)**

Supervised individual exploration of an architectural problem which permits the student to demonstrate his competence as a designer of buildings and to formalize a coherent personal view of architecture. Studio, twelve hours per week. Prereq: ARC 869 and ARC 899 with at least grades of C.

**HISTORY AND THEORY OF ARCHITECTURE SEQUENCE**

**ARC 101 INTRODUCTION TO ARCHITECTURE. (3)**

An introductory course for students not enrolled in the College of Architecture. Familiarizes students with the profession with emphasis on understanding architectural theory, design, and practice through the study of critical issues in architecture and their relationships to society and culture.

**ARC 120 INTRODUCTION TO THE HISTORY AND THEORY OF ARCHITECTURE. (3)**

Introduces recurrent themes in the history and theory of architecture through an examination of seminal examples from different cultures in various historical periods and serves as an introduction to surveys of the history and theory of architecture. Prereq: Admission to College of Architecture or permission of dean.

**ARC 121 HISTORY AND THEORY OF ARCHITECTURE I. (3)**

The first of four courses in the survey of the history and theory of architecture in the West, with attention to the achievements in Mesopotamia and Egypt, the empires of the Greeks and Romans, and medieval Europe. Prereq: ARC 120.

**ARC 222 HISTORY AND THEORY OF ARCHITECTURE II. (3)**

Introduces the architecture of the Renaissance and baroque architecture, with emphasis on the seminal Italian contributions as a basis for the investigation of regional varieties elsewhere and the influence of the heritage on contemporary issues in design. Prereq: ARC 121.

**ARC 223 HISTORY AND THEORY OF ARCHITECTURE III. (3)**

Introduces the developments in architecture and theory in the Enlightenment, the nineteenth century, and the early twentieth century. Prereq: ARC 222.

**ARC 324 HISTORY AND THEORY OF ARCHITECTURE IV. (3)**

Continues the investigations of the history and theory of architecture in the twentieth century. Prereq: ARC 223.

**ARC 325 THEORIES OF URBAN FORM. (3)**

An investigation of the factors and a consideration of the theories which have affected urban form.

**#ARC 589 AMERICAN LANDSCAPES. (3)**

A review and analysis of America's vernacular landscapes. Topics include: the history of settlement by Europeans, Africans, and others; evolving political allegiances; and the expansion of agricultural and industrial technologies in the context of diverse physical environments. The role of political philosophy in landscape development and historic preservation will be highlighted. Prereq: GEO 172 or consent of instructor. (Same as GEO 490G).

**ARC 820 STUDIES IN HISTORY AND THEORY OF ARCHITECTURE I: THEORIES. (3)**

A series of seminars devoted to investigations of theories of architecture. Prereq: ARC 324.

**ARC 821 STUDIES IN HISTORY AND THEORY OF ARCHITECTURE II: URBAN FORM. (3)**

A series of seminars devoted to investigations of topics in urban forms. Prereq: ARC 325.

**ARC 822 STUDIES IN HISTORY AND THEORY OF ARCHITECTURE III: TECHNIQUES. (3)**

A series of seminars devoted to investigations of the means by which architecture is made. Prereq: ARC 324.

**STRUCTURAL DESIGN AND ANALYSIS**

**ARC 830 STRUCTURAL DESIGN AND ANALYSIS I. (3)**

Conception of building forms and behaviors as total structural systems and major subsystems. The use of mathematics and physics to determine forces, stresses, and deformations in structural systems. Prereq: MA 109 or 123, MA 112 and PHY 201 or their equivalents.

**ARC 831 STRUCTURAL DESIGN AND ANALYSIS II. (3)**

A continuation of ARC 830 with an introduction to computer-aided analysis. Prereq: ARC 828 and ARC 830.

**ARC 832 STRUCTURAL DESIGN AND ANALYSIS III. (3)**

Design of steel structures and timber structures. Prereq: ARC 831.

**ARC 833 STRUCTURAL DESIGN AND ANALYSIS IV. (3)**

Design of reinforced concrete structures, masonry structures, and foundations. Prereq: ARC 832 or consent of instructor.

**MATERIALS AND METHODS OF CONSTRUCTION**

**ARC 829 MATERIALS AND METHODS OF CONSTRUCTION. (3)**  
Introduces the art and technics of building, with attention to their influence on the formal language of architecture. Considerations of the properties of materials and methods of construction through analyses of selected works, lectures, and tours of construction sites.

**ARC 836 BUILDING SYSTEMS INTEGRATION. (3)**  
A continuation of ARC 829, with an emphasis on the integration of materials, structural systems, and environmental controls. Detailed investigations of the interpretation and employment of materials and systems of construction, with attention to the manner in which they order architecture. Prereq: ARC 829 and ARC 835; coreq: ARC 833.

**ENVIRONMENTAL CONTROLS**

**ARC 834 ENVIRONMENTAL CONTROLS I. (3)**  
Introduces concepts of the luminous, thermal, and acoustical environment and the mechanical and electrical systems of buildings. Prereq: PHY 203.

**ARC 835 ENVIRONMENTAL CONTROLS II. (3)**  
A continuation of ARC 834. Prereq: ARC 834.

**PROFESSIONAL PRACTICE**

**ARC 850 PROFESSIONAL PRACTICE. (3)**  
Professional and ethical responsibility to profession and community; procedural matters pertaining to practice and management.

**ADVANCED ARCHITECTURAL PROBLEMS SEQUENCE**

**ARC 828 COMPUTERS AND ARCHITECTURE. (3)**  
Introduces computers with an emphasis on the exploration of their applications in architecture. Students will be exposed to the creative potential of computers in design as well as to their analytic capabilities. Lecture, two hours; laboratory, three hours per week.

**ARC 899 THESIS RESEARCH. (3)**  
Supervised investigation which is intended to identify the salient issues which will be addressed in the thesis and to provide a rationale for the student's approach to these issues. Prereq: ARC 868 with at least a grade of C and approval of the faculty advisor for the thesis.

**ARC 912 INDEPENDENT STUDY. (3)**  
Supervised, independent investigations of selected topics in architecture. May be repeated to a maximum of nine credits when topics differ sufficiently. Prereq: Written consent of instructor.

**ARC 963 SELECTED TOPICS IN ARCHITECTURE (Subtitle required). (3)**  
Seminars and workshops for investigations of selected topics in architecture. May be repeated to a maximum of nine credits when topics differ sufficiently. Prereq: Consent of instructor.

**HISTORIC PRESERVATION SEQUENCE**

**#ARC 602 DYNAMICS OF HISTORIC PRESERVATION: LAW, LAND USE PLANNING AND ECONOMICS. (3)**  
A sequel to DMT 589, this course is an advanced examination of the history, theory, and legal and economic aspects of architectural preservation. Course readings and discussions will address issues on preservation legislation, the planning process, historic districts and landmarks, tax and economic incentives for preservation/restoration, and rural and urban real estate. Practicing professionals to serve as guest speakers. Prereq: DMT 589 or consent of instructor.

**#ARC 610 AMERICAN ARCHITECTURE I. (3)**  
This course will trace the development of architecture from its first appearance in colonial America through its evolution in the early republic until 1860. Vernacular as well as monumental architecture will be examined, and the contributions of craftsmen and the influences of styles in Europe will be assessed. Investigations of well-known examples will provide the student with a basis for the evaluation of more anonymous examples of architecture.

**#ARC 611 AMERICAN ARCHITECTURE II. (3)**  
This course, which will provide a sequel to American Architecture I, will trace the development of modern architecture through an examination of the works of prominent architects, beginning with the triumvirate of the greatest American architects - Richardson, Sullivan, and Wright - and continuing with the Saarinens, Mies van der Rohe, and Kahn. Influences on the evolution of the Modern Movement will be investigated, as will recent responses such as post-modern architecture. Prereq: ARC 610 or consent of instructor.

**#ARC 612 DOCUMENTATION OF HISTORIC BUILDINGS AND SITES. (3)**  
This course will be an introduction to the techniques for the documentation of historic architecture and sites. Among the methods of documentation to which the students will be introduced will be the location and interpretation of deeds, tax rolls, wills, photographs, and other primary sources, as well as the analysis of architectural evidence for determination of the chronology of construction. Field investigations, descriptions and drawings will provide practical experience.

**#ARC 613 HISTORICAL STRUCTURAL SYSTEMS AND BUILDING MATERIALS. (3)**  
An introduction to basic principles of traditional construction in stone, masonry, wood, and cast iron. The student will gain an understanding of the structural systems used with each of these building materials by preparing drawings and/or studying such details as floor and roof framing, window and stair construction, and finishes. The course concludes with a discussion of traditional mechanical systems and strategies for inserting modern systems in older buildings.

**#ARC 616 PRESERVATION DESIGN STUDIO. (6)**  
An introductory studio in architectural preservation, using sites in Kentucky. Design projects in restoration/preservation and adaptive reuse of historic structures, new urban infill structures, and new structures within historic urban and rural contexts. Individual and team projects, involving interaction with local preservation and planning groups. Lecture, two hours; studio, 12 hours per week. Prereq: Enrollment in program or consent of instructor.

**#ARC 699 SUMMER INTERNSHIP. (1-6)**  
Summer internship either in or out of Kentucky, providing intensive, practical experience in historic preservation. Internships for which the student can apply in other states or countries will be encouraged to provide practical experience outside of Kentucky, and work at several sites is possible. Possible internship programs include those offered by the Smithsonian Institution, National Park Service, or in various foreign countries, depending on the student's interest and subject to approval of the Director. Prereq: Two semesters of course work or consent of the Director.

**#ARC 720 CASE STUDIES IN PRESERVATION. (3)**  
An elective seminar in which case studies of significant local, regional, national and international preservation projects will be presented, analyzed and evaluated. Site visits, lectures by preservationists, architects, developers, and agency officials. Case studies will vary each semester, focusing upon preservation projects of current interest, including individual structures, rural and urban preservation, and community preservation planning. Interaction with groups, analysis projects, student presentations. Prereq: DMT 589 and ARC 602 or consent of instructor.

**#ARC 721 INTERPRETATION OF HISTORIC BUILDINGS AND SITES. (3)**  
This course addresses the issues and problems involved in documenting and re-establishing historic buildings and sites as local/national museums. Students will examine museum types, methods of interpretation, and concerns for the handling and displaying of historic materials. Students will discuss house museums in a larger historical context, including social and political history. The course is especially recommended for students with curatorial and restoration interests. Prereq: Consent of instructor.

**#ARC 722 HISTORIC PROPERTIES MANAGEMENT AND ADMINISTRATION. (3)**  
A practical introduction to the management of historic structures, sites, and small museums with particular stress on administration - including budget preparation, grant writing, trustee relations, volunteers, and members - together with collection development, management, curatorship, and conservation. Case studies of selected museums will be utilized. Much of this course will apply to the operation of other types of nonprofit preservation organizations.

**#ARC 723 KENTUCKY ARCHITECTURE AND CULTURAL LANDSCAPES.****(3)**

This course will review Kentucky's architectural heritage - both high style and vernacular - within the perspective of historical development and ecological setting. It will include discussion of historic migration patterns and the diffusion of ideas from east coast culture hearths. Emphasis will be placed upon understanding how the built and physical environments became the context for cultural landscape development. Rural, small town, and urban landscapes will be examined.

**#ARC 724 ADVANCED HISTORICAL STRUCTURAL SYSTEMS AND BUILDING MATERIALS CONSERVATION.****(3)**

A practical discussion of the most effective methods for conserving buildings, organized by building material - wood, masonry, metals, and glass. Readings will be supplemented by site visits and discussion of actual projects. Prereq: ARC 613 or consent of instructor.

**#ARC 725 PRESERVATION PRACTICUM.****(3)**

An in-semester practicum with a state or local agency, private firm or university research unit to provide the student with intensive, practical experience in historic preservation. Students will execute a learning contract with the Preservation Program Director and prospective employer detailing the work they will carry out, identifying achievable, measurable learning objectives, specifying the criteria by which their work will be evaluated, and setting meetings dates with the participating parties to chart their progress. Prereq: Two semesters of course work or consent of the Director.

**#ARC 726 AMERICAN MATERIAL CULTURE.****(3)**

Survey of approaches to the study of American material culture by various academic disciplines such as history, geography, anthropology, interior design, folklore and architecture. First half of course will review how the various disciplines study material culture. Second half will present ways in which various approaches can be combined to restore, interpret, furnish, and landscape historic structures and sites. Specific examples will be provided on a case study basis.

**#ARC 728 HISTORIC LANDSCAPE AND GARDEN RESTORATION AND INTERPRETATION.****(3)**

Building on the discussions of rural preservation and landscape analysis found in earlier courses, this course will focus on the principles and techniques of landscape restoration and interpretation at various scales from restoration of previously existing gardens to documentation of entire landscapes. Prereq: DMT 589, ARC 610, 611, or consent of instructor.

**#ARC 750 ARCHITECTURE DESIGN STUDIO.****(6)**

An advanced studio in architectural design for students with academic preparation in architecture who intend to practice as architects specializing in preservation. Projects include adaptive reuse of historic structures and the design of new structures within historic contexts, using sites in Kentucky as foci for investigations. Individual and team projects of public interest, involving interaction with local preservation and planning groups and other professional and academic disciplines. Lecture, two hours; studio, 12 hours per week. Prereq: B.Arch. or equivalent or consent of instructor.

**#ARC 799 FINAL PROJECT.****(6)**

This project is designed to serve as the capstone of the student's experience in the program. Chosen in consultation with and evaluated by the Graduate Committee and the Director and supervised by an appropriate faculty member, the project will reflect the student's major interest. For this reason, many types of projects could be chosen, including design projects, research in architectural history, or exercises in practical preservation planning. Prereq: 39 hours of course work or consent of instructor.

**ART****Art****ART 100 INTRODUCTION TO ART.****(3)**

This course is open to all University students interested in an understanding and appreciation of the visual arts. The formal and expressive qualities of major art forms are examined through lectures and presentations.

**ART 191 ART PROFESSIONS.****(1)**

Lectures and discussions on the various art professions as they affect the student, the professional artist, the art historian, the art educator, and the community. May be repeated to a maximum of eight hours.

**ART 748 MASTER'S THESIS RESEARCH.****(0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**ART 768 RESIDENCE CREDIT FOR MASTER'S DEGREE.****(1-6)**

May be repeated to a maximum of 12 hours.

**AS****Aerospace Studies****AS 111 AEROSPACE STUDIES I, AFROTC.****(1)**

A course designed to provide the student with a basic understanding of the nature and principles of war, national power, and the Department of Defense role in the organization of national security. The student also develops leadership abilities by participating in a military organization, the cadet corps, which offers a wide variety of situations demanding effective leadership.

**AS 112 AEROSPACE STUDIES I, AFROTC.****(1)**

A course designed to provide the student with a basic understanding of the contribution of aerospace power to the total U.S. strategic offensive and defensive military posture. The student also develops leadership abilities by participating in a military organization, the cadet corps, which offers a wide variety of situations demanding effective leadership.

**AS 113 LEADERSHIP SEMINAR.****(1)**

A course designed for development of basic skills required to be a manager, including communications, human relations, and administration of equal opportunity. Credit will not be granted toward the hours requirements for the degree. Pass/fail only. Prereq: Enrollment in AS 111.

**AS 114 LEADERSHIP SEMINAR.****(1)**

A continuation of AS 113. A course designed to develop managerial skills including superior/subordinate relationships, communications, customs and courtesies, basic drill movements and career progression requirements. Credit will not be granted toward the hours requirements for the degree. Pass/fail only. Prereq: Enrollment in AS 112.

**AS 211 AEROSPACE STUDIES II, AFROTC.****(1)**

Introduces the study of air power from a historical perspective; focuses on the development of air power into a primary element of national security. Leadership experience is continued through active participation in the cadet corps. Lecture, one hour; leadership laboratory, one hour. Prereq: AS 111, 112 or PAS approval.

**AS 212 AEROSPACE STUDIES II, AFROTC.****(1)**

Provides a foundation for understanding how air power has been employed in military and non-military operations to support national objectives. Examines the changing mission of the defense establishment, with particular emphasis on the United States Air Force. Leadership experience is continued through participation in the cadet corps. Lecture, one hour; leadership laboratory, one hour per week. Prereq: AS 111, 112 or PAS approval.

**AS 213 LEADERSHIP SEMINAR.****(1)**

A course designed for development of advanced skills required to be a manager/leader, including leadership styles, public speaking, group dynamics, motivation and preparation for field training. Credit will not be granted toward the hours requirements for the degree. Pass/fail only. Prereq: Enrollment in AS 211.

**AS 214 LEADERSHIP SEMINAR.****(1)**

A continuation of AS 213. A course designed to develop supervisory management skills to include communications, techniques of critique, social actions, personnel evaluation procedures, problem solving, role playing and field training preparation. Credit will not be granted toward the hours requirements for the degree. Pass/fail only. Prereq: Enrollment in AS 212.

**AS 331 AEROSPACE STUDIES III, AFROTC.****(3)**

A study of management functions with emphasis on the individual as a manager in an Air Force environment. Individual motivational and behavioral process, communication, and group dynamics are included to provide a foundation for the development of professional skills as an Air Force Officer. Students refine their leadership and managerial abilities by organizing and managing a quasi-military unit. Prereq: Acceptance into POC or approval of PAS.

**AS 332 AEROSPACE STUDIES III, AFROTC.****(3)**

A study of leadership with specific emphasis on the Air Force leader. Includes theoretical, professional and communicative aspects. In addition, military justice and administrative law are discussed within the context of the military organization. Students continue to develop and refine their leadership abilities by organizing and managing a military unit, the cadet corps, which offers a wide variety of situations requiring effective leadership. Prereq: AS 331 or approval of PAS.

**AS 333 LEADERSHIP LABORATORY.****(0)**

Laboratory to accompany AS 331 or AS 332. Pass/fail only.



- AS 341 AEROSPACE STUDIES IV, AFROTC. (3)**  
A study of the military profession, civil-military interaction, communicative skills, framework of defense policy, and formulation of defense strategy. Students refine their leadership abilities by organizing and managing a military unit, the cadet corps, which offers a wide variety of situations requiring effective leadership. Prereq: AS 331, 332 or approval of PAS.
- AS 342 AEROSPACE STUDIES IV, AFROTC. (3)**  
Continues the study of strategy and the management of conflict, formulation and implementation of U.S. defense policy, defense organization, and case studies in defense policy making. Students also refine their leadership abilities by organizing and managing a military unit, the cadet corps, which offers a wide variety of situations requiring effective leadership. Prereq: AS 331, 332, or approval of PAS.
- AS 343 LEADERSHIP LABORATORY. (0)**  
Laboratory to accompany AS 341 or AS 342. Pass/fail only.
- AS 395 INDEPENDENT WORK. (2-6)**  
A study of an advanced problem on subject area in aeronautical science under the guidance of a departmental staff member. One discussion per week; term paper required. Prereq: Senior standing in AFROTC Program; major and 3.0 standing in Aerospace Studies.

## ASC Animal Sciences

- ASC 106 INTRODUCTION TO ANIMAL SCIENCES. (3)**  
Relationships of food production and consumption to income of humans throughout the world; major livestock (beef and dairy cattle, sheep, swine, poultry and horses) production areas of the world; relationships between live animal merit and yield of retail cuts of meat; identification of skeletal components; identification and functions of reproductive and digestive tract components; characteristics of breeds of beef and dairy cattle, sheep, swine, poultry and horses.
- ASC 120 INTRODUCTORY ANIMAL SCIENCE LABORATORY. (1)**  
Provides a laboratory for training students in the basic concepts of livestock production. Students will identify breeds, analyze daily feed allowances, study anatomy and external part nomenclature, observe behavioral characteristics and develop annual management plans for cattle, sheep, swine, poultry and horses produced for food, fiber and recreation. Students will learn to evaluate animals for food, fiber and recreational purposes. To complete the total production cycle, students will participate in food and fiber processing exercises. Laboratory, three hours per week. Prereq. or concur: GEN 106.
- ASC 300 MEAT SCIENCE. (5)**  
A historical perspective of the meat industry together with major changes in body type and composition in both the live animal and its end product meat. Students will evaluate live market animals (swine, cattle, sheep) and follow their carcasses and cuts through fabrication and distribution channels. Major topics of discussion will focus on growth and development, inspection, grading, physical and chemical composition of meat and post-mortem changes that affect meat quality. Additional information will cover meat marketing trends, nutrition, meat cookery, meat selection, health issues and consumer information. Prereq: ASC 106 or FSC 107.
- ASC 301 LIVESTOCK SELECTION AND EVALUATION. (3)**  
Selection principles of purebred and commercial beef cattle, sheep, swine and horses. Evaluation of live animal and carcass characteristics of beef cattle, sheep and swine. Emphasis placed on oral reasons. Laboratory, six hours. Not open to freshmen. Prereq: GEN 106.
- ASC 303 EVALUATION AND GRADING OF MEATS. (2)**  
A detailed consideration of the factors involved in the selection, grading and evaluation of carcasses and wholesale cuts of beef, pork and lamb. Specific emphasis will be given to cutability, quality and maturity as they relate to palatability and acceptance by the consumer. Laboratory, four hours. Prereq: ASC 304 or FSC 306.
- ASC 309 ADVANCED EVALUATION AND GRADING OF MEAT. (2)**  
Further consideration of the factors involved in selecting, grading and evaluating carcasses and wholesale cuts of beef, pork, and lamb. Emphasis will be placed on writing reasons. Laboratory, four hours. Prereq: ASC 303 or consent of instructor.
- ASC 310 EQUINE ANATOMY AND CONFORMATION. (2)**  
Anatomy of the horse with emphasis on the feet and legs. Topics will also include analysis of gaits, movement and the causes of common unsoundness with particular attention to the relationship between conformation and soundness and the application of visual appraisal to the selection of horses for performance and breeding. Prereq: ASC 106 and ASC 120.
- ASC 311 ADVANCED EQUINE EVALUATION. (1)**  
Advanced study of conformation and performance in the horse. Selection of horses of different breeds based on confirmation, breed character and movement. Emphasis will be placed on developing a knowledge of industry standards and preparation of oral reasons. Prereq: ASC 310.
- ASC 312 ADVANCED LIVESTOCK SELECTION AND EVALUATION. (2)**  
Selection of purebred and commercial beef cattle, sheep, swine and horses. Special emphasis on oral reasons, livestock contest procedures and herd improvement principles. Laboratory, six hours. Prereq: ASC 301 or consent of instructor.
- ASC 320 EQUINE MANAGEMENT. (3)**  
Study of the basic principles associated with horse management. Topics will include equine behavior, equine diseases and herd health programs, facilities and environmental management, nutrition and feeding management. Prereq: ASC 106 and ASC 120.
- ASC 321 DAIRY CATTLE EVALUATION. (2)**  
Evaluation of dairy cattle for type characteristics. Laboratory, four hours.
- ASC 323 ADVANCED DAIRY CATTLE EVALUATION. (1)**  
Open only to those who have consent of instructor. Laboratory, two hours. Prereq: ASC 321.
- ASC 340 POULTRY PRODUCTION. (3)**  
A study of the application of avian biology to modern poultry production. Topics include anatomy, physiology, reproduction, incubation and embryonic development, breeding and genetics, nutrition and feeding, disease control, housing and environmental control, management, poultry and egg products, and the structure of the poultry industry. For majors and non-majors. Prereq: ASC 106 or equivalent.
- ASC 360 GENETICS. (3)**  
The basic principles of heredity as currently understood from evidence accumulated in classical, cytogenetic, molecular, and quantitative genetic experiments. Emphasis is placed on a thorough understanding of genetic principles and the relationship of genetics to all biological disciplines. Prereq: Six credits in biological sciences and one course in general chemistry. (Same as AGR/ENT 360.)
- ASC 362 ANIMAL BREEDING. (3)**  
Study of roles of selection and mating systems for production of genetically superior livestock populations. Prereq: ASC 360.
- ASC 364 REPRODUCTIVE PHYSIOLOGY OF FARM ANIMALS. (3)**  
Introduction to the anatomical and physiological processes of farm animal reproduction. Evaluation of management procedures as they relate to reproductive physiology. Prereq: GEN 106, BIO 104, CHE 230 or CHE 236.
- ASC 378 ANIMAL NUTRITION. (3)**  
A fundamental study of the nutrients, their utilization and their role in the animal. Prereq: CHE 230 or 236.
- ASC 380 FEEDS AND FEEDING. (3)**  
The composition and nutritional characteristics of common feedstuffs. The digestive systems, nutritional requirements, formulated rations and economical feeding programs for farm animals. Lecture, two hours; laboratory, two hours. Prereq: ASC 378.
- ASC 382 PRINCIPLES OF LIVESTOCK NUTRITION. (3)**  
A study of the basic principles of livestock nutrition and the application of these principles in the use of various feeds and products in the feeding of beef cattle, dairy cattle, horses, sheep and swine— including the study of tables of nutrient requirements and feed composition and detailed study on the systematic balances of daily rations and formulation of feed mixtures. Lecture, two hours; laboratory, two hours per week. For nonmajors only.
- ASC 395 SPECIAL PROBLEM IN ANIMAL SCIENCE/FOOD SCIENCE. (2)**  
Course designed for students interested in pursuing independently some specific problem. May be repeated for maximum of four credits. Prereq: Consent of instructor. (Same as FSC 395.)
- ASC 399 EXPERIENTIAL LEARNING IN ANIMAL SCIENCES/FOOD SCIENCE. (1-6)**  
A field-based learning experience in animal sciences and food science under the supervision of a faculty member. May be repeated to a maximum of six credits as an elective on a pass/fail basis. Prereq: Consent of instructor and department chairperson and completion of a departmental learning contract before registration. (Same as FSC 399.)

**ASC 404G SHEEP SCIENCE. (4)**  
History and importance of the sheep industry; application of the principles of selection, breeding, feeding and management of sheep for efficient lamb and wool production. Lecture, two hours per week; laboratory, four hours per week. Prereq: ASC 300, ASC 362, ASC 364 and ASC 380 or consent of instructor.

**ASC 406 BEEF CATTLE SCIENCE. (4)**  
Scope and importance of the beef cattle industry; roles of the major cattle breeds and organizations associated with the beef cattle industry; application of equipment, identification, nutrition, reproduction, genetics, health, marketing, taxation and management principles to beef cattle production; impact of current economic, social and environmental issues on the beef cattle industry. Prereq: ASC 300, ASC 362, ASC 364, ASC 380.

**ASC 408G SWINE SCIENCE. (3)**  
A study of scope and importance of the swine industry. The application of the principles of selection, reproductive physiology, breeding, nutrition, housing, environment and management to the modern production of swine. Lecture, two hours; laboratory, two hours. Prereq: ASC 300, ASC 362, ASC 364, and ASC 380.

**ASC 410G HORSE SCIENCES. (3)**  
Detailed study of the anatomy and physiology of the horse as they relate to the nutrition, reproduction, athletic ability, unsoundness and control of diseases and parasites. Lecture, two hours; laboratory, two hours. Prereq: ASC 362, ASC 364, ASC 380.

**ASC 420G DAIRY CATTLE SCIENCE. (3)**  
Scope and importance of the dairy cattle industry; selection, breeding, housing, feeding and management of dairy cattle. Lecture, two hours; laboratory, two hours. Prereq: ASC 362, ASC 364, and ASC 380.

**ASC 462G ARTIFICIAL INSEMINATION AND FERTILITY OF FARM ANIMALS. (2)**  
A course designed to acquaint students with current methods of applying artificial insemination to the improvement of farm animals with special reference to cattle. Emphasis will be on management of herds for maximum fertility. Lecture, one hour; laboratory, two hours per week. Prereq: ASC 364 and permission of instructor.

**ASC 470 CAPSTONE FOR ANIMAL AGRICULTURE. (3)**  
Discussion of the importance of livestock production to society and consideration of major issues impacting animal agriculture. Principles and practices learned in disciplinary and commodity Animal Sciences courses are integrated into a unified perspective, and the scientific method is employed as an approach to problem analysis and resolution. Refinement of skills in critical thinking, information gathering, writing, and oral communication is emphasized. Prereq: Senior standing in College of Agriculture, Animal Sciences major.

**ASC 564 MILK SECRETION. (3)**  
Anatomy of the mammary gland, physiology and biochemistry of milk secretion and management factors affecting yield and composition of milk. Prereq: ASC 380, VS 350.

**ASC 580 PRINCIPLES OF ANIMAL NUTRITION. (3)**  
The chemistry and physiology of animal nutrition and the nutritive requirements for growth, fattening, reproduction, lactation, and other body functions, Prereq: ASC 378 and ASC 380 or graduate standing.

**ASC 601 MAMMALIAN ENDOCRINOLOGY. (3)**  
An introduction to the basic anatomy, physiology and biochemistry of endocrine systems with emphasis on mechanisms of hormone synthesis, secretion and action. Lectures and reading assignments will focus on endocrine function in mammalian species, including laboratory animals, humans and livestock. Prereq: BCH 401G and BIO 350 or equivalents. (Same as PGY 601.)

**ASC 630 ADVANCED MEAT SCIENCE. (4)**  
Advanced meat science with special reference to the histological, chemical, physical and microbiological properties as they relate to meat quality, organoleptic acceptability and processing procedures. Lecture, three hours; laboratory, two hours. Prereq: ASC 304, ASC/FSC 306 or equivalent; one course in histology or biochemistry or consent of instructor. (Same as FSC 630.)

**ASC 660 PHYSIOLOGY OF REPRODUCTION. (3)**  
Physiological processes of reproduction in farm animals: gonadal functions, endocrine relationships, fertility, and factors affecting reproductive efficiency. Prereq: ASC 364, ASC 550.

**ASC 664 ADVANCED ANIMAL BREEDING. (3)**  
Advanced study of selection and mating system theory applicable to production of genetically superior livestock populations. Prereq: ASC 362 and STA 570; STA 671 and STA 672 desirable.

**ASC 680 LABORATORY METHODS IN NUTRITIONAL SCIENCES. (4)**  
The use of laboratory techniques and instrumentation in the solution of fundamental problems of nutrition. Lecture, one hour; laboratory, six hours. (Same as NS 680.)

**ASC 681 ENERGY METABOLISM. (2)**  
An in-depth discussion of nutritional energetics, from the standpoint of factors which influence the utilization of dietary energy. A critical review of current literature. Prereq: ASC 378 or equivalent, BCH 502 or equivalent or consent of instructor.

**ASC 682 MICROBIAL ECOLOGY OF DIGESTION. (4)**  
Principles of microbiology as they relate to nutrition and digestion in ruminant and nonruminant animals. Procedures for cultivation, isolation and characterization of anaerobic bacteria from the gastrointestinal tract. Methods for measuring and evaluating microbial growth and activity in the gastrointestinal tract. Lecture, two hours; laboratory, four hours. Prereq: BIO 476G or equivalent and consent of instructor.

**ASC 683 PROTEIN METABOLISM. (2)**  
A study of the principles and present concepts of protein and amino acid nutrition and metabolism in the animal. Prereq: Graduate level biochemistry.

**ASC 684 ADVANCED RUMINANT NUTRITION. (3)**  
Principles of ruminant metabolism in the utilization of feedstuffs for meat, milk, and wool production. Prereq: ASC 682 and two or more courses from ASC 681, ASC 683, ASC 685 and ASC 687 or consent of instructor.

**ASC 685 MINERAL METABOLISM. (2)**  
An in-depth review of the function, requirement deficiency and toxicity of mineral elements in nutrition. Emphasis on the interactions between elements and current literature will be made. Prereq: ASC 378 or NFS 510 or equivalent, BCH 502 or equivalent or consent of instructor. (Same as NFS 685.)

**ASC 686 ADVANCED NONRUMINANT NUTRITION. (3)**  
A study of nutrient utilization as influenced by digestion, absorption and metabolism with emphasis on swine and poultry. Prereq: One course each in nutrition and biochemistry.

**ASC 687 VITAMIN METABOLISM. (2)**  
Detailed study of the metabolism of vitamins and the role of vitamins in the metabolism of carbohydrates, proteins, lipids, and minerals. Prereq: BCH 502 or CHE 552 or consent of instructor.

**ASC 688 EQUINE NUTRITION. (2)**  
Detailed study of anatomical, physiological and microbiological factors influencing the nutritive requirements of the equine for maintenance, growth, reproduction, lactation and work. Prereq: One course in nutrition and physiology or biochemistry or consent of instructor.

**ASC 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**ASC 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**ASC 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**ASC 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

**ASC 771 ANIMAL SCIENCE SEMINAR. (1)**  
May be repeated twice for a maximum of three credits.

**ASC 780 SPECIAL PROBLEMS IN ANIMAL DERIVED FOODS. (1-4)**  
May be repeated for a maximum of nine credits. Prereq: Consent of graduate adviser. (Same as FSC 780.)

**ASC 781 SPECIAL PROBLEMS IN GENETICS AND ANIMAL BREEDING. (1-4)**  
May be repeated to a maximum of nine credits. Prereq: Consent of graduate adviser.

**ASC 782 SPECIAL PROBLEMS IN ANIMAL NUTRITION. (1-4)**

May be repeated to a maximum of nine credits. Prereq: Consent of graduate adviser.

**ASC 783 SPECIAL PROBLEMS IN REPRODUCTIVE PHYSIOLOGY (Subtitle required). (1-4)**

Intensive study or investigation of topics in physiology not covered in formalized courses. May be repeated under different subtitle to a maximum of nine credits. Prereq: Consent of graduate adviser.

**ASC 790 RESEARCH IN ANIMAL DERIVED FOODS. (1-6)**

Problems involving original investigation. May be repeated for a maximum of nine credits. Prereq: Consent of graduate adviser. (Same as FSC 790.)

**ASC 791 RESEARCH IN GENETICS AND ANIMAL BREEDING. (1-6)**

Problems involving original investigation. May be repeated for a maximum of nine credits. Prereq: Consent of graduate adviser.

**ASC 792 RESEARCH IN ANIMAL NUTRITION. (1-6)**

Problems involving original investigation. May be repeated for a maximum of nine credits. Prereq: Consent of graduate adviser.

**ASC 793 RESEARCH IN REPRODUCTIVE PHYSIOLOGY (Subtitle required). (1-6)**

Original investigation of mechanisms and problems related to mammalian reproduction. May be repeated under different subtitle to a maximum of nine credits. Prereq: Consent of graduate adviser.

**AST**

**Astronomy**

**AST 191 THE SOLAR SYSTEM. (3)**

One part of the two-semester introduction to astronomy. This course is primarily about the nature, origin, and evolution of the planets of our solar system and of their satellites. Special emphasis is given to recent spacecraft studies of the solar system. Related topics include the nature of comets, the uses of astronomical telescopes, and eclipses and other solar phenomena. Prereq: Two years of high school algebra or MA 108R concurrently.

**AST 192 GALACTIC AND EXTRA-GALACTIC ASTRONOMY. (3)**

One part of a two-semester introduction to astronomy. This course concentrates on the universe outside our own solar system. A principle theme is the origins and evolution of stars, of galaxies, and of the universe at large. Highlights include the nature of black holes and quasars, synthesis within stars of the chemical elements essential for life, the Big Bang model of the formation of the universe, and the possible fates of the universe. Prereq: Any AST or PHY course or consent of instructor.

**AST 591 ASTROPHYSICS I - STARS. (3)**

Structure of the universe - an overview: hierarchy of objects, the distance ladder. Stellar structure: hydrostatic equilibrium, energy transport, nuclear energy generation, equilibrium solutions. Stellar evolution: nucleosynthesis, evolution off the main sequence, final stages of stellar life - white dwarfs, supernovae, neutron stars and black holes. Binary stellar systems. Prereq: PHY 361, PHY 416G, PHY 417G. (Same as PHY 591.)

**AST 592 ASTROPHYSICS II - THE GALAXY. (3)**

Interstellar matter: gas and dust, interstellar reddening, absorptions lines, 21 cm observations. Phases of the interstellar medium: HII regions, atomic and molecular clouds. Star formation. Stellar populations. Galactic structure and dynamics: the galactic nucleus, spiral structure, rotation curve, dark matter. Prereq: PHY 591. (Same as PHY 592.)

**AST 640 GALAXIES AND COSMOLOGY. (3)**

A course covering extra-galactic astronomy and cosmology. Topics include properties of galaxies, active galaxies and quasars. The standard big bang model of the universe will be discussed in detail, including observational cosmology, nucleosynthesis in the early universe and formation of large scale structure. Prereq: PHY/AST 592 or consent of instructor. (Same as PHY 640.)

## B&E Business And Economics

### B&E 100 INTRODUCTION TO BUSINESS AND ECONOMICS. (1)

An overview of the business enterprise, emphasizing the functional areas of business, their interrelationships, and how they are integrated into the business enterprise.

### B&E 300 CAREER DEVELOPMENT IN BUSINESS AND ECONOMICS. (1)

The course will emphasize the application of analytical, communicative, and critical thinking skills in the development of students' careers. It will address career opportunities, selection of personally appropriate career plans, and job search activities. It will enhance analytical skills through career analysis and company analysis, and enhance written and oral communication skills through their application to job search activities. Prereq: At least 60 hours of earned credit.

### B&E 309 INTRODUCTION TO INTERNATIONAL BUSINESS. (3)

The course focuses on the management of international businesses, investigating the effects of differences in national requirements, and cultural expectations on management. Lectures by a variety of faculty and guest speakers will discuss the global economy, address a variety of topics.

## BA Business Administration

### BA 601 TOTAL QUALITY MANAGEMENT. (3)

An examination of the theory and practice of total quality management. The course emphasizes cross functional analysis of contemporary quality management practice.

### BA 610 GLOBAL BUSINESS MANAGEMENT. (3)

This course examines the problems of managing a business enterprise which spans international boundaries. Students will develop an understanding of the political, social, economic, and technological factors driving globalization and will consider the impact of these forces on competition, markets, industry structure, and organization.

### BA 700 TEACHING METHODS IN BUSINESS. (1)

A three part course that examines what constitutes good teaching and explores effective techniques for college instruction. Seminars emphasize practical information for both the principal activities and the details of teaching. Departmental discussions allow students to discuss issues that arise in their teaching practice. Reviews of classroom performance provide professional feedback in order to enhance on-the-job learning. Seminar, two hours per week. Prereq: Approval of Director of Graduate Studies. (Same as ECO 700.)

### BA 749 DISSERTATION RESEARCH. (0)

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

### BA 762 RESEARCH METHODOLOGY. (3)

Examines fundamental concepts in design, control, and measurement for social science research with emphasis on: reliability, internal and external validity, and causality. Prereq: Admission to DBA program and prior completion of or concurrent enrollment in a graduate level course on the general linear model.

### BA 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)

May be repeated to a maximum of 12 hours.

### BA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)

May be repeated indefinitely.

## BCH Biochemistry

### BCH 395 INDEPENDENT WORK IN BIOCHEMISTRY. (3-12)

Students will carry out a laboratory research project and related reference reading. Laboratory: 9-36 hours per week. May be repeated to a maximum of 12 credits. Prereq: Permission of instructor.

### BCH 401G FUNDAMENTALS OF BIOCHEMISTRY. (3)

Descriptive chemistry of amino acids and proteins, carbohydrates, lipids and nucleic acids and discussion of major metabolic pathways and of methods of energy production in cells. Lecture, three hours; one optional conference. Prereq: CHE 107, CHE 236 and BIO 152 or equivalent.

### BCH 501 GENERAL BIOCHEMISTRY. (3)

An introductory course devoted to the structure and function of proteins and enzymes and the generation and storage of metabolic energy associated with the metabolism of carbohydrates, lipids, and amino acids. Prereq: CHE 107, CHE 230 and 232, or equivalent. BIO 152 is also recommended.

### BCH 502 GENERAL BIOCHEMISTRY. (3)

A continuation of BCH 501. The topics discussed include the molecular basis of gene expression; molecular endocrinology; biochemistry of connective tissue, muscle, erythrocyte, and the immune system; structure, function and metabolism of membranes. The sequence BCH 501, BCH 502 covers the material of BCH 811. Prereq: BCH 501 or equivalent.

### BCH 503 PLANT BIOCHEMISTRY. (3)

The chemical constituents of plants, their interaction and the regulation of their interaction in key plant metabolic systems will be studied. Included in the course will be discussions of photosynthesis, nitrogen, nitrate reduction, nitrogen assimilation, plant growth and its regulation and the structure and metabolism of constituents unique to plants. Prereq: BCH 501 and 502 or equivalent or consent of instructor. (Same as PPA 503.)

### BCH 504 PHYSICAL BIOCHEMISTRY. (3)

Thermodynamic, hydrodynamic, structure, and kinetic properties of biological systems and macromolecules. Prereq: CHE 444G or equivalent.

### BCH 517 EXPERIMENTAL METHODS IN BIOCHEMISTRY. (4)

A laboratory course dealing with the instrumentation and procedures of biochemical research. Because many of the materials used are labile, the course is given in a block during a four-week period at the end of the spring semester. Five days per week during four-week intersession, or summer session. Prereq: BCH 401G, 502 or 811 and consent of instructor.

### BCH 601 SPECIAL TOPICS IN MOLECULAR AND CELLULAR GENETICS. (1)

Each semester five distinguished scientists visit the UK campus to deliver a series of three formal lectures each and participate in numerous informal contacts with graduate students. The emphasis is on the presentation of the most current advances (often unpublished) in selected topics in molecular and cellular genetics. May be repeated to a maximum of six credits. (Same as AGR/BIO/MI/PPA 601.)

### BCH 605 PRINCIPLES OF NEUROBIOLOGY. (4)

The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of neurobiology. Areas covered will include neuronal and glial cell biology, neurotransmitters, signaling mechanisms, neuroanatomy, and neuronal development. The course is designed to provide a brief overview of each of the areas and introduce students to current research questions. The course will consist of lectures and informal presentations in a 'Journal Club' format. The course will be interdisciplinary and will be of interest to graduate students in anatomy, biology, biochemistry, immunology, pharmacy, pharmacology, physiology, psychology and toxicology and to neurology and neurosurgery residents. Prereq: Introductory biochemistry course, or equivalent, and/or consent of instructor. (Same as ANA/NEU/PGY/PHA 605.)

### BCH 610 BIOCHEMISTRY OF LIPIDS AND MEMBRANES. (3)

A lecture and seminar course devoted to intermediary metabolism of lipids and various biochemical aspects of the structure, assembly and functions of biological membrane systems. Prereq: CHE 232, CHE 444G, BCH 401G, 502 or 811. BCH 502 may be taken concurrently.

### BCH 611 BIOCHEMISTRY AND CELL BIOLOGY OF NUCLEIC ACIDS. (3)

A lecture and seminar course devoted to a study of the principles of nucleic acid chemistry and to the role of nucleic acids in cellular function. Prereq: BCH 401G, 502 or 811.

### BCH 612 STRUCTURE AND FUNCTION OF PROTEINS AND ENZYMES. (3)

Primarily a lecture course devoted to the relationship of the structure of protein molecules to their biological roles. Proteins will be discussed in terms of their size, shape, conformation, primary structure, catalytic mechanism and regulatory properties. Prereq: BCH 401G, 502 or 811; CHE 444G or consent of instructor. May be taken concurrently with BCH 502.

### BCH 615 MOLECULAR BIOLOGY. (3)

An integrative and functional approach to the regulatory aspects of DNA, RNA and proteins in prokaryotic and eukaryotic cells. Lectures and discussions with readings in original literature. Prereq: A course in genetics (e.g. BIO 404G) and a course in nucleic acids and elementary molecular biology (e.g. BCH 502) or consent of instructor. (Same as BIO/MI 615.)

**BCH 618 SEMINAR IN BIOCHEMISTRY. (1)**

A weekly seminar, required of all students majoring in biochemistry, devoted to discussions of areas not covered in other courses and to recent developments in the field. May be repeated to a maximum of five credits.

**BCH 619 SEMINAR IN BIOCHEMISTRY. (1)**

A weekly seminar, required of all students majoring in biochemistry, devoted to discussions of areas not covered in other courses and to recent developments in the field. May be repeated to a maximum of five credits.

**BCH 640 RESEARCH IN BIOCHEMISTRY. (1-9)**

Prereq: Consent of instructor.

**BCH 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**BCH 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**BCH 779 MEMBRANE SCIENCES COLLOQUIUM. (1)**

Outstanding membrane scientists present their current research on biological and/or synthetic membranes. Students read a pertinent paper by the speaker prior to his/her talk and write a short paper on the talk; especially important is relevance of the main points of the talk to membrane science in general and the student's own research in particular. May be repeated to a maximum of six credits. (Same as CHE/CME/PHA/PHR 779.)

**BCH 780 TOPICS IN BIOCHEMISTRY. (1-3)**

A lecture and seminar course offered on topics of special interest to graduate students. May be repeated to a maximum of six credits.

**\*BCH 812 DENTAL BIOCHEMISTRY. (6)**

This is a comprehensive course in biochemistry designed to fulfill the specific needs of student dentists. Course content is generally as outlined in the American Association of Dental Schools suggested curriculum guidelines for biochemistry. Part I acquaints students with the chemical constituents of prokaryotic and eukaryotic cells; topics include the chemistry of lipids, carbohydrates, proteins, vitamins and coenzymes, and the nature of enzyme action. Part II integrates the chemical principles learned from Part I with concepts of cell dynamics, structure, function, subcellular organization, and metabolism. Topics include intermediary metabolism, bioenergetics, DNA replication, protein synthesis, and cellular regulatory and control mechanisms. Course content, where possible, is related to current concepts concerning the etiology of oral diseases, their treatment, and prevention to assist student dentists in attaining institutional goals and objectives for clinical competency. Lecture: 96 hours. Prereq: Admission into the College of Dentistry or consent of the course director. (Same as OBI 812.)

**BCH 815 FIRST-YEAR ELECTIVE, BIOCHEMISTRY. (1-3)**

With the advice and approval of his or her faculty advisor, the first year student may choose approved electives offered by the Department of Biochemistry. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass/Fail only. Prereq: Admission to first year, College of Medicine.

**BCH 825 SECOND-YEAR ELECTIVE, BIOCHEMISTRY. (1-4)**

With the advice and approval of his or her faculty advisor, the second-year student may choose approved electives offered by the Department of Biochemistry. The intent is to provide the student with an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass/Fail only. Prereq: Admission to second year medical curriculum and approval of advisor.

**BCH 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved elective:****BCH 850 ELECTIVE IN BIOCHEMISTRY****BIO Biological Sciences****#BIO 101 WAYS OF DOING BIOLOGY. (1)**

Through a series of lectures and discussion freshman students will gain a better understanding of the various academic programs in the life sciences across campus. Information will also be provided about research opportunities and career possibilities. Pass/fail only.

**BIO 102 HUMAN ECOLOGY. (3)**

A study of the interrelationships of man, populations, space, energy, food, mineral resources and other life on earth. Not for life science majors.

**BIO 103 BASIC IDEAS OF BIOLOGY. (3)**

Introductory biology. Discussion topics are those relevant to both plants and animals - cell structure and function, molecules important to living things, metabolism, heredity, environment. Not for life science majors.

**BIO 104 ANIMAL BIOLOGY. (3)**

An introduction to the major areas of interest in animal biology, e.g., life processes, the cell, development, heredity, body systems, evolution, taxonomy, phylogeny, ecology. Prereq: High school chemistry recommended.

**BIO 105 ANIMAL BIOLOGY LABORATORY. (1)**

Laboratory to be taken concurrently with BIO 104. Laboratory, two hours per week. Prereq: One unit of chemistry or consent of instructor; BIO 104 should be taken concurrently.

**BIO 106 PRINCIPLES OF PLANT BIOLOGY. (3)**

The principles underlying the structure, physiology and reproduction of flowering plants. Prereq: High school chemistry recommended.

**BIO 107 PLANT BIOLOGY LABORATORY. (1)**

Laboratory studies of the morphology, physiology and reproduction of plants with emphasis on the flowering plants. Laboratory, two hours per week. Prereq: One unit of chemistry or consent of instructor. BIO 106 should be taken concurrently.

**BIO 110 INTRODUCTION TO HUMAN BIOLOGY AND HEALTH. (3)**

A course describing basic anatomical and physiological functions of various body cells, tissues, and organs and their interrelationships as a functioning whole. It also deals with basic information as to maintenance of health; brief description of the major and common diseases affecting man—their control and prevention.

**BIO 111 GENERAL BIOLOGY LABORATORY. (1)**

Laboratory studies in the structure and function of cells, plants, and animals; ecology; heredity; and evolution.

**BIO 114 MAJOR DISCOVERIES IN BIOLOGY. (3)**

This course considers important experiments and observations (e.g., the basic principles of genetics, the origin of species, the discovery of penicillin, DNA as genetic material, the conditioned reflex, etc.) that will serve to acquaint students with the excitement of conducting research in biology, while familiarizing them with some of the major advances in this science. The course is designed for students who do not intend to major in biology. Prereq: BIO 103, 104, 106, or equivalent.

**\*BIO 150 PRINCIPLES OF BIOLOGY I. (3)**

The first semester of an integrated one-year sequence (BIO 150 and BIO 152) that is designed to develop an appreciation of biological principles necessary to explore life at the cellular and molecular levels. Similarities and differences in structure and function of simple and complex cells will be covered along with theories on the origin and evolution of biological systems. Prereq: CHE 105, or Math ACTE score of 26 or above plus concurrent enrollment in CHE 105, or chemistry placement test passed plus concurrent enrollment in CHE 105.

**\*BIO 151 PRINCIPLES OF BIOLOGY LABORATORY I. (2)**

An introductory laboratory in which biological systems are investigated at the cellular and molecular levels. Laboratory, four hours per week. Prereq: This course is a companion to the BIO 150 lecture course, but it need not be taken concurrently.

**\*BIO 152 PRINCIPLES OF BIOLOGY II. (3)**

The second semester of an integrated one-year sequence (BIO 150 and 152) that is designed to develop understanding and appreciation for the diverse forms of plant and animal life, and their relationships to each other and to their environment. Structure and function relationships will be explored at many levels of organization: cell, tissue, organ, organism, population and community. Prereq: CHE 105, or Math ACTE of 26 or above plus concurrent enrollment in CHE 105, or chemistry placement test passed plus concurrent enrollment in CHE 105.

**\*BIO 153 PRINCIPLES OF BIOLOGY LABORATORY II. (2)**

An introductory laboratory course in which biological systems are investigated at the organismal, population and community levels. Laboratory, four hours per week. Prereq: CHE 105, or Math ACTE of 26 or above plus concurrent enrollment in CHE 105, or chemistry placement test passed plus concurrent enrollment in CHE 105.

**BIO 204 THE GENETIC PERSPECTIVE. (3)**

An introductory genetics course for nonscience majors examining how heredity affects humans and the remainder of the living world and providing some insights into other fields of science from the geneticist's perspective. Prereq: Courses in high school biology and chemistry or an introductory college biology course.

**BIO 205 HONORS BIOLOGY: STRUCTURE AND FUNCTION OF BIOLOGICAL MOLECULES. (4)**

The prime objectives of this course are to provide honors students with a basic understanding of the structural and functional properties and interrelationships of the molecules that are common to all living systems, and to elucidate the fundamental principles upon which all life is predicated. Lecture, three hours; laboratory, three hours per week. Prereq: Enrollment in Honors Program. High school chemistry is strongly recommended.

**BIO 208 PRINCIPLES OF MICROBIOLOGY. (3)**

This course will introduce biology and nonbiology students to fundamental microbiological principles and techniques. Emphasis is placed upon structural, functional, ecological and evolutionary relationships among microorganisms, principally viruses, rickettsiae bacteria, and fungi and algae. Course open to freshmen with a strong background in sciences. Prereq: High school chemistry recommended.

**BIO 209 INTRODUCTORY MICROBIOLOGY LABORATORY. (2)**

Laboratory exercises in general microbiology. Laboratory, four hours per week. Prereq: One unit of chemistry or consent of instructor; BIO 208 should be taken concurrently.

**BIO 210 THE LIFE PROCESSES OF PLANTS. (3)**

This course is intended to provide a basic understanding of the natural products and processes that shape the nature of modern plants, and govern their interactions with the environment and characteristics unique to plants, and develop a basic understanding of how these plant attributes relate to organismic function. Emphasis will be placed on exploring the nature of the major plant biomes of the Earth, their community dynamics, and how member plants compete for space and other resources. Development of optimal plant strategies for reproductive success, plant interaction with other living systems as well as abiotic factors and their defense from predation and attack will also be considered. (Same as PLS 210.)

**BIO 261 FIELD BOTANY. (3)**

A study of the local flora with emphasis on the Bluegrass and the Appalachian regions of Kentucky, with the use of identification keys and herbarium collections. Laboratory, two hours; field trip, four hours per week. Prereq: An introductory course in biology.

**BIO 300 GENERAL ENTOMOLOGY. (3)**

Fundamentals of insect biology and relationships among insects, plants, and other organisms; identification of commonly encountered insects. Beneficial and detrimental effects of insects are discussed. Lecture, two hours; laboratory, two hours per week. Prereq: One course in introductory biology. (Same as ENT 300.)

**\*BIO 304 PRINCIPLES OF GENETICS. (4)**

A study of the physical and chemical aspects of the genetic material and their relationship to the expression and inheritance of the phenotype. Lecture, three hours; recitation, two hours per week. Prereq: BIO 150 and BIO 152.

**BIO 315 INTRODUCTION TO CELL BIOLOGY. (3)**

The structure and function of the cells will be considered. Emphasis will be placed on the ultrastructure of cell organelles in plants and animals as a framework for understanding the compartmentalized nature of cell activity. Prereq: BIO 150, 151, 152, 153 (or equivalent). Coreq: CHE 230 or equivalent.

**\*BIO 325 INTRODUCTORY ECOLOGY. (4)**

This course introduces students to the basic concepts in ecology. Topics covered include: adaptations of organisms to the environment; factors that influence the distribution and abundance of species; population structure, dynamics, and regulation; community development (succession), structure and function; food webs, energy flow, and nutrient cycling. Lecture, three hours; recitation, two hours per week. Prereq: BIO 150 and BIO 152 or consent of instructor.

**BIO 340 COMPARATIVE ANATOMY. (5)**

Comparative study of the anatomy of vertebrates with emphasis on evolutionary change, adaptive and functional significance of structural organization and basic concepts of the comparative approach. Laboratory studies on representative vertebrates involving dissections, models, and demonstrations. Lecture, three hours; laboratory, four hours per week. Prereq: BIO 150, 151, 152, 153 or BIO 104, 105 or equivalent course in animal biology.

**BIO 350 ANIMAL PHYSIOLOGY. (4)**

An introduction to the basic principles of animal physiology. An elementary discussion of the major vertebrate organ systems including nutrition, metabolism, respiration, circulation, excretion, muscle contraction, peripheral and central nervous system, and endocrine function emphasizing homeostasis. Lecture, three hours; demonstration, two hours. Prereq: BIO 150-153 or equivalent; CHE 105, 107.

**BIO 351 PLANT KINGDOM. (3)**

An evolutionary survey of the morphology, taxonomy, life histories and biological relationships of all plant groups comprising the plant kingdom. Lecture, two hours; laboratory, two hours. Prereq: An introductory course in biology.

**BIO 375 BEHAVIORAL ECOLOGY AND SOCIOBIOLOGY. (3)**

This course will explore the selective forces influencing animal behavior, such as foraging, predator avoidance, mate choice, parental care, and social interaction. Specific phenomena to be explored include the evolution of optimal foraging and search images, extravagant male characteristics, female preferences, conflicts between the sexes, infanticide, parent-offspring conflict, dominance hierarchies, optimal group size, altruism, and eusociality. The study of these behaviors integrates ideas and approaches from ecology, genetics, physiology, and psychology. Students will be encouraged to read outside material, to think carefully, logically, and critically about ideas, and to ask questions and defend their views in class. Lecture, one hour; laboratory, four hours per week. Prereq: A year of introductory biology (BIO 150/152).

**\*BIO 395 RESEARCH IN BIOLOGY. (1-3)**

An independent research project in an area of biology under the direction of a faculty mentor. The research may be conducted in the School of Biological Sciences or in other biological units on campus. A research contract signed by the student and the faculty research mentor must be approved by the Director of Undergraduate Studies in Biology. May be repeated to a maximum of 12 credits, but a maximum of only 6 credits may be used to satisfy the requirements of a BS or BA in Biology. Prereq: Completion of at least one of the Biology core courses (Cell Biology, Genetics, Physiology, Ecology) is strongly recommended.

**#BIO 410 LABORATORY IN GENETICS AND CELL BIOLOGY. (3)**

A laboratory course for students of genetics and cell biology to provide practical experience in contemporary experimental analysis. Prereq: BIO 315 and BIO 304, or equivalent (may be taken concurrently).

**BIO 425 BIOLOGY SEMINAR. (1)**

Readings and reports on special topics in the biological sciences. Satisfies the seminar requirement for majors in botany, zoology, and biology. May be repeated for a maximum of two credits. Prereq: One year college biology.

**BIO 430G PLANT PHYSIOLOGY. (3)**

Basic principles of plant physiology; the physiological processes of green plants and the effect of the environment on these processes. Prereq: BIO 150, 151, 152, 153 (or equivalent); CHE 230/231 (or equivalent).

**\*BIO 452G LABORATORY IN ECOLOGY. (2)**

An introduction to laboratory and field experimentation and computer simulation in ecology. Exercises and demonstrations will be performed to familiarize students with (1) particular populations and ecosystems, (2) some important research problems in ecology, and (3) current research techniques for dealing with them. One or two Saturday field trips will be required. Laboratory, four hours. Prereq or coreq: BIO 451G or equivalent and consent of instructor.

**BIO 461 INTRODUCTION TO POPULATION GENETICS. (2)**

This survey course examines the population dynamics and equilibria of genes in nuclei, chloroplasts and mitochondria. Emphasis will be on biological relevance (in plants, animals, and micro-organisms), but some theoretical derivations will also be introduced. Prereq: AGR 360 (or equivalent) and one course in probability/statistics. (Same as AGR/ENT/FOR 461.)

**BIO 476G GENERAL MICROBIAL PHYSIOLOGY. (4)**

Microorganisms: their physiology, morphology, fine structure, genetics and metabolism in relationship to bacterial growth and division. Lecture, two hours; laboratory, four hours. Prereq: CHE 230 and BIO 150, 151, 152, 153 (or equivalent).

**BIO 494G IMMUNOBIOLOGY. (3)**

A survey of theories and mechanisms of immunity including: nature of antigens and antibodies, antigen-antibody reactions, immunocompetent cells, immunogenetics, allergic reactions, tumor immunology and transplantation immunology. Prereq: BCH 401G (may be taken concurrently) and BIO 108 or BIO 276, or BIO 476G, or consent of instructor. (Same as MI 494G.)

**BIO 502 PRINCIPLES OF SYSTEMS, CELLULAR AND MOLECULAR PHYSIOLOGY. (5)**

Advanced survey of major mammalian physiological systems at the systems, cellular and molecular level; lectures, assigned reading, advanced texts or monographs, demonstrations and problem oriented study questions. Prereq: One year each, physics, general chemistry; PGY 206 or its equivalent. (Same as PGY 502.)

**BIO 508 EVOLUTION. (3)**

Mechanisms of evolutionary change, with a brief summary of historical evolution, especially of the Metazoa. Prereq: BIO 404G or ASC/AGR 360.

**BIO 510 RECOMBINANT DNA TECHNIQUES LABORATORY. (4)**

An introduction to the construction, isolation, and analysis of recombinant DNA clones, with emphasis on practical experience in basic techniques. Graduate students will be given first preference in course enrollment. Lecture, one hour; laboratory, six hours per week. Prereq: BIO 404G and BIO 276 or equivalent and BCH 401G, or BCH 501 or BCH 502 or equivalent.

**BIO 515 GENERAL CELL BIOLOGY. (3)**

An integrative, analytical study of the cell as the basic unit of biological structure and function, with emphasis on eukaryotes. Lecture, discussions with readings in some original literature. Prereq: BIO 315 or BCH 401G or equivalent and consent of instructor. (Same as MI 515.)

**#BIO 520 BIOINFORMATICS. (3)**

An introduction to computer analysis of macromolecular structure information. This course describes how to access, process, and interpret structural information regarding biological macromolecules as a guide to experiments in biology. Lecture, two hours; laboratory, two hours per week. Prereq: BIO 315 or BIO 404G or BCH 401 or BCH 501 or BCH 502 or BIO 510 or consent of instructor.

**BIO 529 DEVELOPMENTAL BIOLOGY. (3)**

A review of theories of differentiation, a consideration of the genetic environment, and intensive study of correlative factors in development and differentiation at the tissue, cell and molecule levels. Lectures and assigned readings. Prereq: Any introductory biology course dealing with plants or animals.

**BIO 535 COMPARATIVE NEUROBIOLOGY AND BEHAVIOR. (3)**

The course consists of an introduction to neurophysiology and study of the neural basis of sensory processing and motor patterns. A comparative analysis of the neurobiological basis of behavioral responses will be made, utilizing a broad range of vertebrates and invertebrates. Prereq: BIO 350 or consent of instructor. (Same as PGY 535.)

**BIO 540 FUNDAMENTALS OF RADIATION BIOLOGY. (2)**

Fundamental aspects of radiation biology. Radiation effects on macromolecules, cells, tissues, organs, and organisms. Prereq: One year of biological sciences, one year of chemistry, one year of physics, and MA 113, or equivalent. (Same as RAS 540.)

**BIO 541 RADIOISOTOPE METHODOLOGY. (2)**

Radioisotope techniques and their application in the biological and medical sciences. Radiation safety, calibration and use of radiation detectors, counting statistics, uptake and assay methods, and applications. Laboratory, five hours per week. Prereq: One year biology, CHE 115, PHY 213, and MA 113, or equivalent. (Same as RAS 541.)

**BIO 542 HISTOLOGY. (5)**

An intensive study of vertebrate histology at the tissue, cell and subcell levels with emphasis on human tissues. Some knowledge of cell biology, biochemistry, physiology and anatomy is desirable. The laboratory involves study of prepared microscope slides. Lecture, three hours per week; laboratory, four hours per week. Prereq: BIO 152 or BIO 315 or BIO 340 or consent of instructor.

**BIO 544 EMBRYOLOGY. (5)**

A comparative study of chordate development, stressing morphogenesis and reproduction of vertebrate species and evolutionary changes in ontogeny. Laboratory devoted principally to development of the frog, chick and pig. Three lectures and two two-hour laboratories per week. Prereq: BIO 340.

**BIO 549 COMPARATIVE ENDOCRINOLOGY. (3)**

An introductory and comparative survey of invertebrate and vertebrate endocrine organs and neuroendocrine mechanisms with emphasis on the evolution, chemistry, actions and functions of hormones. Prereq: BIO 350 or consent of instructor. (Same as PGY 549.)

**BIO 550 COMPARATIVE PHYSIOLOGY. (5)**

Physiological mechanisms by which animals cope with different environmental stresses. Osmoregulation, respiration, temperature regulation and tolerance, sensory reception, circulation, etc. Prereq: One year college chemistry, BIO 350 or equivalent, one year college physics or consent of instructor.

**BIO 551 PLANT AUTECOLOGY. (4)**

The effect of physical and biotic factors on plants and environment. Physiological, morphological and anatomical adaptations of plants to the physical factors of the environment are emphasized. Some of the laboratory exercises are carried out in the field. Lecture, three hours; laboratory, two hours. Prereq: BIO 451G or consent of instructor.

**BIO 554 MAMMALOLOGY. (3)**

A study of the mammals of the world and their evolution, classification, adaptations and life history, with emphasis on the mammals of Kentucky. Lecture, two hours; laboratory, three hours per week.

**BIO 555 VERTEBRATE ZOOLOGY. (4)**

An intensive survey of the vertebrate classes with emphasis on morphology, classification, phylogeny, trends in evolution, and adaptations. Lecture, two hours; laboratory, two hours. Prereq: BIO 104, 105 or BIO 150, 151, 152, 153 or consent of instructor.

**BIO 559 ORNITHOLOGY. (4)**

A study of the life histories, habits, identification, structure, adaptations, and physiology of birds. Special emphasis upon migrations, songs, nests and economic importance of our native birds. Lecture, field excursions, laboratory studies. Prereq: BIO 104, 105 or BIO 150, 151, 152, 153 or consent of instructor.

**BIO 561 MEDICAL ENTOMOLOGY. (4)**

Study of arthropod vectors of disease. Structure, collection, identification, control measures and life history studies. Prereq: one year of biology. (Same as ENT 561.)

**BIO 563 PARASITOLOGY. (4)**

Protozoan, helminth and arthropod parasites of man and domestic animals, emphasis on etiology, epidemiology, methods of diagnosis, control measures, and life histories. Techniques for host examination and preparation of material for study. Prereq: BIO 150, 151, 152, 153 or consent of instructor. (Same as ENT 562.)

**BIO 564 INSECT TAXONOMY. (4)**

A study of insect taxonomy including the collection, preparation, and identification of adult insect specimens. Prereq: Consent of instructor. (Same as ENT 564.)

**BIO 565 LIMNOLOGY. (4)**

Analysis of fresh-water systems, with special emphasis on aquatic ecology. Lecture, three hours; laboratory, three hours per week. Prereq: CHE 115, PHY 213, and BIO 150-153; or consent of instructor.

**BIO 568 INSECT BEHAVIOR. (3)**

The principles of animal behavior will be stressed using insects as examples. Physiology, mechanisms, behavioral ecology and evolution of insect behavior will be covered. Prereq: One year of biology. (Same as ENT 568.)

**BIO 570 INVERTEBRATE ZOOLOGY. (4)**

An intensive survey of the invertebrate phyla, including morphology, classification, phylogeny, general trends in the evolution of organ systems, and adaptations to varied modes of existence. Lecture, two hours; laboratory, four hours. Prereq: BIO 104, 105 or BIO 152, 153 or consent of instructor.

**BIO 571 ALGOLOGY. (4)**

A survey of the physiology, morphology, life histories, taxonomy and evolutionary relationships of the various groups comprising the algae, with the main emphasis upon the freshwater algae. Lecture, two hours; laboratory, four hours. Prereq: Six credits in biology.

**BIO 573 MYCOLOGY. (4)**

A survey of the physiology, morphology, life histories, taxonomy and evolutionary relationships of the various groups comprising the fungi. Lecture, three hours; laboratory, two hours. Prereq: BIO 106, 107 or BIO 152, 153.

**BIO 575 PLANT ANATOMY AND MORPHOLOGY. (4)**

A survey of the diverse structural features of plants and their functional and phylogenetic significance. Emphasis will be on the adaptive design of modern vascular plants as a response to natural and artificial selection. Lecture, three hours; laboratory, two hours per week. Prereq: Introductory biology sequence (six hours) or consent of instructor.

**BIO 580 METABOLISM OF MICROORGANISMS. (4)**

An intensive study of the physiology and biochemistry of microorganisms with special emphasis on anaerobic fermentations, anaerobic and aerobic respiration, oxidation-reduction pathways involving organic and inorganic compounds, and the comparative aspects of prokaryotic and eukaryotic energy transducing and utilization mechanisms. Lecture or conference, two hours; laboratory, four hours per week. Prereq: CHE 230, CHE 231, BCH 401G (or equivalent), and an introductory course, with laboratory, in microbiology.

**BIO 582 VIROLOGY. (3)**

Physical, chemical and biological properties of viruses. Modes of replication and control of gene product formation displayed by representative plant, animal, and bacterial viruses. Prereq: One year of biology and one semester of introductory microbiology or equivalent. BIO 404G and biochemistry or equivalent strongly recommended, or consent of instructor.

**BIO 585 PATHOGENIC MICROBIOLOGY. (3)**

Human and animal pathogenic microorganisms, especially their morphological, cultural, and pathogenic properties. Prereq: BIO 208 or 276 or 476G, and CHE 107. (Same as MI 585.)

**BIO 586 LABORATORY IN PATHOGENIC MICROBIOLOGY. (2)**

Laboratory studies on human and animal pathogenic bacteria, especially their morphological, cultural, and pathogenic properties. Laboratory, four hours per week. Prereq or concur: BIO 585. (Same as MI 586.)

**BIO 595 IMMUNOBIOLOGY. (2)**

Laboratory in immunology and serology. Preparation, standardization, and uses of biological products; serology. Laboratory, four hours. Prereq: BIO/MI 494G or concurrently; or consent of instructor. (Same as MI 595.)

**BIO 601 SPECIAL TOPICS IN MOLECULAR AND CELLULAR GENETICS. (1)**

Each semester five distinguished scientists visit the UK campus to deliver a series of three formal lectures each and participate in numerous informal contacts with graduate students. The emphasis is on the presentation of the most current advances (often unpublished) in selected topics in molecular and cellular genetics. May be repeated to a maximum of six credits. (Same as AGR/BCH/MI/PPA 601.)

**BIO 605 EMPIRICAL METHODS IN ECOLOGY AND EVOLUTION. (2)**

This course provides students with hands-on experience in a diverse array of modern research methods used by ecologists and evolutionary biologists, including techniques used in: molecular genetics, chemical ecology, behavioral studies, motion analyses, using high-speed video, image analyses for morphometrics and color, and field techniques in both aquatic and terrestrial systems. Lecture, one hour; laboratory, three hours per week. Prereq: BIO 451G or FOR 340 or ENT 665 or consent of instructor. (Same as ENT/FOR 605.)

**BIO 606 CONCEPTUAL METHODS IN ECOLOGY AND EVOLUTION. (2)**

This course provides students with hands-on experience in a diverse array of conceptual research techniques used by ecologists and evolutionary biologists. The focus will be on optimization methods used for predicting animal and plant behaviors and life histories, and on methods for assessing population trends and dynamics. Mathematical techniques used will include graphical analyses, matrix algebra, calculus, and computer simulations. Prereq: One year of calculus and BIO 451G or FOR 340 or ENT 665, or consent of instructor. (Same as ENT/FOR 606.)

**BIO 607 ADVANCED EVOLUTION. (2)**

This course covers advanced topics in evolution, concentrating on questions central to the understanding of general evolutionary processes. Phenomena occurring both within populations (e.g., selection, inheritance, population subdivision) and between populations (e.g., gene flow, competition) will be addressed. Special attention will be given to modern research approaches and techniques including quantitative genetics, measurement of selection, phylogenetic analyses of comparative data and molecular systematics. Prereq: One year of calculus, genetics (BIO 404G or BIO 461) and BIO 508 or consent of instructor. (Same as ENT/FOR 607.)

**BIO 608 BEHAVIORAL ECOLOGY AND LIFE HISTORIES. (2)**

This course uses an evolutionary approach to examine behavior and life histories. Topics addressed include: the optimality approach, constraints on optimality, kin and group selection, predator and prey behaviors, social and mating behaviors, and life history evolution. Prereq: BIO 451G and one semester of calculus; or consent of instructor. (Same as ENT/FOR 608.)

**BIO 609 POPULATION AND COMMUNITY ECOLOGY. (2)**

This course discusses the processes that determine population distributions and dynamics and community structure for both plants and animals. Topics addressed include: population regulation and population stability, community diversity and stability, ecological succession, population interactions (competition, predation, mutualism), coevolution, and the effects of spatial and temporal heterogeneity on population and community patterns. Prereq: BIO 451G or FOR 340 or consent of instructor. (Same as ENT/FOR 609.)

**BIO 611 BIOPATHOLOGY. (3)**

The course will examine the mechanisms by which various biological, chemical and physical agents injure susceptible hosts and the complex biochemical and immunological reactions which occur in response to injury. The host defense mechanisms will be illustrated by an analysis of selected human diseases and animal model systems with particular emphasis on the events at the molecular and cellular level. Prereq: BCH 502 or concurrent, BIO/MI 494G or equivalent and consent of instructor. (Same as MI 611.)

**BIO 612 BIOLOGY OF AGING. (3)**

A multidisciplinary discussion of how the process of aging affects biological systems. Coverage will be quite broad and includes topics such as subcellular and cellular aging, genetics, immunology, anatomy and physiology, animal model of aging, etc. Prereq: Enrollment in a graduate program of a biomedical science department or consent of instructor. (Same as ANA/GRN 612.)

**BIO 615 MOLECULAR BIOLOGY. (3)**

An integrative and functional approach to the regulatory aspects of DNA, RNA and proteins in prokaryotic and eukaryotic cells. Lectures and discussions with readings in original literature. Prereq: A course in genetics (e.g. BIO 404G) and a course in nucleic acids and elementary molecular biology (e.g. BCH 502) or consent of instructor. (Same as BCH/MI 615.)

**BIO 618 MOLECULAR NEUROBIOLOGY. (4)**

This course provides knowledge base and analytical skills in the field of molecular neurobiology. An in-depth introduction to current technologies, their rationale and limitations, will be the focus to address normal brain function and neuropathological conditions. Prereq: BCH 501, 502, NEU 605, or consent of instructor. (Same as ANA/MI/PGY 618.)

**BIO 619 CYTOGENETICS. (4)**

Classical, biochemical and molecular studies of the structure and function of eukaryotic chromosomes. Emphasis is placed on the effects of variation in chromosome type, structure and number on Mendelian genetics and in plant and animal breeding. Lecture, three hours; laboratory, two hours. Prereq: AGR/ASC 360 or BIO 404G. (Same as AGR 619.)

**BIO 620 PLANT MOLECULAR BIOLOGY. (3)**

This course is intended to be a treatment of current concepts of plant molecular biology. It will be a literature-based course, supplemented by handouts and reading lists. The course will deal as much as is possible with topics that are unique to plants. Current aspects of molecular biology that are relevant to the course content will be covered in the first part of the course; however, these lectures will not be a review of topics that should have been retained from introductory genetics and biochemistry courses. Also, they will not be a substitute for a molecular biology course. Prereq: One semester of undergraduate genetics and biochemistry or consent of instructor. (Same as AGR 620.)

**BIO 621 TOPICS IN MODERN BIOLOGY (Subtitle required). (1-3)**

A course for students in the biological and related sciences to be taught on various topics by specialists in their fields. Designed to give the student the most up-to-date information on the various topics. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

**BIO 622 PHYSIOLOGY OF PLANTS I. (3)**

A physiological/biochemical treatment of central topics in modern plant physiology. Topics will include: plant-cell biology, ion transport, water and translocation, respiration and photosynthesis. Prereq: BIO 430G or equivalent or consent of coordinator. Prereq or concur: BCH 501. (Same as AGR/FOR/HOR 622.)

**BIO 623 PHYSIOLOGY OF PLANTS II. (3)**

A physiological/biochemical treatment of central topics in modern plant physiology. Topics will include: plant hormones, an introduction to plant biotechnology, senescence and abscission, stress physiology, phytochrome-photomorphogenesis-phototropism nitrogen and sulfur metabolism. Prereq: BIO 430G or equivalent, and BCH 501 or consent of coordinator. (Same as AGR/FOR/HOR 623.)



**BIO 625 INSECT-PLANT RELATIONSHIPS. (3)**

This course examines the natural history, ecology, and evolution of insect/plant relationships. Topics include mechanisms and theory of plant defense, behavioral and physiological adaptations of herbivorous insects, pollination biology, multitrophic-level interactions, causes of insect outbreaks, and applications to managed ecosystems. Critical reading and discussion of current literature is emphasized. Prereq: Two years of college-level biology. (Same as ENT 625.)

**BIO 630 EXPERIMENTAL TECHNIQUES IN PLANT PHYSIOLOGY. (3)**

Presentation of theory and experimental application of methods for studying plant metabolism and cell biology. Techniques presented include: UV/Vis spectrophotometry, gel electrophoresis, TLC, GLC, HPLC, use of radioisotopes, gel filtration, isolation and characterization of organelles, mRNA isolation. Prereq: BIO 430G or equivalent or consent of instructor. (Same as AGR 630.)

**BIO 632 ADVANCED CELL BIOLOGY I. (3)**

A molecular level treatment of cell structure and function derived from current experimental approaches. Eukaryotes will be stressed. Topics will usually include membrane structure and function, the cytoskeleton and the extracellular matrix, and bioenergetics. Lectures and discussions with reading in the original literature. Prereq: BIO 404G or equivalent; coreq: BCH 501 or equivalent, or consent of instructor.

**BIO 633 ADVANCED CELL BIOLOGY II. (3)**

This course is a companion to BIO 632. Topics will usually include a molecular level discussion of gene structure, gene expression, and gene regulation, followed by the cell and molecular biology of cell proliferation, development, and differentiation. Lectures and discussions with reading in the original literature. Prereq: BIO 404G or equivalent, BCH 501 or equivalent, or consent of instructor.

**BIO 635 INSECT PHYSIOLOGY AND INTERNAL MORPHOLOGY. (4)**

Principles of insect physiology, function of organs, circulation, reproduction, respiration, neurophysiology, endocrinology, and digestion. Internal morphology will be studied as it relates to function. Lecture, three hours; laboratory, two hours. Prereq: Consent of instructor. (Same as ENT 635.)

**BIO 638 DEVELOPMENTAL NEUROBIOLOGY. (3)**

An explanation of the processes which contribute to the development of the nervous system. Neurophysiological, cell biological and molecular approaches to cell differentiation, neuronal pathfinding and synapse formation and stabilization will be explored and discussed. Examples will be drawn from both vertebrate and invertebrate preparations. Prereq: BIO 535 or consent of instructor. (Same as ANA/PGY/PSY 638.)

**BIO 665 INSECT ECOLOGY. (3)**

The biotic and physical factors influencing the distribution and abundance of insects and insect populations. Prereq: Consent of instructor. (Same as ENT 665.)

**BIO 685 ADVANCED IMMUNOBIOLOGY. (4)**

An introductory level graduate course surveying current trends in immunology including the organization and structure of cells relevant to immunity, immunochemistry, types of immune responses, cellular immunology, immunogenetics and immunopathology. Prereq: BCH 401G, or BCH 501 or 502 or equivalent or consent of instructor. (Same as MI 685.)

**BIO 707 CONTEMPORARY TOPICS IN IMMUNOLOGY. (2)**

This course will deal with controversial and evolving areas in immunology. Lectures in a given topic will be accompanied by student discussion of contemporary literature. Prereq: MI 685 or equivalent or consent of instructor. (Same as MI 707.)

**BIO 720 MICROBIAL STRUCTURE AND FUNCTION. (4)**

Molecular basis of structure and function in unicellular microbes. Molecular genetic and structural approaches to the analysis of bacterial architecture growth, division, and differentiation. Prereq: Consent of instructor, BCH 501, BCH 502, and BIO 476G or equivalent. (Same as MI 720 and OBI 720.)

**BIO 732 MINERAL NUTRITION OF PLANTS. (3)**

Discussion of accumulation, translocation, and utilization of mineral elements by higher plants. Emphasis will be placed on the relationships between these processes and plant metabolism. Prereq: BIO 430G or equivalent; BCH 501 or consent of instructor. (Same as AGR/HOR 732.)

**BIO 740 MAMMALIAN RADIATION BIOLOGY. (2)**

The physical and biological sequelae of radiation effects will be discussed emphasizing human and mammalian responses and radiation health. Emphasis will be for health and medical workers. Prereq: Must have consent of instructor, BIO/RM 540 or RM 546 or equivalent background. (Same as RM 740.)

**BIO 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**BIO 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**BIO 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**BIO 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**BIO 770 SEMINAR IN BIOLOGY. (1)**

Reports and discussions of current research and literature in biology. Required of all graduate students. May be repeated to a maximum of 8 credits. Prereq: Graduate standing in biological sciences.

**BIO 772 SEMINAR IN MICROBIOLOGY. (0-1)**

Review of current literature in microbiology; presentation of papers on work in progress in the department or on assigned topics; reports on meetings of national and international scientific and professional societies and symposia. Required of all graduate students. Two hours per week. May be repeated nine times for a maximum of 10 credits. (Same as MI 772.)

**BIO 773 SEMINAR IN PLANT PHYSIOLOGY. (1)**

Reports and discussions on various topics in plant physiology. May be repeated for a maximum of eight credits. (Same as AGR 773.)

**BIO 782 ADVANCED VIROLOGY. (3)**

Current trends in virology. Typical topics include DNA tumor viruses, RNA tumor viruses, persistent virus infections, and interference. Emphases of molecular mechanisms. Prereq: BIO 582. Adequate biochemistry and genetics strongly recommended, or consent of instructor.

**BIO 795 RESEARCH IN BIOLOGY. (1-9)**

Independent research work in biology. May be repeated to a maximum of 24 credits. Prereq: Graduate standing in biological sciences.

**BIO 798 RESEARCH IN MICROBIOLOGY. (1-9)**

May be repeated to a maximum of 24 credits. Prereq: Consent of instructor. (Same as MI 798.)

**BME Biomedical Engineering****BME 481G TOPICS IN BIOMEDICAL ENGINEERING. (3)**

Detailed investigation of a topic of current significance in biomedical engineering such as: biomaterials, hard or soft tissue biomechanics, rehabilitation engineering, cardiopulmonary systems analysis, biomedical imaging. Prereq: Consent of instructor.

**BME 501 FOUNDATIONS OF BIOMEDICAL ENGINEERING. (3)**

This course demonstrates the application of diverse engineering principles to analysis and understanding of the structure, function, and control of biological systems. Quantitative measurements and analysis of homeostatic, regulatory, transport, biochemical, and biomechanical processes of the human body. Prereq: Engineering standing or consent of instructor.

**BME 530 BIOMEDICAL INSTRUMENTATION. (3)**

Transducers, amplifiers for physiological measurements, biopotential measurements, and selected topics in biomedical instrumentation. Some of the topics include pressure, flow, ultrasonic and nuclear instrumentation and scanning and imaging devices. Lecture, two hours; laboratory, three hours per week. Prereq: EE 305 or equivalent.

**BME 605 BIOMEDICAL SIGNAL PROCESSING I. (3)**

Continuous and discrete signals, sampling, Fourier Transform, Laplace Transform, Z-Transform, correlation and spectral analysis, digital filters. Prereq: EE 305 or equivalent, BME 501 or PGY 502.

**BME 610 BIOMEDICAL CONTROL SYSTEMS I. (3)**

Homeostatic mechanisms, input-output analysis, steady state and transient response, feedback concepts, system identification and simulation from actual operating data. Prereq: PGY 502 and ME 440 or equivalent.

**BME 615 BIOMEDICAL SIGNAL PROCESSING II. (3)**

Stochastic processes, Fourier-based spectral analysis and linear system identification, modern spectral estimation (AR, MA, ARMA), parametric transfer function estimation, time-frequency analysis of nonstationary signals. Prereq: BME 605, BME 610, EE 640 recommended.

**BME 620 BIOMEDICAL CONTROL SYSTEMS II. (3)**

Biomedical Systems Models, dynamic programming, variational approach to optimal control problems, real-time parameter estimation, adaptive control methods and biomedical applications. Prereq: BME 605, BME 610.

**BME 625 ANALYSIS OF NONLINEAR BIOMEDICAL SYSTEMS. (3)**

Basic concepts of nonlinear systems: iterated maps, dynamical flows, bifurcations, chaos. Modelling and analysis of nonlinear systems: Wiener kernels, white-noise identification, polyspectra, nonlinear time-series models. Extensive discussion of selected biomedical applications. Prereq: BME 610, BME 615 or EE 650 recommended.

**BME 630 MAGNETIC RESONANCE IN BIOMEDICINE. (3)**

Introductory course on the fundamental principles of magnetic resonance imaging and spectroscopy, and its uses in biomedical engineering. Topics include: quantum mechanical and classical descriptions of nuclear magnetic resonance, relaxation theory, signal generation, the Bloch equations and solutions, signal processing and encoding. Imaging and spectroscopy applications will be introduced. Several practical demonstrations will be given. Strong engineering/physics and mathematics background is necessary. Prereq: Undergraduate degree in engineering or physics.

**BME 635 MAGNETIC RESONANCE INSTRUMENTATION AND MEASUREMENT. (3)**

Laboratory course on the fundamentals of magnetic resonance, instrumentation, measurement, and its biomedical applications. Begins with the nuclear induction experiment and ends with design and implementation of experiments to address engineering and physics problems that relate to the medical field. Instrumentation hardware and software will be taught. Strong engineering/physics and mathematics background is necessary. Prereq: BME 630 or permission of instructor.

**BME 641 PRACTICES OF BIOMEDICAL ENGINEERING. (1)**

Survey of the regulatory, legal, managerial, financial and medical environment in which the biomedical engineering profession is practiced. This course attempts to provide the interface between the theoretical course material taught in the BME curriculum and the realities of the diverse multidisciplinary world that is unique to the biomedical engineer. Outside guest speakers, in class lectures, and case history analyses will be used. Group term project is mandatory. Prereq: Engineering baccalaureates receive preference.

**BME 650 MUSCULOSKELETAL BIODYNAMICS. (3)**

Study of the mechanical and electrical properties and viscoelastic nature of the musculoskeletal system and its components. Engineering analysis of system's dynamic response to stress. Mathematical modeling of system and components. Prereq: PGY 502, EE 305, or consent of instructor.

**BME 661 BIOMATERIALS SCIENCE AND ENGINEERING. (3)**

Study of biological and man-made materials that perform, improve, or restore natural functions. Structure and properties of connective tissue and commonly implanted metals, ceramics, and polymers; biocompatibility of materials used in orthopedic, soft tissue, and cardiovascular applications. Prereq: Undergraduate engineering degree or consent of instructor.

**BME 662 TISSUE-IMPLANT INTERFACE. (3)**

Study of the interface between implants and host tissues from both the materials and biological perspective. Structure of the tissue-implant interface; surface characterization of biomaterials; protein adsorption; mechanisms of cell responses; and methods for controlling the tissue-implant interface, with emphasis on orthopedic and cardiovascular applications. Prereq: BME 661.

**BME 670 BIOMECHANICS I. (3)**

Application of laws of mechanics to study the behavior of human organ systems. Stress-strain analysis of soft and hard body tissues with emphasis on pulmonary and musculoskeletal systems. Viscoelastic properties. Prereq: PGY 502, EM 302 or consent of instructor.

**BME 672 BIOMECHANICS II. (3)**

Application of laws of mechanics to study the behavior of human organ systems. Whole body biodynamics: analysis of gait. Fluid mechanics of circulation. Steady and pulsatile flow in large blood vessels and microcirculation. Rheology of blood and other biological fluids. Prereq: PGY 502, ME 330 or consent of instructor.

**BME 680 ADVANCED TOPICS IN BIOMECHANICS. (3)**

Flow limitation in compliant tubes. Impedance concepts in lung airways and vessels. Fluid mechanics of lung microcirculation. Morphological analysis of bifurcating networks. Fractal analysis of blood flow. Stress wave in tissue. Structural analysis of body organs. Applications to the lungs, cardiovascular and skeletal systems. Prereq: BME 670 and BME 672 or consent of instructor.

**BME 682 ADVANCED TOPICS IN ORTHOPAEDIC BIOMECHANICS. (1)**

Seminars in Orthopaedic Biomechanics Research exploring current clinical problems and engineering solutions. Lecture, three hours per week. Prereq: BME 670 and BME 672.

**BME 685 BIOFLUID MECHANICS. (3)**

Review of the rheology of circulatory processes in the body. Special emphasis on cardiovascular dynamics: pulsatile pressure and flow, vascular impedance, wave propagation/reflection, cardiac dynamics. Special topics. Lecture, three hours with periodic lab demonstrations. Prereq: PGY 502 or equivalent, BME 672, or consent of instructor.

**BME 690 RESEARCH IN BIOMEDICAL ENGINEERING (Subtitle required). (1-3)**

Individual study related to a special research project. Intended for M.S. candidates who want a research project experience independent of their M.S. thesis work. This course cannot be used to satisfy residency credit requirements. Lecture, 1-3 hours; laboratory, 3-6 hours per week. May be repeated to a maximum of six credits. Prereq: Consent of instructor and graduate standing in BME.

**BME 699 SPECIAL TOPICS IN BIOMEDICAL ENGINEERING (Subtitle required). (1-3)**

Special topics in biomedical engineering, addressed primarily in a lecture/discussion format. Presentation of focussed or specialized topics that are not available in standard courses. Lecture, three hours; laboratory 0-2 hours per week. May be repeated to a maximum of nine credits. Prereq: Consent of instructor and graduate standing in BME.

**BME 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**BME 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**BME 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**BME 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**BME 772 SEMINAR. (0)**

Review of current literature in the field of biomedical engineering, general discussion and presentation of papers on research in biomedical engineering. Lecture, one hour per week. Required for all graduate students in biomedical engineering.

**BME 781 SPECIAL PROBLEMS IN BIOMEDICAL ENGINEERING (Subtitle required). (1-3)**

Discussion of advanced and current topics in biomedical engineering. Individual work on research problems of current interest. May be repeated to a maximum of nine credits. Lecture/laboratory hours, variable. Prereq: Approval of instructor.

**BSC Behavioral Science**

**BSC 331 BEHAVIORAL FACTORS IN HEALTH AND DISEASE. (3)**

The study of human behavior relating to health and disease and the organization of health care as a social system. Selected concepts from the psychological and social sciences are presented in a biobehavioral frame of reference and applied to the consideration of specific problems.

**BSC 527 SOCIETY AND HEALTH. (3)**

The study of human behavior in illness and of medicine as a complex form of social organization from historical, cross-cultural and contemporary perspectives. Prereq: Consent of instructor. (Same as SOC 527.)

**BSC 529 SURVEY OF MEDICAL ANTHROPOLOGY. (3)**

Cross-cultural survey of health, disease, and healing in folk, primitive, and modern pluralistic societies. Biocultural and ethnomedical approaches in medical anthropology. Prereq: Nine hours of anthropology or consent of instructor. (Same as ANT 529.)

**BSC 546 SOCIAL FACTORS IN MENTAL HEALTH. (3)**

The significance of social, psychological and cultural factors in the recognition and course of mental health problems; the organization of mental health services in society. Prereq: Consent of instructor. (Same as SOC 546.)

**BSC 620 ORIENTATION TO MEDICAL BEHAVIORAL SCIENCE. (1)**

This course offers a structural exposure of students to the varieties of basic and clinical science research and current issues in health care policy under discussion at the University Medical Center. Following weekly attendance at research seminars and clinical rounds, students will present their observations in follow-up discussion groups. May be repeated to a maximum of three credits.

**BSC 626 SURVEY OF HEALTH PSYCHOLOGY. (3)**

A survey of the field of health psychology. It will explore the ways in which social and psychological research contribute to an understanding of health and illness behavior. Prereq: Graduate or professional standing and consent of instructor. (Same as PSY 626.)

**BSC 664 CULTURAL ISSUES IN MENTAL ILLNESS. (3)**

An in-depth discussion of theory and method of the various approaches to cultural and social factors in the etiology, distribution, and treatment of mental illness. Data from non-Western and Western cultures are examined. Prereq: Enrollment in graduate program in anthropology, sociology, psychology, educational and counseling psychology, or consent of instructor. (Same as ANT/PSY 664.)

**BSC 745 RESEARCH METHODS IN MEDICAL BEHAVIORAL SCIENCE. (3)**

This is an applied methods course which will review the various aspects of research and apply them to current medical behavioral studies. The different approaches used by the behavioral and clinical sciences will be reviewed and demonstrated. Prereq: Any methods courses required for a Ph.D. in the department major.

**BSC 765 RESEARCH PROBLEMS IN MEDICAL ANTHROPOLOGY. (3)**

(1) Advanced history and theory of medical anthropology; (2) research design, field work, analysis of data in medical anthropology. Prereq: ANT 529 or equivalent, or consent of instructor. (Same as ANT 765.)

**BSC 766 CONCEPTS IN MEDICAL SOCIOLOGY. (3)**

A review of sociological concepts and methods which have been applied to the study of health and medicine; the contributions of medical sociology to general sociological theory and to concepts and research on health-related problems of society. Prereq: Consent of instructor. (Same as SOC 766.)

**BSC 770 PSYCHOSOCIAL ISSUES IN HEALTH AND AGING. (3)**

This course will focus on psychosocial issues related to the physical health and functioning of older adults. Topic areas include: theories of aging; age-appropriate research designs; age-related cognitive personality, social and family changes which influence physical health; health behavior and education of older adults; and selected chronic conditions, e.g. Alzheimer's disease, arthritis, depression, diabetes and stroke.

**BSC 772 TOPICAL SEMINAR IN MEDICAL BEHAVIORAL SCIENCE. (1-3)**

Advanced study of selected topics of current importance in medical behavioral science. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**BSC 773 PSYCHOSOCIAL ONCOLOGY. (3)**

This course will introduce the student to the field of psychosocial oncology. Historical and recent developments in the application of behavioral science knowledge and methodology to the understanding and treatment of cancer and the cancer patient will be examined. The role of psychosocial factors in the etiology, prevention, and treatment of cancer will be explored. Emphasis will be placed upon the interaction of biological, psychological, and social factors throughout the course of cancer. Prereq: Graduate standing.

**BSC 774 BEHAVIORAL AND ECOLOGICAL ASPECTS OF HUMAN NUTRITION. (3)**

This course will examine the social ecology of human nutrition using the evolutionary perspective. It will apply the concepts and principles of social science to the study of human nutrition. The course serves also as an introduction to nutritional anthropology. Discussions will focus on the origins of the human diet; human dietary adaptation to diverse ecological and technological situations; social, cultural, behavioral and ecological factors that influence dietary choices in primitive, peasant, modernizing and contemporary societies; and methodological issues in studying food habits and assessing nutritional status. Among the topics that may be addressed are: social, cultural, and psychological factors involved in eating disorders; infant feeding cross-culturally; causes of malnutrition in the Third World as well as in developed countries; ethnic variation in food ideology and food habits; issues in the applicability of anthropometric measures to diverse populations and culturally appropriate approaches to nutritional change. Prereq: Consent of instructor. (Same as ANT 774.)

**BSC 775 HUMAN RESPONSE TO STRESS. (3)**

Human Response to Stress provides an overview of current models and theories of stress, a review of multi-disciplinary approaches to the study of stress in applied settings, and a reading knowledge of selected research findings in the field of stress. Prereq: Consent of instructor.

**BSC 776 SEMINAR IN DEPENDENCY BEHAVIOR. (3)**

The course is designed to explore theories of dependency behavior by examining the concept of dependency as it can be applied to the study of various phenomena including alcohol use and abuse; dependence on other psychoactive substances; institutional dependency; dependency in work settings; and poverty and welfare. Prereq: Consent of instructor. (Same as ANT/PSY/SOC 776.)

**BSC 777 SEMINAR IN MENTAL ILLNESS CONCEPTS, RESEARCH AND POLICY. (3)**

Advanced study of contemporary concepts of mental health and mental illness, and their historical development; major forms of response to mental illness. Prereq: Consent of instructor. (Same as SOC 777.)

**BSC 778 BEHAVIORAL FACTORS IN SELECTED DISEASES. (3)**

An exploration of behavioral science concepts which bear on various physical illnesses. The perspective of the course is interdisciplinary, using concepts from the various behavioral science disciplines. Prereq: Consent of instructor.

**BSC 779 BEHAVIORAL FACTORS IN DEATH AND DYING. (3)**

Behavioral concepts are examined which explain reactions of individuals, collectivities and social institutions to the phenomenon of death. Prereq: Consent of instructor.

**BSC 785 COMPARATIVE HEALTH CARE SYSTEMS. (3)**

This seminar will focus on concepts, issues, and research pertaining to health care systems in comparative perspective. It will deal with the following questions. (1) What are the core analytical dimensions of a health care system? (2) How do health care systems connect with the other institutional domains of a society, with its value-system, and with its major cultural and historical trends? and (3) Within the health care system, how are the main constituents of modern medicine related to each other? Prereq: Consent of instructor. (Same as SOC 785.)

**BSC 790 RESEARCH IN MEDICAL BEHAVIORAL SCIENCE. (1-6)**

Individually directed research and reading in particular aspects of medical behavioral science under the supervision of one or more members of the faculty. May be repeated to a maximum of 12 hours. Prereq: Consent of instructor.

**BSC 815 FIRST-YEAR ELECTIVE, BEHAVIORAL SCIENCE. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Behavioral Science. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**\*BSC 820 PATIENTS, PHYSICIANS, AND SOCIETY II. (5)**

In this course, students will approach written clinical scenarios with initiative by researching, gathering, and selecting materials to produce resource packets within and for their tutorials. Students will be challenged with complex ethical, legal, social, psychological, economic and biological issues. Prereq: Admission to second year of medical curriculum. (Same as MD 820.)

**BSC 825 SECOND-YEAR ELECTIVE,  
BEHAVIORAL SCIENCE. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Behavioral Science. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**BSC 850-899 FOURTH-YEAR ELECTIVE  
FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

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**BUS Business and  
Office Technology**

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See also Vocational Education.

**BUS 116 KEYBOARDING. (1)**

Development of keyboarding skills for operating typewriters, CRT's, and equipment with keyboards; emphasis on touch system for accuracy and control of alphabetic, numeric, symbol, and command keys. (No credit for those with previous typewriting instruction.)

**BUS 117 TYPEWRITING. (2)**

Principles and techniques of typewriting are integrated with a thorough study of form, style, and arrangement of typewritten materials. Prereq: BUS 116 or equivalent.

**BUS 118 ADVANCED KEYBOARDING  
AND WORD PROCESSING. (3)**

A study of advanced principles and techniques of keyboarding and word processing with emphasis upon planning and organizing a wide range of business communications media and upon meeting production standards essential to the operation of modern offices.

**BUS 160 BASIC BUSINESS CONCEPTS  
FOR OFFICE PERSONNEL. (3)**

Introduces the terminology of business and orients the student to other business and office education courses; provides an understanding of the interrelationships which exist between consumers and businesses and the impact of the activities of both groups on the economy. Major emphasis is upon interpreting and using this understanding in an office career.

**BUS 204 OFFICE FINANCIAL APPLICATIONS. (3)**

Basic financial applications required for office procedures and planning. Applications include banking, pricing, interest and installment credit, taxes, insurance, capital financing, and annuities. Touch 10-key keyboarding utilizing computer software will be taught. Lecture, three hours; laboratory, one-half hour per week.

**BUS 209 OFFICE ACCOUNTING  
PRINCIPLES AND APPLICATIONS. (4)**

A study of accounting systems of the professions, small businesses, and institutions. Special applications and practice sets will be utilized on automated equipment.

**BUS 212 ACCELERATED SHORTHAND. (3)**

Reinforcement of shorthand principles and theory; development of dictation speeds and transcription skills. Prereq: BUS 112 and 117, or consent of instructor.

**BUS 519 RECORDS MANAGEMENT. (3)**

The underlying principles and procedures of records management; information storage and retrieval systems; integration and control of records systems and programs. Prereq: BUS 118.

**BUS 556 BUSINESS REPORTS AND COMMUNICATIONS. (3)**

Written and oral communication relating to current problems in business investigated by various research procedures with major emphasis placed upon sources of data, compilation and arrangement of data, documentation, bibliography, and effective presentation. Prereq: BUS 315.

## CD Communication Disorders

### CD 277 INTRODUCTION TO DISORDERS OF SPEECH AND LANGUAGE. (3)

An introduction to developmental aspects of speech and language. Definitions, symptomologies, and etiologies of articulation, language, fluency and voice disorders.

### CD 285 APPLIED PHONETICS. (3)

Study of the phonetic structure of the English language with requirement of mastery of International Phonetic Alphabet. Emphasis will be placed on phonetic transcription, and application will be made for students interested in general speech, speech correction, radio, television, and theatre. (Same as COM 285.)

### CD 378 ANATOMY AND PHYSIOLOGY OF SPEECH. (3)

A detailed investigation of structures and functions supporting speech production: respiration, phonation, articulation, and resonance. Neural bases of speech and language will also be introduced. Prereq: CODI major or permission of instructor.

### CD 379 FUNDAMENTALS OF HEARING. (3)

Investigation of the anatomical, physiological, and neurological bases of hearing; physics of sound; and elementary psychoacoustics. Prereq: CODI major or permission of instructor.

### CD 380 PATHOLOGIES OF THE AUDITORY SYSTEM. (3)

Detailed investigation of various definitions, symptomatologies, etiologies, and treatments of hearing impairment. Surveys of definitions, symptomatologies, etiologies, and treatments of central and functional hearing impairment. Prereq: CD 379 or permission of instructor.

### CD 382 CLINICAL ORIENTATION IN SPEECH-LANGUAGE PATHOLOGY I. (3)

A lecture-laboratory experience designed to orient the student to the professional activities in speech-language pathology. Lecture: one hour; laboratory: four hours per week. Prereq: CD 277, CODI majors only.

### CD 383 CLINICAL ORIENTATION IN SPEECH-LANGUAGE PATHOLOGY II. (3)

A lecture-laboratory experience designed to orient the student to the professional activities in speech-language pathology. Lecture: one hour; laboratory: four hours per week. Prereq: CD 382 or permission of instructor; CODI majors only.

### CD 384 INTRODUCTION TO DIAGNOSTIC PROCEDURES IN SPEECH-LANGUAGE PATHOLOGY. (3)

Introduction to the principles, techniques, and tools used to develop and implement a diagnostic protocol. Prereq: CD 588 or permission of instructor; CODI majors only.

### CD 511 SPEECH-LANGUAGE DEVELOPMENT AND DISORDERS FOR THE SEVERELY HANDICAPPED. (3)

An introduction to communication development and intervention for language disordered individuals whose language age is at or below four years, including cognitive, social, auditory, visual, and motor components. Topics include prerequisites for language, normal communication development, evaluation of language functioning, and approaches to altering communication behavior. Prereq: CD 277 or EDS 375 or consent of instructor. (Same as EDS 511).

### CD 512 SPEECH-LANGUAGE DEVELOPMENT AND DISORDERS FOR THE MILDLY HANDICAPPED. (3)

An introduction to the characteristics of receptive and expressive language disorders in language-disordered children whose language age is four years or higher, including auditory, visual, cognitive, and motor components. Topics include language development, language disorders, language evaluation, and techniques for receptive and expressive language stimulation. Prereq: CD 277 or EDS 375 or permission of instructor. (Same as EDS 512).

### CD 514 LANGUAGE DEVELOPMENT THROUGH THE LIFESPAN. (3)

An introduction to the normal development of language in individuals from birth to advanced age. Topics include theories of language acquisition; prelinguistic development; development in each of the language domains (phonology, semantics, morphology and syntax, and pragmatics); the relationships between oral language, written language, and academic progress; and cultural differences. Prereq: CD 277 or permission of instructor.

### CD 515 LANGUAGE ASSESSMENT AND REMEDIATION. (3)

An introduction to the assessment and remediation of language disorders in individuals from birth to adulthood. Topics include characteristics of language disorders, assessment of prelinguistic and linguistic skills, methods of language remediation, and techniques for stimulating the development of prelinguistic and linguistic skills. Prereq: CD 514 or permission of instructor.

### CD 521 NONSPEECH COMMUNICATION. (3)

Addresses the use of nonspeech communication systems with moderately to severely handicapped individuals. This course encompasses two basic components: 1) a lecture/discussion component which examines the full range of nonspeech communication systems, including evaluation and training considerations, and 2) a manual sign component which provides students with a basic functional receptive and expressive manual sign vocabulary. Prereq: EDS 375 or equivalent or permission of instructor.

### CD 555 PROBLEMS IN COMMUNICATION DISORDERS (Subtitle required). (1-4)

In-depth study of a current topic or issue in communication disorders. A specific topic will be assigned each time the course is offered. May be repeated to a maximum of nine credits.

### CD 585 SPEECH SCIENCE. (3)

To provide basic information concerning the physics of sound and the scientific bases of speech production and perception. Emphasis is placed on the acoustic nature of speech and the perception of spoken information. Instrumentation in speech science will be demonstrated. Prereq: CODI major or permission of instructor.

### CD 587 AUDIOMETRY. (3)

Introduction to basic clinical techniques for assessing hearing acuity. Topics include principles and techniques of: school age identification audiometry and hearing conservation programs, pure tone air and bone conduction threshold testing, speech audiometry, masking, and audiometric calibration. Prereq: CD 380 or permission of instructor.

### CD 588 DISORDERS OF ARTICULATION. (3)

Analysis, identification and management of articulation disorders. Application of physiological phonetics to remediation is included. Prereq: CD 285 and CD 277, or permission of instructor.

### CD 589 CRANIOFACIAL ANOMALIES. (3)

Analysis, identification, and management of communication deficits associated with craniofacial abnormalities. Prereq: CD 378 and CD 588, or permission of instructor.

### CD 591 AURAL REHABILITATION. (3)

Introduction to management strategies, exclusive of language, for the hearing impaired. Topics include: variables affecting hearing handicap; hearing aid characteristics, selection, and orientation; acoustic and visual aspects of speech; auditory and visual perception and training; speech conservation. Prereq: CD 587.

### CD 592 PROBLEMS AND NEEDS OF THE HEARING IMPAIRED. (3)

Effects of hearing impairment on mental development, language acquisition, and personality adjustment; current research and clinical trends in auditory rehabilitation and the education of the deaf.

### CD 610 ETHICS IN CLINICAL SCIENCES RESEARCH. (1)

Students will examine ethical issues in biomedical research using a case-study approach. Representative issues addressed may include data selection and retention, plagiarism, scientific review of grants and manuscripts, scientific misconduct, and informed consent. Prereq: Graduate student status. (Same as CLS/CNU/PT/RAS 610.)

### CD 647 ADVANCED LANGUAGE DISORDERS. (3)

Developmental and structured approaches to language evaluation and remediation. Assessment of language levels, knowledge of the language system and variables influencing language functioning in children in relation to devising intervention strategies. Presentation of remediation techniques for children aged 0 to 21. Prereq: CD 514 and CD 515, or permission of instructor.

### CD 655 ADVANCED DIAGNOSTIC PROCEDURES IN SPEECH-LANGUAGE PATHOLOGY. (3)

Study of the principles of assessment and a critical review of existing standardized and non-standardized assessment tools in the field of speech-language pathology. Emphasis on selection of assessment tools for clients from diverse ethnic backgrounds with a variety of communication disorders, administration of selected tools, and organization of diagnostic information. Prereq: CD 384 or permission of instructor; CODI majors only.

**CD 656 CLINICAL PRACTICUM IN DIAGNOSTIC PROCEDURES FOR SPEECH- LANGUAGE PATHOLOGY. (1)**

Experience in the assessment of speech and language skills in children and adults. Emphasis on organization of all behavioral and test data and on report writing. Laboratory, two hours per week. May be repeated to a maximum of two credits. Prereq: CD 384 or equivalent; permission of instructor.

**CD 657 CLINICAL PRACTICUM IN SPEECH-LANGUAGE PATHOLOGY. (3)**

Experience with children and adults in the management of speech and language disorders. May be repeated to a maximum of twelve credits. Prereq: CD 382 and CD 383 or equivalent; permission of instructor.

**CD 658 CLINICAL PRACTICUM IN AUDIOLOGY. (1)**

Experience in management and/or basic evaluation of hearing impairment. Primary emphasis on planning and executing management techniques. May be repeated to a maximum of three credits. Prereq: CODI majors only. CD 587, CD 591, and CD 515, or equivalent; permission of instructor.

**CD 659 CLINICAL ROTATION IN SPEECH-LANGUAGE PATHOLOGY. (1-12)**

Supervised clinical experience in the evaluation and management of communication disorders of children and adults who are served by agencies other than the University Speech-Language-Hearing Clinic. Up to forty laboratory hours per week (at site all day). May be repeated up to 36 hours. Prereq: CODI Majors only. Must successfully complete nine hours of clinical practicum (graduate level) and consent of instructor.

**CD 670 DISORDERS OF PHONATION. (3)**

Analysis, identification, and management of disorders of phonation and resonance, including the specific communication problems of the laryngectomized adult. Prereq: Permission of instructor.

**CD 672 APHASIA AND RELATED NEUROGENIC DISORDERS OF LANGUAGE. (3)**

Analysis, identification, and management of neurogenic disorders of language and cognition. Primary emphasis is given to the acquired disorders of aphasia, traumatic brain injury, dementia, and right hemisphere dysfunction. Prereq: CD 378, CD 514, CD 515, or permission of instructor.

**CD 673 NEUROGENIC DISORDERS OF SPEECH. (3)**

Analysis, identification and management of neurogenic disorders of speech and related disorders. Primary emphasis is given to dysarthria, apraxia of speech, and dysphagia. Prereq: CD 378, CD 588 or permission of instructor.

**CD 674 DISORDERS OF FLUENCY. (3)**

Analysis, identification and management of fluency disorders. Prereq: Permission of instructor.

**CD 701 RESEARCH METHODOLOGY IN COMMUNICATION DISORDERS. (3)**

Principles and methods for designing research in communication sciences and disorders. Topics include: introduction to the scientific method, research designs, measurement techniques, formulating research questions, writing and evaluating research reports, and ethics of research. Prereq: Graduate standing in Communication Disorders.

**CD 702 SEMINAR IN SPEECH PATHOLOGY (Variable topic). (1-3)**

Advanced coverage of the clinical and research literature on the etiology, description, assessment, and management of specific speech and language disabilities. The semester topic will be rotated. Topics will include: stuttering, developmental language disabilities, cleft palate, cerebral palsy, etc. May be repeated to a maximum of nine credits.

**CD 789 INDEPENDENT STUDY IN COMMUNICATION DISORDERS. (1-6)**

Independent study for graduate students with an interest in a specific problem in communication disorders. May be repeated to a maximum of 12 credits. Lecture, 1-6 hours; laboratory, 2-12 hours per week. Prereq: Graduate status and consent of instructor.

**CDE Community Dentistry**

**CDE 830 DENTAL PRACTICE MANAGEMENT I. (2)**

This course is designed to assist the third-year student in examining and formulating attitudes and values regarding current issues in the dental profession and the health care system. A clinical experience introducing students to use of a dental assistant is also included. Students are provided an opportunity to begin a process of career planning by examining how current issues may affect career options and selections in the future prior to a summer dental practice field experience. Lecture, 36 hours; clinic, 15 hours. Prereq: Third-year standing in the College of Dentistry.

**CDE 841 DENTAL PRACTICE FIELD EXPERIENCE. (6-10)**

Students are provided a full-time, off-campus assignment to a dental practice environment for a period of 6-10 weeks. Students spend an average of 32 hours each week participating in practice management and patient treatment activities under the supervision of a dentist. Approximately eight hours a week are spent in career plan development and in study of the community or region, particularly its health care delivery system and the role of dentistry in that system. Prereq: CDE 830.

**CDE 844 DENTAL PRACTICE MANAGEMENT II. (7)**

This course will provide fourth-year dental students with information needed to establish, manage and maintain a vital dental practice. Recognizing that the career goals of students vary, the course material will encompass a broad range of management principles. This course also includes a seven-week clinical rotation in dental auxiliary utilization. Lecture, 69 hours; clinic, 147 hours. Prereq: CDE 830 or consent of course director.

**CDE 850 COMMUNITY DENTISTRY ELECTIVE. (1-10)**

Elective courses offered by the Department of Community Dentistry provide opportunities for further study of or experience in various aspects of community dentistry. Topics may include analysis and evaluation of scientific literature, principles of scientific communication, dental practice field experiences during the summer and academic year, and principles of health care organization. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

**CDS Conjoint Dental Science**

**CDS 611 CHILD GROWTH AND DEVELOPMENT PART I. (2)**

A seminar course on nature and physiologic control of physical growth, for graduate students in dentistry. Prereq: Admission to a graduate program of the College of Dentistry; D.D.S. or D.M.D. degree.

**CDS 612 CHILD GROWTH AND DEVELOPMENT PART II. (2)**

A seminar course for graduate students in dentistry covering emotional and intellectual growth of children, and diseases and congenital anomalies of children. Prereq: Admission to graduate program of the College of Dentistry; D.D.S. or D.M.D. degree.

**CDS 631 PRINCIPLES OF DENTAL OCCLUSION. (2)**

This course is designed to give the student as broad as possible a view of the complex subject of dental occlusion. Prereq: Admission to dental graduate program; D.D.S. or D.M.D. degree.

**CDS 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**CDS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**CDS 770 GERIATRIC DENTISTRY SEMINAR – CLINIC. (2)**

In this course participants plan, discuss and evaluate oral health care provided to older adult patients in various settings. Clinic/laboratory, eight hours per week. May be repeated to a maximum of eight credits. Prereq: Admission to the Geriatric Dentistry Fellowship Program.

**CDS 790 RESEARCH IN GERIATRICS. (1-4)**

This course involves student planning and writing of a research protocol, and execution of the research project. Projects and thesis are approved by the course director. Projects may include original or ongoing research within the department of Oral Health Science or other Departments of the Medical Center. Lecture: One to four hours; laboratory: two to 24 hours per week. May be repeated to a maximum of eight credits. Prereq: Admission to Postdoctoral Geriatric Dentistry Program.

**CDS 810 NEW DEVELOPMENTS IN DENTISTRY I. (1-2)**

This course will cover selected new developments in dentistry or treat with added emphasis established dental skills and knowledge. The topics will be in such areas as the basic sciences, behavioral science, clinical dentistry, dental practice management, and community dentistry. Methods of instruction will vary, depending on topics. When offered, this course will be required of first-year dental students. May be repeated to a maximum of four credits. Prereq: First-year standing in the College of Dentistry; any course prerequisite will be announced.

**CDS 812 NORMAL HUMAN GROWTH AND DEVELOPMENT. (1)**

This is a lecture course which introduces basic concepts of normal human growth and development from birth through adolescence. Lectures emphasize the time-dependent changes that normally occur during physical and psychological maturation. A special emphasis is directed toward basic knowledge and understanding of craniofacial growth and development of the teeth and occlusion. Lecture, 18 hours. Prereq: ANA 530, ANA 536; concur: ANA 532, ANA 534.

**CDS 813 MANAGEMENT I: INTRODUCTION TO MANAGEMENT FOR THE DENTIST. (2)**

In this introductory course in management for the dentist, basic concepts will be presented which can be applied in the management of time, people, facilities and money. Instruction leading to certification in cardiopulmonary resuscitation is included. Lecture, 45 hours. Prereq: Admission to the College of Dentistry.

**CDS 815 INTRODUCTION TO ORAL HEALTH PRACTICE. (5)**

This course presents a systematic approach to examination and evaluation of the dental patient, including techniques of examination and basic diagnostic procedures. In addition, an introduction to preventative dentistry and infection control is included, as well as rotations through various specialty clinics. Lecture, 66 hours; laboratory, 39 hours; clinic, 15 hours. Prereq: Admission to the College of Dentistry.

**CDS 816 THE PROFESSION OF DENTISTRY. (1)**

This course is an introduction to life in the profession of dentistry. The course will explore normal everyday morality, and consider whether a case can be made for an extraordinary morality or ethic for practitioners. The course will conclude with a brief review of the history of dentistry to enable the student to place the profession of dentistry in cultural and historical perspective. Prereq: Admission to the College of Dentistry.

**CDS 820 NEW DEVELOPMENTS IN DENTISTRY. (1-2)**

This course will cover selected new developments in dentistry or treat with added emphasis established dental skills and knowledge. The topics will be in such areas as the basic sciences, behavioral science, clinical dentistry, dental practice management, and community dentistry. Methods of instruction will vary, depending on topics. When offered, this course will be required of second-year dental students. May be repeated to a maximum of four credits. Prereq: Second-year standing in the College of Dentistry; any course prereqs will be announced.

**CDS 821 LOCAL ANESTHESIA. (1)**

The action and dosage of local anesthetic agents used in dentistry are taught as are the proper injection techniques. The technique of venipuncture and administration of intravenous drugs are also included. Patient evaluation and emergency techniques for cardiac and respiratory resuscitation are reviewed. Lecture, six hours; self-instruction, 10 hours; clinic, five hours. Prereq: ANA 534; corequisite: OBI 822.

**CDS 823 MANAGEMENT II: PATIENT COMMUNICATION. (1)**

The primary purpose of this course is to improve students' ability to interact with patients in an empathetic and professional manner. Proper management of all assigned patients is required. Instruction leading to recertification in cardiopulmonary resuscitation is provided. Lecture, 26 hours. Prereq: CDS 813.

**CDS 824 PRINCIPLES OF PATIENT MANAGEMENT I. (1)**

This course presents the rationale for the development of the University of Kentucky College of Dentistry Preliminary, Phase I and Phase II treatment plans and a method of critically evaluating treatment results. Basic UKCD clinical protocol is presented and discussed. Lecture, 25 hours. Prereq: CDS 811 or consent of course director.

**CDS 830 NEW DEVELOPMENTS IN DENTISTRY III. (1-2)**

This course will cover selected new developments in dentistry or treat with added emphasis established dental skills and knowledge. The topics will be in such areas as the basic sciences, behavioral science, clinical dentistry, dental practice management, and community dentistry. When offered, this course will be required of third-year dental students. May be repeated to a maximum of four credits. Prereq: Third-year standing in the College of Dentistry; any course prerequisites will be announced.

**CDS 831 CONSCIOUS SEDATION. (1)**

This course is designed to teach the principles of nitrous oxide-oxygen inhalation sedation and intravenous sedation in dentistry. The management of emergencies associated with these techniques and an introduction to the principles of general anesthesia are also included. Lecture, 21 hours; clinic, four hours. Prereq: CDS 821, OBI 824.

**CDS 833 MANAGEMENT III: SPECIAL PATIENT MANAGEMENT. (1)**

This course introduces the dental student to various handicapping conditions and teaches the proper methods of physical management of handicapped patients needed to provide dental care. Proper management of all assigned dental patients is required. Instruction leading to recertification in cardiopulmonary resuscitation is also included. Lecture, 26 hours; laboratory, 3 hours; clinic, 3 hours per term. Prereq: CDS 823.

**CDS 836 DIAGNOSIS AND MANAGEMENT OF FACIAL PAIN. (2)**

An interdisciplinary approach will be used to teach current concepts of the diagnosis and management of facial pain. The course content will be presented in both lecture and clinical laboratory format. Information and physical examination skills presented in the classroom will be reinforced by attendance and active participation in the Facial Pain Clinic. Lecture, 29 hours; laboratory, 2 hours; clinic, 6 hours. Prereq: ANA 538, OBI 824, OSG 820, RSD 822.

**CDS 840 NEW DEVELOPMENTS IN DENTISTRY IV. (1-2)**

This course will cover selected new developments in dentistry or treat with added emphasis established dental skills and knowledge. The topics will be in such areas as the basic sciences, behavioral science, clinical dentistry, dental practice management, and community dentistry. Methods of instruction will vary, depending on topics. When offered, this course will be required of fourth-year dental students. May be repeated to a maximum of four credits. Prereq: Fourth-year standing in the College of Dentistry; any course prerequisites will be announced.

**CDS 843 MANAGEMENT IV: GERIATRIC DENTISTRY. (2)**

Emphasis in this course is placed on developing abilities to make individual treatment decisions for elderly dental patients and acquiring positive attitudes towards the provision of oral health care to the aged. Students will make site visits to residential centers for the elderly. Proper management of all assigned dental patients and instruction leading to recertification in cardiopulmonary resuscitation are also included. Lecture, 23 hours; laboratory, 12 hours. Prereq: CDE 810 and CDS 833 or consent of course director.

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**CE Civil Engineering**

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**CE 106 COMPUTER GRAPHICS AND COMMUNICATION. (3)**

Introduction to the use of scale, dimensioning, and orthographic projections. Graphical solution of spatial problems. Integrated application of computer graphics. Lecture, two hours; laboratory, four hours per week. Prereq: High school algebra and trigonometry or equivalent.

**#CE 120 INTRODUCTION TO CIVIL ENGINEERING. (1)**

An introduction to the civil engineering profession and the use of computer hardware and software in CE systems analysis and design. Presentations will be used to illustrate the conception, design, construction, and operation processes. Sample problems and class exercises on the various technical areas of civil engineering will make use of existing computer software packages and teamwork principles.

**CE 121 INTRODUCTION TO CIVIL ENGINEERING SYSTEMS. (3)**

An introduction to the civil engineering profession from a systems point of view and the use of computer hardware and software in CE systems analysis and design. A project will be used to illustrate the conception, design, construction and operation processes. Other small projects in transportation, structural, foundation and water resources systems will make use of existing computers software packages and spreadsheets. Emphasis throughout the course will be on computational, oral, and writing skill improvement.

**CE 211 SURVEYING. (4)**

A comprehensive course in the art and science of surveying as applied to civil and mining engineering, including the use and care of surveying instruments; measurement of horizontal and vertical distances, angles and directions; collection of ground and underground data for the design and layout of roads, buildings, various mineral workings and other structures; and some aspects of the precise determination of position and direction for survey control. Lecture, three hours; laboratory, three hours per week. Prereq: CE 106, CE 121 or MNG 102, MA 114. (Same as MNG 211.)

**CE 250 TECHNOLOGY AND THE ENVIRONMENT. (3)**

An introduction to the issues associated with environmental pollution and the role of technology in the solution to environmental problems. Topics to be discussed include air pollution, water treatment, water pollution sources and control measures, environmental concerns arising from the use of nuclear and fossil fuels, solid and hazardous waste management, and economic and regulatory constraints. This course may not be taken by CE majors.

**CE 303 INTRODUCTION TO CONSTRUCTION ENGINEERING. (3)**

The study of the planning, administration, and management of construction projects and an introduction to the methodology utilized in executing specified designs. Emphasis is placed on the organization of construction firms, development of construction documents, theory of estimating and quantity take-offs, contractual and management systems, scheduling project administration, and inspection of construction operations. Prereq: Registration in College of Engineering.

**CE 331 TRANSPORTATION ENGINEERING. (3)**

An introduction to transportation engineering. Development of transportation systems in the United States. Route geometrics and design. Traffic flow characteristics and control. Planning financing and economic analysis of transport facilities. Prereq: CE 211 or CE 215 and registration in the College of Engineering.

**CE 341 FLUID MECHANICS I. (3)**

Fundamental principles of fluid flow. Includes fluids at rest (hydrostatics) and fluids in motion. Continuity, momentum and energy relations, ideal and viscous fluids. Emphasis on incompressible fluids (liquids). Prereq: ME 220 and registration in the College of Engineering.

**CE 351 INTRODUCTION TO ENVIRONMENTAL ENGINEERING. (3)**

Overview of environmental chemistry and microbiology, water quality, water and wastewater treatment, solid and hazardous wastes management, hazardous waste remediation, and air pollution control. Emphasis on the basic science and engineering principles required to understand both natural and engineered systems, as well as the engineering approach to understanding the natural environment and specific treatment mitigation methods. Prereq: CHE 107, MA 214, PHY 231, and registered in the College of Engineering, or consent of instructor.

**CE 381 CIVIL ENGINEERING MATERIALS. (3)**

A study of the microscopic and macroscopic structures and properties of materials used in civil engineering construction with emphasis on the relationships of their physical and mechanical properties to engineering design and application. Written reports and oral presentation of results will be required. Lecture, two hours; laboratory, three hours per week. Prereq: EM 302 and registration in College of Engineering.

**CE 382 STRUCTURAL MECHANICS. (3)**

Analysis of statically determinate structures including trusses, beams, cables, arches and frames. Influence lines for truss and beam structures. Approximate analysis of statically indeterminate structures. Displacement calculations and introduction to statically indeterminate structural analysis. Prereq: EM 302 and registration in the College of Engineering.

**CE 395 INDEPENDENT WORK IN CIVIL ENGINEERING. (1-6)**

Individual work on some selected problem in the field of civil engineering. May be repeated for a maximum of six credits. Prereq: Engineering standing, consent of department chairperson and the instructor.

**CE 401 SEMINAR. (1)**

A discussion of the ethical and professional aspects of civil engineering practice. Concepts of loss prevention and conflict resolution. Structured small group discussion, oral presentations, and role playing. Lecture, two hours per week. Prereq: Senior classification and engineering standing.

**CE 403 CONSTRUCTION METHODOLOGY. (3)**

A study of the methodology used in construction, with an emphasis on the selection and application of resources: labor, materials, equipment, money and time. The importance of cost and quality is stressed. Weekly lab periods are used to acquaint the student with actual construction documents and to provide supervised work sessions in plan reading and basic estimating. Lecture, two hours; laboratory, three hours per week. Prereq: CE 303, CE 381, engineering standing.

**\*CE 421 CIVIL ENGINEERING SYSTEMS ANALYSIS. (3)**

An introduction to systems analysis and operation research, with applications in civil engineering. Probability and statistics, regression analysis, linear and nonlinear analysis, numerical calculus, linear and nonlinear optimization techniques, and mathematical simulation. Emphasis on setting up mathematical models to analyze civil engineering systems. Prereq: CS 221 or CS 223; prereq or concur: CE 303, 331, 341, 382; and engineering standing.

**CE 441 FLUID MECHANICS II. (3)**

Application of basic fluid mechanics to problems of importance to civil engineering practice. This includes pipe flow (pipe networks), open channel flow, culvert flow, flow through meters, pumps, and turbines. Prereq: CE 341, CS 221 or CS 223 and engineering standing.

**CE 451 WATER AND WASTEWATER TREATMENT. (3)**

Fundamentals of the design and operation of water and wastewater treatment facilities. Prereq: CE 341, CE 351, and engineering standing or consent of instructor.

**CE 460 FUNDAMENTALS OF GROUNDWATER HYDROLOGY. (3)**

The first course in the physics of saturated flow in porous media. Topics include groundwater occurrence, Darcian flow, well hydraulics, flow nets and layered systems flow. The basic concepts of pollutant movement and unsaturated flow are introduced and case studies are analyzed. Prereq: ME 330 or CE 341 or consent of instructor. (Same as AEN 438G.)

**CE 461G HYDROLOGY. (3)**

A study of the factors affecting the occurrence, movement and utilization of water including meteorological considerations, evaporation, transpiration, runoff relationships, hydrograph analysis, and ground water management. Prereq: CE 341, engineering standing or consent of instructor.

**\*CE 471G SOIL MECHANICS. (3)**

A study of the strength, deformation and hydraulic properties of soils and their relationship to settlement, stress distribution, earth pressure, bearing capacity and slope stability. Written and oral presentations of student projects will be required. Lecture, two hours; laboratory, three hours per week. Prereq: EM 302; prereq or concur: GLY 240; and engineering standing or consent of instructor.

**CE 482 ELEMENTARY STRUCTURAL DESIGN. (3)**

Application of principles of solid mechanics to the design of steel, timber, and reinforced concrete members and structures. Emphasis on basic ideas and their application to practical design of relatively simple structures according to the building code. Credit may not be used to satisfy degree requirements if credit is earned in CE 485G, or CE 486G, or CE 487G. Prereq: CE 382 and engineering standing.

**\*CE 486G REINFORCED CONCRETE STRUCTURES. (3)**

Theory and design of beams, slabs, girders and columns as related to building frames and bridges. Introduction to pre-stressed concrete, elastic design and ultimate strength design. Concur: CE 487G; prereq: CE 382 and engineering standing, or consent of instructor.

**\*CE 487G STEEL STRUCTURES. (3)**

Design criteria and methods. Behavior and design of structural steel beams, columns, beam-columns, and bolted and welded connections. Analysis and design of composite steel/concrete beams. Torsion of open and closed sections. Considerations of instability of beams, columns, and plates in design. Plastic analysis and design of continuous structures. Introduction to computerized structural analysis and design. Concur: CE 486G; prereq: CE 382 and engineering standing, or consent of instructor.

**CE 503 CONSTRUCTION ESTIMATING. (3)**

This course investigates the principles of predicting and controlling the cost of construction projects. Items studied include feasibility studies, preliminary and detailed estimating, budgeting, monitoring and variance analysis. Computer applications for construction estimating will be stressed. Prereq: CE 403 and engineering standing or consent of instructor.

**CE 505 CONSTRUCTION PROJECT PLANNING AND MANAGEMENT. (3)**

A study of the planning process and fundamental management procedures for construction projects. Special attention given to: planning of methods and resources; use of schedules; monitoring time; managing cash flow and costs; and overall project administration and record keeping. Prereq: CE 403 and engineering standing; or consent of instructor.

**CE 506 THE ENGINEER, THE LAW, AND THE ENVIRONMENT. (3)**

The impact of engineering activities on the environment and the resulting legal implications. The interrelationships between engineering and law as they affect such areas as water quality and pollution, air quality and pollution, noise pollution, visual pollution, land use planning and energy considerations and the conservation and (or) preservation of natural resources. Prereq: Engineering standing, or consent of instructor.

**CE 517 BOUNDARY LOCATION PRINCIPLES. (3)**

Procedures for locating or relocating the boundaries of real property; records searching, technical aspects of field work, preparation of descriptions and survey reports, land data systems, legal aspects, special problems. Prereq: CE 211 or CE 215, engineering standing or consent of instructor.



**CE 518 ADVANCED SURVEYING. (3)**

Principles of precise survey procedures in triangulation, trilateration, traverse and leveling; adjustment computations; theory and practice of electronic distance measurement; basic geodesy and state plane coordinate systems; applications to the horizontal and vertical control of engineering projects; review of modern land surveying problems and procedures. Lecture, two hours; laboratory, three hours per week. Prereq: MA 214, CE 211 or CE 215, and engineering standing.

**CE 521 ENGINEERING ECONOMY. (3)**

Economic evaluation and financial analysis of engineering alternatives in which the goal of economic efficiency is applied to engineering design. Prereq: Engineering standing.

**CE 531 TRANSPORTATION SYSTEMS OPERATIONS. (3)**

Analysis of transportation infrastructure problems through diagnostic study of existing transportation systems operations with emphasis on capacity and safety objectives. Engineering practice oriented toward open-ended solutions. Prereq: CE 211 or CE 215, CE 331, engineering standing.

**CE 533 RAILROAD FACILITIES DESIGN AND ANALYSIS. (3)**

Principles of railroad location, construction, rehabilitation, maintenance, and operation with emphasis on track structure design and analysis, bridges and bridge loading, drainage considerations, track geometry effects, and operating systems analysis. Prereq: CE 331, CE 381, CE 382; concur: CE 471G and engineering standing.

**CE 534 PAVEMENT DESIGN, CONSTRUCTION AND MANAGEMENT. (3)**

Design, analysis, construction, and management of flexible and rigid pavements. Stresses and strains, pavement materials, subgrade soil stabilization, bases and subbases, quality control, drainage, pavement-type selection, and pavement management. Prereq: CE 381, prerequisite or concurrent CE 471G, and engineering standing.

**CE 539 TRANSPORTATION SYSTEMS DESIGN. (4)**

Introduction to the processes and procedures for transportation systems design. Policy design, functional design and sizing, operation and schedule design, location and geometric design, supporting structures design as they individually and collectively affect the efficacy of transportation systems. Written and oral presentation of student projects will be required. Lecture, three hours; laboratory, three hours per week. Prereq: CE 211 or CE 215 and CE 331 and engineering standing.

**CE 546 FLUVIAL HYDRAULICS. (3)**

Rainfall physics, principles of erosion on upland areas and construction sites, stable channel design in alluvial material, mechanics of sediment transport, river mechanics, reservoir sedimentation. Prereq: CE 461G, ME 330 and engineering standing. (Same as AEN 536.)

**CE 549 ENGINEERING HYDRAULICS. (3)**

Analysis of flow in closed conduits and natural and artificial open channels. Design of hydraulic structures. Prereq: CE 341, CE 441 and engineering standing. (Same as AEN 545).

**CE 556 SOLID AND HAZARDOUS WASTE MANAGEMENT. (3)**

Study of the generation and management of solid and hazardous wastes. Application of engineering principles to the collection, transport, processing, resource recovery and ultimate disposal of these wastes. Prereq: CE 471G, CE 521 or consent of instructor and engineering standing. (Same as AEN 556).

**CE 560 GROUNDWATER MODELING. (3)**

An introduction to the practical aspects of numerical modeling techniques as applied to the solution of groundwater flow and groundwater pollution problems. Steady state and transient models of regional groundwater flow. Effect of river, pumping wells, and natural geological barriers. Models of regional groundwater pollution. Delineation of capture zones and particle tracking models. Modeling of remedial actions at contaminated sites. Prereq: CE 461G or equivalent and CS 221 or CS 223 or equivalent.

**CE 569 WATER RESOURCES SYSTEM DESIGN. (4)**

Application of principles of hydrology, hydraulics, and environmental engineering in the planning, design, and analysis of a comprehensive water resource project. Emphasis on basic ideas and their application to the practical design of water supply, distribution, collection and treatment facilities. Written and oral presentation of student projects will be required. Lecture, three hours; laboratory, three hours per week. Prereq: CE 451, 461G, 549 and engineering standing. (Same as AEN 569).

**CE 579 GEOTECHNICAL ENGINEERING. (3)**

Application of the principles of soil mechanics and structural mechanics to the design of retaining walls, bracing for excavations, footings, mat and pile foundations and to the analysis of the stability of earth slopes. Prereq: CE 471G and engineering standing.

**CE 582 ADVANCED STRUCTURAL MECHANICS. (3)**

Approximate methods of frame analysis; energy principles; flexibility and stiffness methods for trusses, frames, arches, nonprismatic members and flexible connections/supports; influence lines for statically indeterminate structures; introduction to plastic analysis; and use of available computer programs for structural analysis and matrix operations. Prereq: CE 382 and engineering standing.

**CE 583 SUSPENSION BRIDGES. (3)**

Analysis and design of suspension bridges. Derivation of governing equations and application to existing structures. Prereq: CE 487G and engineering standing.

**CE 586 PRESTRESSED CONCRETE. (3)**

Fundamental basis and underlying principles for the analysis and design of prestressed concrete. Working stress and ultimate strength design methods, full and partial prestressing. Design for shear and torsion, deflection, crack control, and long-term effects, and prestress losses. Composite beams, continuous beams, slabs, short and slender columns, precast structures and their connections. Prereq: CE 486G and engineering standing.

**CE 589 DESIGN OF STRUCTURAL SYSTEMS. (4)**

Design loads and structural systems. Systems concepts in planning analysis, design and construction of structures. Buildings, bridges, special structures and foundations. Computer aided design and drafting (CADD) utilizing microcomputers and the mainframe computer. Written and oral presentations of student projects will be required. Lecture, three hours; laboratory, three hours per week. Prereq: CE 487G and CE 486G and engineering standing or consent of instructor; Coreq: CE 579.

**CE 599 TOPICS IN CIVIL ENGINEERING (Subtitle required). (1-4)**

A detailed investigation of a topic of current significance in civil engineering such as: design of small earth dams, man and the environment, drilling and blasting, scheduling construction operations, construction equipment and methods, traffic safety, optimum structural design, environmental impact analysis, systems analysis in civil engineering, motor vehicle noise and its control. May be repeated to a maximum of eight credits, but only four credits can be earned under the same title. A particular topic may be offered at most twice under the CE 599 number. Prereq: Variable; given when topic is identified; plus engineering standing.

**PREREQUISITE FOR GRADUATE WORK:** Students desiring to take any of the following courses should have a thorough working knowledge of chemistry, physics and mathematics. For major work, a candidate must hold a bachelor's degree in civil engineering or its equivalent.

**CE 601 CONSTRUCTION EQUIPMENT. (3)**

Analysis of construction equipment use and economics. Selection and matching equipment for productivity and cost effectiveness. Mathematical simulation of construction operations. Prereq: CE 403, CE 503, or consent of instructor.

**CE 602 CONSTRUCTION ADMINISTRATION. (3)**

Administration of construction companies and projects, organization, economics, material management, productivity models, labor and equipment tracking, quality control and managerial accounting. Construction labor relations, claims and construction financing are also discussed. Prereq: CE 403, CE 506, or consent of instructor.

**CE 633 AIR TRANSPORT ENGINEERING. (3)**

Planning location and design of airports, STOL ports, and heliports. Air traffic operations, performance and control as related to facility requirements. Role of governmental agencies. Prereq: CE 531 or consent of instructor.

**CE 634 TRAFFIC CHARACTERISTICS. (3)**

Vehicle operating characteristics; driver, pedestrian and roadway characteristics as they individually, and collectively as traffic stream characteristics, are related to the planning design and operation of highway facilities. Prereq: CE 331.

**CE 636 OPERATIONAL EFFECTS OF GEOMETRICS IN TRANSPORTATION. (3)**

Operational effects of the geometry of transportation facilities includes capacity, safety, and economic considerations prompting current and impending changes in geometric design of intersections, interchanges, horizontal and vertical alignment, clearances, cross section elements and interfaces between elements of the transportation system. Prereq: CE 331.

**CE 641 MECHANICS OF LIQUID FLOW IN PIPES. (3)**

Steady and unsteady one-dimensional pipe flow. Water hammer and surge tank analysis. Steady two-dimensional pipe flow. Digital and analog computer applications. Prereq: CE 549.

**CE 642 OPEN CHANNEL FLOW. (3)**

The hydraulics of free surface flow including such topics as uniform flow, varied flow, unsteady flow, the hydraulic jump flow transitions, spillways and channel delivery. Prereq: CE 341. (Same as AEN 642).

**CE 651 FUNDAMENTALS OF WATER QUALITY CONTROL I. (3)**

Theory and practices of water and wastewater treatment with emphasis on physical and chemical processes for municipal and industrial wastewater treatment. Prereq: CE 451 or consent of instructor.

**CE 652 FUNDAMENTALS OF WATER QUALITY CONTROL II. (3)**

Theory and practices of wastewater treatment with emphasis on biological treatment processes for municipal and industrial wastewater treatment. Prereq: CE 451 or consent of instructor.

**CE 653 WATER QUALITY IN SURFACE WATERS. (3)**

Water quality requirements for various beneficial uses. Analysis of dispersion, advection, evaporation, natural aeration, biological oxidation and photosynthesis; their effects on the physical, chemical and biological quality of waters in streams, lakes, reservoirs, estuaries and other surface waters. Eutrophication. Prereq: MA 214 and CE 451, or consent of instructor. (Same as AEN 653).

**CE 654 PRINCIPLES OF WATER AND WASTEWATER TREATMENT PROCESSES. (3)**

Physical, chemical, and biological principles of water and wastewater treatment processes. Basic concepts such as chemical kinetics and equilibrium, acid-base chemistry, oxidation-reduction reactions and acid mine drainage, reactor design, mass transfer, and microbial metabolism are emphasized. Prereq: CE 451 or consent of instructor.

**CE 660 GROUNDWATER HYDROLOGY. (3)**

The equations of saturated and unsaturated groundwater flow, the formulation of boundary value problems, and some analytical methods of solution. Solutions using Fourier series, solutions involving the Fourier transform and the Fourier sine and cosine transforms. The Boltzman transformation, development of the Philip solution for horizontal and vertical flow. Mathematical statement of the saturated and unsaturated groundwater pollution problem and some analytical methods of solution. The semigroup solution of the resulting evolution equation, examples of solutions using the Laplace transform and the Fourier transform, more complex solutions in two-dimensional and three-dimensional domains, solutions for distributed sources in time and in space, solutions for time-varied boundary conditions. Prereq: MA 214, CE 461G or equivalent. (Same as AEN 638).

**CE 662 STOCHASTIC HYDROLOGY. (3)**

Hydrologic random variables and probability distributions. Statistical measures, development and use of Monte Carlo simulations in the generation of precipitation fields. Statistical tests of hydrologic data. Point frequency and regional frequency analysis. Analysis of hydrologic time series. Long-term trend, harmonic analysis of periodicity, autocorrelation, spectral analysis. Correlation and regression analysis. Linear stochastic models. Introduction to stochastic processes in hydrology, real-time hydrologic forecast (Kalman filter), pattern recognition, and stochastic differential equations. Prereq: MA 214, CE 461G or equivalent.

**CE 665 WATER RESOURCES SYSTEMS. (3)**

Application of systems analysis, mathematic modeling, and optimization in water resources management and design. Solution of engineering problems found in water supply, water quality, urban drainage, and river basin development and management by use of linear, nonlinear, and dynamic programming models. Prereq or concur: CE 421 and CE 569 or consent of instructor. (Same as AEN 665).

**CE 667 STORMWATER MODELING. (3)**

Introduction to deterministic and parametric modeling approaches for mathematically simulating stormwater runoff and quality. Emphasis on modeling concepts and model formulation. Analysis of deterministic component models and their linkage. Formulation of existing parametric models. Presentation of methods for parameter optimization and regionalization. Demonstration of linkage between the two approaches with illustrative examples. Prereq: CE 341 and CE 461G, or consent of instructor. (Same as AEN 667).

**CE 671 ADVANCED SOIL MECHANICS. (3)**

Detailed study of soil behavior. Specific topics include soil classification and structure, strength and deformational behavior, compaction, consolidation, and stress distribution in earth masses. Prereq: CE 471G or consent of instructor.

**CE 676 GROUNDWATER AND SEEPAGE. (3)**

Permeability and capillary flow in soils, mathematical theory of flow through porous media. Flow through anisotropic, stratified and composite sections. Solution by flow net, conformal mapping and numerical methods. Seepage toward wells. Dewatering and drainage of soils. Prereq: CE 471G or consent of instructor.

**CE 679 SOIL-STRUCTURE DYNAMICS AND EARTHQUAKE ENGINEERING. (4)**

Dynamic and earthquake response of soils and structures using standard analysis and design techniques. Time discretization topics include fast Fourier transforms, central differences, Newmark's method and Rayleigh-Ritz modal decomposition. Elastic wave propagation and measurement methods for obtaining the dynamic properties of soils and structures are considered. Earthquake terminology, analysis and design methods. Prereq: CE 579 and CE 582.

**CE 681 ADVANCED CIVIL ENGINEERING MATERIALS. (3)**

Fundamental aspects of mechanical behavior of civil engineering materials. Rheology and fracture of asphalt and Portland cement concrete materials. Prereq: CE 381.

**CE 682 ADVANCED STRUCTURAL ANALYSIS. (3)**

Theory and application of energy principles for plane and space frames; material and geometric nonlinearities; and nonlinear solution schemes. Prereq: CE 582 or consent of instructor.

**\*CE 684 SLAB AND FOLDED PLATE STRUCTURES. (3)**

Design and analysis of reinforced concrete floor slabs and folded plate roofs. Elastic and inelastic methods. Prereq: CE 582 or consent of instructor.

**\*CE 686 ADVANCED REINFORCED CONCRETE THEORY. (3)**

Background and origin of modern reinforced concrete design procedures and codes. Comparison of American and foreign methods of analysis. Review of current research and projection to anticipated future changes in design and construction practices. Prereq: CE 486G or consent of instructor.

**\*CE 687 ADVANCED METAL STRUCTURES. (3)**

Background and origin of modern structural steel design procedures and codes. Applications of various methods to structural buckling problems. Instability of beams, columns, frames, and plates. Considerations of buckling and interaction of buckling modes in design. Post-buckling analysis and design of cold-formed steel, and other metal structures. Plastic analysis and design of steel frames. Factors related to metal structural design. Prereq: CE 582 or consent of instructor.

**\*CE 699 TOPICS IN CIVIL ENGINEERING (Subtitle required). (1-4)**

An advanced level presentation of a topic from one of the major areas of civil engineering such as hydraulics, geotechnics, structures, transportation, surveying, or water resources. Course with a given subtitle may be offered not more than twice under this number. Prereq: Variable; given when topic identified; graduate standing.

**CE 709 COMPUTER APPLICATIONS IN CONSTRUCTION. (3)**

This course is an advanced design class where students, using the knowledge gained in 500 and 600 level construction courses, learn how to select and implement automation into the construction process. Students investigate commercially available software and its use in managing construction projects. Prereq or concur: CE 503, 505, 602.

**CE 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**CE 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**CE 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**CE 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE. (0-12)****CE 772 EXPERIMENTAL METHODS IN SOIL MECHANICS. (3)**

A comprehensive study, including literature review, and experimentation of the instrumentation, methods, and problems associated with the measurement of the behavior and the properties of soil. Laboratory and field methods used in research and practice. Lecture and recitation, two hours; laboratory, three hours. Prereq or concur: CE 671 or consent of instructor.

**CE 779 ADVANCED GEOTECHNICAL ENGINEERING. (3)**

Application of the principles of soil mechanics to the design and analysis of foundations and earth structures. Prereq: CE 579 and CE 671 or consent of instructor.

**\*CE 782 DYNAMICS OF STRUCTURES. (3)**

Review of methods of analysis of simple structural systems. Effects of wind, earthquake, traffic and machinery loads. Matrix methods for complex dynamic structural systems, random vibrations of structures. Prereq: CE 582 or consent of instructor.

**CE 784 SHELL STRUCTURES. (3)**  
Design and analysis of reinforced concrete shell structures, including domes, barrel shells, hyperbolic paraboloids and cylindrical tanks. Prereq: CE 684 or consent of instructor.

**CE 790 SPECIAL RESEARCH PROBLEMS IN CIVIL ENGINEERING. (1-6)**  
Individual work on some selected problems in one of the various fields of civil engineering. Laboratory, six hours. May be repeated to a maximum of nine credits. Prereq: Consent of the chairperson of the department.

**CE 791 SPECIAL DESIGN PROBLEMS IN CIVIL ENGINEERING. (1-6)**  
Individual work on some selected problems in one of the various fields of civil engineering. Laboratory, six hours. May be repeated to a maximum of nine credits. Prereq: Consent of the chairperson of the department.

## CEP Cooperative Education

**CEP 399 COOPERATIVE EDUCATION. (1)**  
A course designed for undergraduate students who, through the appropriate cooperative education office, secure full-time, salaried, career-related positions under the supervision of a sponsoring employer. Enrollment in the course constitutes full-time status. Course may be taken on a pass-fail basis only and may be repeated on a rotational basis to a maximum of six credit hours. Prereq: Prior approval from the director of co-op education in participating academic unit.

## CEX Cooperative Extension

**CEX 501 PRINCIPLES OF COOPERATIVE EXTENSION. (3)**  
Philosophy, history and development of cooperative extension service; evaluation of instructional techniques; leadership training; and practice in use of extension methods. Open to junior, senior and graduate students.

## CHE Chemistry

**CHE 104 INTRODUCTORY GENERAL CHEMISTRY. (3)**  
A study of the general principles including laws of definite and multiple proportions, stoichiometry, gases, electronic structure, chemical bonding, periodic relationships, oxidation-reduction, acid bases, chemical equilibrium and acids/bases. Intended for students interested in a one-semester course in general chemistry and recommended for students seeking careers in nursing, nutrition and allied health science fields. Not open to students who have already completed both CHE 105 and 107. Prereq: A working knowledge of algebra such as is acquired in two years of high school algebra, CHE 105, or MA 108R, or a composite ACTE score of 22 or above.

**CHE 105 GENERAL COLLEGE CHEMISTRY I. (3)**  
A study of the principles of chemistry and their application to the more important elements and their compounds. Not open to students who have already completed both CHE 104 and 106, but is open to students who have completed just CHE 104. Prereq: Math ACTE of 21 or above, or MA 109 (or Math placement test), or Chemistry placement test, or the Community College course CHE 102R or CHM 100.

**CHE 106 INTRODUCTION TO INORGANIC, ORGANIC AND BIOCHEMISTRY. (4)**  
A continuation of CHE 104. A study of selected aspects of inorganic, organic and biochemistry including the chemistry of metals and nonmetals, introduction to organic functional group chemistry, proteins, nucleic acids and lipids. Lecture, three hours; laboratory, three hours per week. Not open to students who have already completed CHE 105 and 107. Not recommended for students seeking careers in medicine, science, dentistry, engineering, veterinary science, agricultural sciences, education, or allied fields for which the recommended sequence is CHE 105-107-115. Prereq: CHE 104 or the community college course CHM 100.

**CHE 107 GENERAL COLLEGE CHEMISTRY II. (3)**  
A continuation of CHE 105. A study of the principles of chemistry and their application to the more important elements and their compounds. Not open to students who have completed only CHE 104 but is open to students who have completed both CHE 104 and 106. Prereq: CHE 105 or both CHE 104 and 106.

**CHE 115 GENERAL CHEMISTRY LABORATORY. (3)**  
An introductory laboratory course dealing with chemical and physical properties; qualitative analysis, and an introduction to quantitative analysis. Lecture, one hour; laboratory, four hours. Prereq or concur: CHE 107.

**CHE 226 ANALYTICAL CHEMISTRY. (3-5)**  
An introduction to the theory and practice of quantitative analysis. Lecture, two hours; laboratory, three to six hours. Prereq: CHE 107 and 115.

**CHE 230 ORGANIC CHEMISTRY I. (3)**  
Fundamental principles and theories of organic chemistry. Prereq: CHE 107 and 115.

**CHE 231 ORGANIC CHEMISTRY LABORATORY I. (2)**  
Laboratory for CHE 230 or CHE 236. Laboratory, six hours per week. Prereq or concur: CHE 230 or CHE 236.

**CHE 232 ORGANIC CHEMISTRY II. (3)**  
A continuation of CHE 230. Prereq: CHE 230.

**CHE 233 ORGANIC CHEMISTRY LABORATORY II. (2)**  
Laboratory for CHE 232. Laboratory, six hours per week. Prereq: CHE 231. Prereq or concur: CHE 232.

**CHE 235 SPECIAL ORGANIC LABORATORY. (1)**  
Special laboratory for students majoring in chemical engineering, materials science engineering, or clinical laboratory sciences. Laboratory, three hours per week. Prereq or concur: CHE 230 or CHE 236.

**CHE 236 SURVEY OF ORGANIC CHEMISTRY. (3)**  
A one-semester course in organic chemistry. Not open to students who have already completed both CHE 230 and 232. Prereq: CHE 115.

**CHE 395 INDEPENDENT WORK IN CHEMISTRY. (1-3)**  
May be repeated to a maximum of nine credits. Prereq: Major and a standing of 3.0 in the department.

**CHE 440G PHYSICAL CHEMISTRY. (4)**  
An introduction to the laws of thermodynamics, the thermo-dynamic functions and their application to phase equilibria, chemical equilibria, solutions and electrochemistry. Chemical kinetics, including rate laws, reaction mechanisms, Arrhenius, collision, and activated complex theories, and catalysis. Quantum theory including an elementary introduction to spectroscopy. The fourth hour to be devoted to problem solving and problem-solving techniques. Prereq: CHE 226; MA 114; PHY 213 or 232.

**CHE 441G PHYSICAL CHEMISTRY LABORATORY. (2)**  
Laboratory studies in physical chemistry to accompany CHE 440G or 444G. Laboratory, six hours. Prereq: CHE 440G or 444G.

**CHE 442G PHYSICAL CHEMISTRY. (3)**  
A further development of the material introduced in CHE 440G: Advanced thermodynamic methods, statistical thermodynamics, quantum chemistry, and spectroscopy. Prereq: CHE 440G or 446G.

**CHE 446G PHYSICAL CHEMISTRY FOR ENGINEERS. (3)**  
An introductory course in physical chemistry for engineering students. Kinetic theory, thermodynamics, phase diagrams, colligative properties, electrochemistry, transport properties, kinetics, quantum theory, spectroscopy. Prereq: CHE 107, 115; PHY 232; MA 213.

**CHE 450G PRACTICAL INORGANIC CHEMISTRY. (3)**  
A combined lecture and laboratory course which will acquaint the student with the synthesis, characterization and properties of inorganic and organometallic compounds of both main-group and transition elements. Lecture, one hour; laboratory, six hours per week. Prereq: CHE 231 and CHE 232; prereq or concur: CHE 440G or CHE 444G.

**CHE 510 ADVANCED INORGANIC CHEMISTRY. (3)**  
A course dealing with the concepts of inorganic chemistry with emphasis on atomic structure, periodicity, nomenclature, bonding, reaction mechanisms and acid-base theories. Prereq: CHE 107 or 226.

**CHE 514 DESCRIPTIVE INORGANIC CHEMISTRY. (3)**  
A course dealing in detail with descriptive chemistry of the elements and their compounds, excluding the hydrocarbons and their derivatives. Prereq: CHE 226 and CHE 232; or CHE 450G, or permission of instructor.

**CHE 520 RADIOCHEMISTRY. (3)**  
Applications of radionuclides in chemistry with emphasis on principles of radioactive decay, interactions of radiation with matter, use of isotopic tracers, activation analysis, isotope dilution analysis, hot atom chemistry and nuclear dating methods. Prereq: CHE 107, or 226.

**CHE 521 RADIOCHEMISTRY LABORATORY.** (1-2)  
Introductory radiochemistry laboratory. Emphasis is on nuclear radiation detection and radiochemical techniques including activation analysis, isotope dilution, liquid scintillation counting, hot-atom chemistry, X-ray fluorescence, nuclear spectroscopy, and radiochemical separations. Three or six (laboratory and discussion) hours per week. Prereq: CHE 520.

**CHE 522 INSTRUMENTAL ANALYSIS.** (4)  
The theory and application of instrumental methods of analysis. Lecture, two hours; laboratory, six hours. Prereq or concur: CHE 442G or 444G.

**CHE 524 CHEMICAL INSTRUMENTATION.** (4)  
Aspects of electronics, microcomputers, computer interfacing and data analysis as they apply to chemical measurements and measurement systems. Lecture, two hours; laboratory, six hours per week. Prereq: CHE 440G or 444G or consent of instructor.

**CHE 526 CHEMICAL SEPARATIONS.** (2)  
An advanced study of the theory, instrumentation, and analytical applications of chemical separation methods. Prereq: CHE 440G or 444G or consent of instructor.

**CHE 532 SPECTROMETRIC IDENTIFICATION OF ORGANIC COMPOUNDS.** (2)  
Problems involving the use of nuclear magnetic resonance, ultraviolet and infrared spectroscopy, mass spectrometry and differential chemical reactivity in determining the structure of organic compounds. Discussion of chemical and physical methods for separation of mixtures of organic compounds. Prereq: CHE 231 and CHE 232.

**CHE 533 QUALITATIVE ORGANIC ANALYSIS LABORATORY.** (2)  
The identification of unknown organic compounds using nuclear magnetic resonance, ultraviolet and infrared spectroscopy, mass spectrometry and traditional chemical techniques. Separation techniques are also emphasized. Laboratory, six hours. Prereq: CHE 532.

**CHE 535 SYNTHETIC ORGANIC CHEMISTRY.** (3)  
A general survey of organic chemistry with emphasis on synthetic methods and the synthesis of natural products. Prereq: CHE 232.

**CHE 538 PRINCIPLES OF ORGANIC CHEMISTRY.** (3)  
A general survey of the field of organic chemistry. Topics emphasized are: mechanistic principles relating molecular structure to reaction outcome, stereoisomerism and its effect on chemical reactivity, and simple molecular orbital theory as required to understand aromaticity and to predict the occurrence and stereochemistry of pericyclic reactions. Prereq: CHE 232.

**CHE 547 PRINCIPLES OF PHYSICAL CHEMISTRY I.** (3)  
An introduction to quantum chemistry and spectroscopy, emphasizing applications to chemical bonding, atomic and molecular spectroscopy, and magnetic resonance. Prereq: CHE 442G, MA 214; or equivalent courses; or permission of instructor.

**CHE 548 PRINCIPLES OF PHYSICAL CHEMISTRY II.** (3)  
Fundamental principles of classical physical chemistry, including thermodynamics, statistical thermodynamics, and chemical kinetics. Prereq: CHE 440G.

**CHE 572 COMMUNICATION IN CHEMISTRY.** (1)  
Reports and discussions on recent research and current chemical literature in seminar format; literature searching methods; résumé construction; preparation of effective presentations, abstracts, and visual aids. May be repeated for a total of two credits.

**CHE 580 TOPICS IN CHEMISTRY.** (1-3)  
A detailed investigation of a topic of current significance in chemistry. May be repeated to a maximum of six credits. Lecture and/or laboratory: variable. Prereq: CHE 232 and 440G or 444G, or consent of instructor.

**CHE 610 CHEMISTRY OF THE TRANSITION METALS.** (3)  
A detailed treatment of the chemistry of the transition elements, lanthanides and actinides, including the structure of coordination complexes, bonding, reaction mechanisms and preparations. Prereq: CHE 510.

**CHE 614 ORGANOTRANSITION METAL CHEMISTRY.** (3)  
A detailed treatment of the organometallic chemistry of the transition metals, including lanthanides and actinides. Topics include synthesis, structure, bonding theories, reactions, characterization by physical methods, and applications in organic chemistry and catalysis. Prereq: CHE 232, CHE 410G or 510, and CHE 442G or 444G; or equivalent courses; or permission of instructor.

**CHE 616 NUCLEAR CHEMISTRY.** (3)  
An advanced study of nuclear chemistry and topics related to nuclear and radiochemistry. Prereq: CHE 443G and 520.

**CHE 620 ELECTROCHEMICAL METHODS OF ANALYSIS.** (3)  
An intensive study of the fundamental theories and principles of electrochemistry, and their practical applications for physical and quantitative analytical measurements. Topics will include potentiometric, voltametric, amperometric, and coulometric methods. Lecture, two hours; laboratory, three hours per week. Prereq: CHE 442G, 522 or 548.

**CHE 625 OPTICAL METHODS OF ANALYSIS.** (3)  
An intensive study of the theory, instrumentation, and analytical applications of modern atomic and molecular spectrometric methods. Lecture, two hours; laboratory, three hours per week. Prereq: CHE 522.

**CHE 626 ADVANCED ANALYTICAL CHEMISTRY.** (3)  
An advanced study of the theory and practice of quantitative analysis.

**CHE 633 PHYSICAL ORGANIC CHEMISTRY.** (3)  
An advanced presentation of the mechanisms of organic reactions, the experimental methods used to elucidate these mechanisms, and the effect of changing structure and reaction conditions on the reactivity of organic molecules. Prereq: CHE 538.

**CHE 643 SPECTROSCOPY AND PHOTOPHYSICS.** (3)  
An integrated treatment of modern spectroscopy and photophysics. Topics to include atomic spectroscopy, microwave, infrared and UV-visible spectroscopy of diatomic and polyatomic molecules, lasers, creation and detection of excited states, fluorescence, phosphorescence, radiationless processes and photochemical transformations. Prereq: CHE 547 or CHE 440G/442G or permission of instructor.

**CHE 646 CHEMICAL KINETICS.** (3)  
Studies of chemical reactions from the standpoint of velocity and mechanism. Prereq: CHE 442G.

**CHE 710 TOPICS IN INORGANIC CHEMISTRY.** (2-4)  
Discussion of topics of recent interest in inorganic chemistry, including physical methods, syntheses, and structural theories. May be repeated to a maximum of 12 credits. Prereq: CHE 610 or 612.

**CHE 746 TOPICS IN PHYSICAL CHEMISTRY.** (2-4)  
Selected topics which may include photochemistry, structure of crystals, molecular spectra, nature of the chemical bond, and other recent advances in the field of physical chemistry. May be repeated to a maximum of 12 credits. Prereq: CHE 442G.

**CHE 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**CHE 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**CHE 768 RESIDENCE CREDIT FOR MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.

**CHE 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.

**\*CHE 772 SEMINAR IN CHEMISTRY INSTRUCTION.** (1)  
A seminar for teaching assistants on the methods and techniques of effective instruction in laboratory and recitation classes in chemistry. Required of all new graduate teaching assistants. Prereq: Admission to M.S. or Ph.D. program in chemistry.

**CHE 776 GRADUATE SEMINAR.** (1)  
Reports and discussions on recent research and current literature. Required of all graduate students. May be repeated for a total of eight credits.

**CHE 779 MEMBRANE SCIENCES COLLOQUIUM.** (1)  
Outstanding membrane scientists present their current research on biological and/or synthetic membranes. Students read a pertinent paper by the speaker prior to his/her talk and write a short paper on the talk; especially important is relevance of the main points of the talk to membrane science in general and the student's own research in particular. May be repeated to a maximum of six credits. (Same as BCH/CME/PHA/PHR 779.)

**CHE 780 INDIVIDUAL WORK IN CHEMISTRY.** (1-5)  
Selected library and laboratory problems in conformance with the student's interest will be attacked and pursued under the direction of a suitable staff member who is proficient in the area under investigation.

**CHE 790 RESEARCH IN CHEMISTRY. (1-12)**

Work may be taken in the following fields, subject to the approval of the Departmental Graduate Committee: analytical chemistry, industrial chemistry, inorganic chemistry, organic chemistry, radiochemistry, or physical chemistry. May be repeated indefinitely.

## CJT Communication, Journalism, Telecommunications – Graduate Courses

**\*CJT 601 PROSEMINAR IN COMMUNICATION. (3)**

Introduction to graduate study; theory and systems, research strategies. Prereq: Graduate standing in communication or consent of instructor.

**CJT 607 EVALUATING AND COMMUNICATING INFORMATION. (3)**

A study of the communication systems with which students will work, of the effect of the communications systems on public decisions, and of the means by which students work efficiently with communications systems. Prereq: Graduate standing in communications or consent of instructor.

**\*CJT 608 MASS COMMUNICATIONS AND SOCIETY. (3)**

A study of the ways in which the communications media play their roles in contemporary society with special attention to the major functions, rights, and responsibilities of media and individuals. Prereq: Graduate standing in communication or consent of instructor.

**CJT 615 INFORMATION SYSTEMS DESIGN. (3)**

Principles and problems of information systems: systems analysis applied to information systems. Design of information systems with particular attention to equipment, training of personnel and evaluation. Prereq: CJT 601 and graduate standing in communications or consent of instructor.

**\*CJT 619 PROSEMINAR IN INTERNATIONAL/ INTERCULTURAL COMMUNICATION. (3)**

Examines important issues in communication from a global perspective. In-depth study of international communications systems, international information flow, problems that occur in communicating with members of different cultures or subcultures, and development of theories and strategies for improving international communications at the mass, organizational, and interpersonal levels. Prereq: CJT 601 and graduate standing in communication or consent of instructor.

**\*CJT 625 PROSEMINAR IN ORGANIZATIONAL COMMUNICATION. (3)**

This course is an introductory graduate-level survey of theory and research in the area of organizational communication and related topics. Students will be exposed to a variety of current theoretical perspectives and methodological orientations. Prereq: Graduate standing in communication or consent of instructor.

**\*CJT 630 PROSEMINAR IN MASS MEDIA LAW AND PUBLIC POLICY. (3)**

Study of mass communication law and policy-making. Intensive review of court decisions, statutes and administrative rules and regulations regarding libel, privacy, public access to government meetings and documents, intellectual property, broadcast regulation, commercial and corporate speech, obscenity and protection of news sources. Prereq: CJT 601 and graduate standing in communication or consent of instructor.

**\*CJT 631 PROSEMINAR IN INTERPERSONAL COMMUNICATION. (3)**

An examination of theories, methods of investigation, and current developments in the area of interpersonal communication. Prereq: Graduate standing in communication or consent of instructor.

**\*CJT 645 PROSEMINAR IN MASS COMMUNICATION THEORY. (3)**

A broad examination and critical analysis of major mass communication theories and research areas. Prereq: A course in research methods and graduate standing in communication or consent of instructor.

**CJT 650 SIGNS AND SIGN BEHAVIOR. (3)**

A study of syntactic, semantic and pragmatic aspects of language and their relation to communication. Specific topics are covered by the individual student with an outlook toward the research report-proposal. Prereq: Graduate standing in communications or consent of instructor.

**\*CJT 651 COMMUNICATIONS THEORY. (3)**

Major theories of the communications process and review of experiments and field studies on communications. Readings, discussion, and student experiments testing theoretical propositions about communications. Prereq: Graduate standing in communication or consent of instructor.

**CJT 665 COMMUNICATIONS RESEARCH METHODS. (3)**

The scientific method. Communications research as a part of social science research. Study and practice of advanced behavioral research techniques which apply to communications. Prereq: A behavioral research course and graduate standing in communications or consent of instructor.

**CJT 682 COMMUNICATION AND PERSUASION. (3)**

An advanced course examining the literature in communication and attitude change. Issues in measurement, theory, and philosophical orientation are central. Covers communication broadly, including interpersonal, mediated, and mass communication. Prereq: Graduate standing in communications or consent of instructor.

**\*CJT 696 INTERNSHIP IN COMMUNICATION. (3)**

Field experience for candidates for the M.A. degree in any field of communications through work in industry, government, education, research or business agencies. Laboratory, 12 hours per week. Prereq: Admission to M.A. program and 18 hours of graduate work. Consent of DGS required.

**\*CJT 700 DIRECTED READING IN COMMUNICATION. (1-3)**

Individual reading study on some communications aspects not treated in depth in a regular course or of topical interest. Advance consultation regarding reading list and examination procedure required. May be repeated to a maximum of 12 credits. Prereq: Graduate standing in communication or consent of instructor.

**\*CJT 701 ADVANCED TOPICS IN COMMUNICATION THEORY (Subtitle required). (3)**

Study of selected topics important to viewing in perspective the development of communication theories and problems. May be repeated to a maximum of six credits. Prereq: Graduate standing in communication or consent of instructor.

**CJT 705 SEMINAR: INFORMATION SCIENCES. (3)**

An investigation of the parameters of the information sciences from an interdisciplinary approach. Investigation and analysis of the literature of communications, management science, cybernetics, information theory to identify the similarities and differences. From this investigation, both qualitative and quantitative concepts of the directions of information science will be derived. Prereq: CJT 601 and graduate standing in communications or consent of instructor.

**\*CJT 719 SEMINAR IN INTERNATIONAL/ INTERCULTURAL COMMUNICATION (Subtitle required). (3)**

Special Topics/Issues in International/Intercultural Communication examines the current and the alternative perspectives in the field of study. Topics/Issues such as the New World Information and Communication Order, Information/Communication Technologies, Communication and Development, Transborder Data Flows, etc., are studied. May be repeated to a maximum of six credits. Prereq: CJT 619 and graduate standing in communication or consent of instructor.

**\*CJT 721 SEMINAR IN INTRAPERSONAL COMMUNICATION. (3)**

The investigation of a single category of theoretical approaches to communication processing within a single organism. May be repeated. Prereq: Graduate standing in communication or consent of instructor.

**\*CJT 725 SEMINAR IN ORGANIZATIONAL COMMUNICATION: (Subtitle required). (3)**

This course is concerned with theory and research relevant to organizational communication and related areas of interest. Special attention is given to various topics relevant to a specific subtitle. May be repeated to a maximum of six credits under a different subtitle. Prereq: Graduate standing in communication or consent of instructor.

**\*CJT 730 SEMINAR IN MASS MEDIA AND PUBLIC POLICY (Subtitle required). (3)**

The role of mass communications media in making public policy and the effects of public policies on the mass media. One subject area will be investigated each semester; typical topics are (1) political campaign communications; (2) censorship; (3) controversial public issues; (4) rights; (5) international and world agreements. May be repeated to a maximum of six credits under a different subtitle. Prereq: CJT 630 and graduate standing in communication or consent of instructor.

**\*CJT 731 SEMINAR IN INTERPERSONAL COMMUNICATION (Subtitle required). (3)**

Consideration of special problems in interpersonal communication with emphasis on emergence of theory and implications for further research. May be repeated to a maximum of six credits under a different subtitle. Prereq: CJT 631 and graduate standing in communication or consent of instructor.

- \*CJT 745 SEMINAR IN MASS COMMUNICATION (Subtitle required). (3)**  
 Consideration of selected topics in mass communication theory and research. May be repeated under a different subtitle to a maximum of six credits. Prereq: Graduate standing in communication or consent of instructor.
- CJT 748 MASTER'S THESIS RESEARCH. (0)**  
 Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.
- CJT 749 DISSERTATION RESEARCH. (0)**  
 Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.
- CJT 765 COMMUNICATION RESEARCH DESIGN. (3)**  
 An intermediate course in the design of communication studies. May be repeated to a maximum of six credits. Prereq: CJT 665 or the equivalent and graduate standing in communications or consent of instructor.
- CJT 767 QUALITATIVE METHODS IN COMMUNICATION RESEARCH. (3)**  
 This seminar treats the underlying assumptions and methodological techniques of qualitative study in communication research. May be repeated to a maximum of six credits. Prereq: Graduate standing and CJT 665 or equivalent.
- CJT 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
 May be repeated to a maximum of 12 hours.
- CJT 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE. (0-12)**  
 May be repeated indefinitely. Prereq: Satisfactory completion of Qualifying Examination (third year).
- CJT 771 SEMINAR IN HEALTH COMMUNICATION. (3)**  
 A topical seminar discussing issues in the field of health communication from a variety of perspectives, e.g., the relevance of interpersonal, international and intercultural and mass communication processes to the quality and availability of health care. May be repeated to a maximum of six credits.
- CJT 780 SPECIAL TOPICS IN COMMUNICATION (Subtitle required). (3)**  
 Professors will conduct research seminars in topics or problems in which they have special research interests. May be repeated to a maximum of six credits. Prereq: At least one year of graduate study in communication.
- CJT 781 DIRECTED STUDY IN COMMUNICATION. (1-6)**  
 To provide advanced students with an opportunity for independent work to be conducted in regular consultation with the instructor. May be repeated to a maximum of six credits. (To be used for independent work.) Prereq: Consent of instructor.
- \*CJT 782 SEMINAR IN STRATEGIC COMMUNICATION (Subtitle required). (3)**  
 This course is concerned with advanced theory and research in strategic communication and social influence. Special attention may be given to compliance gaining, negotiation, self-presentation, deception or other types of strategic interaction. May be repeated to a maximum of six credits under a different subtitle. Prereq: Graduate standing in communication or consent of instructor.
- CJT 790 RESEARCH PROBLEMS IN COMMUNICATION. (1-6)**  
 Intensive study in communications with qualified staff members. Research paper is required. May be repeated to a maximum of 12 credits. Prereq: Satisfactory completion of Preliminary Examination (second year) and consent of instructor.

## CLA Classical Languages and Literatures

### COURSES IN ENGLISH

(No knowledge of Greek or Latin expected.)

- CLA 131 MEDICAL TERMINOLOGY FROM GREEK AND LATIN. (3)**  
 Latin and Greek roots, prefixes, and suffixes as found in medical terminology. Primarily for pre-medical, pre-dental, pre-nursing and pre-veterinary students, but others will be admitted for help in vocabulary building.
- CLA 210 THE ART OF GREECE AND ROME. (3)**  
 A survey of the major forms of art in ancient Western Asia, Greece, and Rome, with emphasis on the comparative typology and cultural significance of the monuments.
- CLA 229 THE ANCIENT NEAR EAST AND GREECE TO THE DEATH OF ALEXANDER THE GREAT. (3)**  
 Covers the birth of civilization in Egypt and Mesopotamia, and the history of the ancient Near East and Greece to the conquest of Greece by Philip of Macedon. (Same as HIS 229.)
- CLA 230 THE HELLENISTIC WORLD AND ROME TO THE DEATH OF CONSTANTINE. (3)**  
 Covers the conquests of Alexander the Great, and the main features of the Hellenistic World, the Roman Republic and the Roman Empire to the death of Constantine. (Same as HIS 230.)
- CLA 235 CLASSICAL MYTHOLOGY. (3)**  
 The Greek myths studied both from the standpoint of their meaning to the Greeks and Romans and from the standpoint of their use in later literature and in everyday life.
- CLA 261 LITERARY MASTERPIECES OF GREECE AND ROME. (3)**  
 A survey of major Greek and Roman literary works. Attention will be focused on the various genres of Classical literature, and the course will include comparative analysis of Greek and Latin literary pieces.
- CLA 312 ART OF GREECE. (3)**  
 Study of the art and architecture of Greece from Mycenaean through Hellenistic times. Emphasis will be on interpreting the arts of Greece of the 5th and 4th centuries B.C. in the context of the political, social, and intellectual life of Classical Athens. Prereq: A-H 105 recommended. (Same as A-H 312.)
- CLA 313 ROMAN ART. (3)**  
 Study of the art and architecture of Rome from the early Republic through the age of Constantine. Attention will focus on painting, sculpture and architecture as reflections of political, social and cultural developments in the Roman world. Prereq: A-H 105 recommended. (Same as A-H 313.)
- CLA 390 ROMAN, JEW AND GREEK: BACKGROUNDS TO CHRISTIANITY. (3)**  
 A survey of the development of Christian literature in the first four centuries. Attention will be focused on the efforts of the Christian community to achieve its own identity and to resolve the conflicts which it faced with Judaism, with the Graeco-Roman world and within itself.
- CLA 395 INDEPENDENT STUDY IN GREEK. (1-3)**  
 Study of an author (e.g. Plato), a work (e.g. the Iliad), or a topic (e.g. prose syntax and style). All readings are in Greek. May be repeated to a maximum of 12 credits with different topics. Prereq: CLA 252 or equivalent, and consent of director of undergraduate studies and instructor.
- CLA 425G THE HEROIC IDEAL: GREEK AND ROMAN EPIC. (3)**  
 A study of the epic genre as developed in the works of major Greek and Latin writers. Attention will be focused on the cultural background of each author and his contribution to the genre as a whole. In addition to Homer and Virgil, the course will normally include the study of Apollonius and Lucan.
- CLA 426G CLASSICAL DRAMA: TRAGEDY AND COMEDY IN GREECE AND ROME. (3)**  
 A study of the development of tragedy and comedy in the ancient world. Attention will be focused on the cultural dimension of each form and the contributions made by individual authors. Emphasis will be placed on Greek tragedy and Roman comedy.

**CLA 450G SPECIAL TOPICS IN CLASSICAL LITERATURE IN TRANSLATION (Subtitle required). (3)**

Each offering of the course is devoted to advanced study of a particular topic in classical literature not covered in other CLA courses, or to a topic in the history of European and North American Latin-language literature, or the classical literary tradition. Examples of such topics are Greek and Latin historiography, classical rhetoric, Latin satire, classical philosophical prose, classical literature and the modern cinema, Latin literature of the Middle Ages and Renaissance. Lectures and discussions, assigned and supplementary readings, paper writing. May be repeated to a maximum of nine credits with different topics.

**CLA 509 ROMAN LAW. (3)**

An historical introduction to the development of Roman law, from the Twelve Tables through the Codex Justinianus. (Same as HIS 509.)

**COURSES IN LATIN**

**CLA 101 ELEMENTARY LATIN. (4)**

An introduction to the study of classical Latin. Emphasis is placed on learning to read the language. Some attention is given to Latin literature and Roman civilization.

**CLA 102 ELEMENTARY LATIN. (4)**

A continuation of CLA 101. Prereq: CLA 101 or the equivalent.

**CLA 201 INTERMEDIATE LATIN. (3)**

Review of grammatical principles together with readings from Latin prose and poetry. Selections from a wide range of authors will be included in order to demonstrate the diversity and appeal of Latin literature. Emphasis is placed on developing reading ability. Prereq: CLA 102 or two years of high school Latin or equivalent.

**CLA 202 INTERMEDIATE LATIN. (3)**

A continuation of CLA 201. Prereq: CLA 201 or three years of high school Latin or equivalent.

**CLA 301 LATIN LITERATURE I (Subtitle required). (3)**

An introduction to the literature of Republican Rome with selected readings of complete works from the major Latin authors. Lectures and class discussions on the various genres, styles, and themes of Latin literature. Topics vary every time the course is offered. May be repeated once under a different subtitle. Prereq: CLA 202 or equivalent.

**CLA 302 LATIN LITERATURE II (Subtitle required). (3)**

An introduction to the literature of Imperial Rome with selected readings of complete works from the major Latin authors. Lectures and class discussions on the various genres, styles, and themes of Latin literature. Topics vary every time the course is offered. May be repeated once under a different subtitle. Prereq: CLA 202 or equivalent.

**CLA 522 ROMAN REPUBLICAN PROSE (Subtitle required). (3)**

A study of one or more works selected from prose writings from the beginnings of Roman literary history to 31 B.C. Authors include Cicero, Caesar, Sallust, and others; genres include history, philosophy, rhetoric and oratory, letters, and others. Textual analysis is emphasized, with lectures and class discussion on the literary milieu. Topics vary every time the course is offered. May be repeated to a maximum of nine credits under a different subtitle. Prereq: CLA 301 or equivalent.

**CLA 523 ROMAN REPUBLICAN POETRY (Subtitle required). (3)**

A study of one or more works selected from poetry from the beginnings of Roman literary history to 31 B.C. Authors include Plautus, Terence, Lucretius, Catallus, and others; genres include drama, lyric poetry, didactic poetry, satire, and others. Textual analysis is emphasized, with lectures and class discussion on the literary milieu. Topics vary every time the course is offered. May be repeated to a maximum of nine credits under a different subtitle. Prereq: CLA 301 or equivalent.

**CLA 526 ROMAN IMPERIAL PROSE (Subtitle required). (3)**

A study of one or more works selected from prose writings from approximately 31 B.C. to the end of the Western Empire. Authors include Livy, Petronius, Tacitus, Pliny, Suetonius, Seneca, Quintilian, Augustine, and others; genres include history, philosophy, biography, letters, fiction, and others. Textual analysis is emphasized, with lectures and class discussion on the literary milieu. Topics vary every time the course is offered. May be repeated to maximum of nine credits under a different subtitle. Prereq: CLA 301 or equivalent.

**CLA 527 ROMAN IMPERIAL POETRY (Subtitle required). (3)**

A study of one or more works selected from poetry from approximately 31 B.C. to the end of the Western Empire. Authors include Virgil, Horace, Propertius, Tibullus, Ovid, Juvenal, Martial, and others; genres include epic, lyric, elegiac, satire, pastoral, and others. Textual analysis is emphasized, with lectures and class discussion on the literary milieu. Topics vary every time the course is offered. May be repeated to a maximum of nine credits under a different subtitle. Prereq: CLA 301 or equivalent.

**CLA 603 STUDIES IN LATIN LITERATURE OF THE REPUBLIC (Subtitle required). (3)**

Intensive study of an author, a literary form, or a problem in the period of the Roman Republic. Considerable attention to secondary sources; students will write papers and present oral reports in class. May be repeated to a maximum of nine hours.

**CLA 604 STUDIES IN LATIN LITERATURE OF THE EMPIRE (Subtitle required). (3)**

Intensive study of an author, a literary form, or a problem in the period of the Roman Empire. Considerable attention to secondary sources; students will write papers and present oral reports in class. May be repeated to a maximum of nine hours.

**COURSES IN GREEK**

**CLA 151 ELEMENTARY GREEK. (4)**

An introduction to the study of Classical Greek. Emphasis is placed on learning to read the language. Some attention is given to Greek literature and civilization.

**CLA 152 ELEMENTARY GREEK. (4)**

A continuation of CLA 151. Prereq: CLA 151 or equivalent.

**CLA 251 INTERMEDIATE GREEK. (3)**

Review of grammatical principles together with readings from Greek prose and poetry. Selections from a wide range of authors will be included in order to demonstrate the diversity and appeal of Greek literature. Emphasis is placed on developing reading ability. Prereq: CLA 152 or equivalent.

**CLA 252 INTERMEDIATE GREEK. (3)**

The reading of Greek prose and poetry. Textual and literary analysis of selections from classical authors and the New Testament. Prereq: CLA 251 or equivalent.

**CLA 395 INDEPENDENT STUDY IN GREEK. (1-3)**

Study of an author (e.g. Plato), a work (e.g. the Iliad), or a topic (e.g. prose syntax and style). All readings are in Greek. May be repeated to a maximum of 12 credits with different topics. Prereq: CLA 252 or equivalent, and consent of director of undergraduate studies and instructor.

**CLA 552 GREEK EPIC AND LYRIC POETRY. (3)**

A study of the two genres as exemplified in Homer, Hesiod, the Homeric Hymns and the early Greek Lyricists. Emphasis on textual analysis with lectures and class discussions on the authors' literary milieu. Prereq: CLA 252 or equivalent.

**CLA 553 GREEK PHILOSOPHICAL LITERATURE. (3)**

A study of Greek philosophical literature as exemplified in Plato, Aristotle and other philosophical writers. Emphasis on textual analysis with lectures and class discussions on the authors' literary milieu. Prereq: CLA 252 or equivalent.

**CLA 556 GREEK DRAMATIC LITERATURE. (3)**

A study of the Greek drama through selected plays of the major tragic and comic writers. Emphasis on textual analysis with lectures and class discussions on the authors' literary milieu. Prereq: CLA 252 or equivalent.

**CLA 557 GREEK HISTORICAL LITERATURE. (3)**

A study of the Greek historiographical tradition as exemplified in Herodotus, Thucydides and other Greek historians. Emphasis on textual analysis with lectures and class discussions on the authors' literary milieu. Prereq: CLA 252 or equivalent.

**CLA 601 STUDIES IN GREEK LITERATURE I (Subtitle required). (3)**

Intensive study of an author, a literary form or a problem in the period from Homer through the Fifth Century, B.C. Considerable attention will be focused on secondary sources; students will write papers and present oral reports in class. May be repeated to a maximum of nine hours.

**CLA 602 STUDIES IN GREEK LITERATURE II (Subtitle required). (3)**

Intensive study of an author, a literary form or a problem in the period from the Fourth Century, B.C. through the Third Century, A.D. Considerable attention will be focused on secondary sources; students will write papers and present oral reports in class. May be repeated to a maximum of nine hours.

**CLASSICS IN GENERAL**

**CLA 511, 512 STUDIES IN ROMAN PHILOLOGY. (3 ea.)**

Courses to meet the needs of students in various areas of Roman philology, e.g., in Latin literature, in Roman civilization, in Latin linguistics, etc. May be repeated to a maximum of nine hours. Prereq: Consent of instructor.

**CLA 530 THE TEACHING OF LATIN. (3)**

The place of Latin and the classical humanities in general education. Objectives, materials, and methods. The reading approach to learning Latin. Evaluation of textbooks and other materials. Prereq: Senior standing.

**CLA 561, 562 STUDIES IN GREEK PHILOLOGY. (3 ea.)**

Courses to meet the needs of students in various areas of Greek philology, e.g., in Greek literature, in Greek civilization, in Greek linguistics, etc. May be repeated to a maximum of nine hours. Prereq: Consent of instructor.

**CLA 580 INDEPENDENT WORK IN CLASSICS. (3)**

Courses to meet the needs of the student, including those who wish to study Medieval and/or Renaissance Latin, will be arranged in various areas. May be repeated to a maximum of 12 credits. Prereq: Major standing of 3.0 in the department or consent of instructor.

**CLA 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**CLA 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**CLA 790 RESEARCH IN THE TEACHING OF CLASSICAL LANGUAGES. (3)**

Problems in the teaching of Latin and/or Greek in secondary and/or higher education. Objectives, methods, preparation of materials, development of curricula, or the history of the field. Prereq: CLA 530 or the equivalent.

## CLS Clinical Laboratory Sciences

**CLS 120 CLINICAL LABORATORY SCIENCES AS A CAREER. (1)**

Presentation of information about the various careers in clinical laboratory science via lectures, demonstrations and field trips. Open to students wishing to explore the field of clinical laboratory sciences.

**CLS 130 INTRODUCTION TO CLINICAL LABORATORY SCIENCES. (1)**

Through lectures, demonstrations and audiovisuals, students are introduced to disease processes, their manifestations, and laboratory studies used for diagnoses and prognoses. Open to students wishing to explore the field of clinical laboratory sciences.

**CLS 501 SEMINAR IN ADVANCED HEMATOLOGY. (2)**

Study of the biochemical aspects of blood cell physiology and kinetics as applied to practice in the clinical hematology laboratory and a review of current related literature. This course is designed for practicing clinical laboratorians or medical technologists who are pursuing a graduate degree. Prereq: BCH 401G or equivalent and consent of instructor.

**CLS 610 ETHICS IN CLINICAL SCIENCES RESEARCH. (1)**

Students will examine ethical issues in biomedical research using a case-study approach. Representative issues addressed may include data selection and retention, plagiarism, scientific review of grants and manuscripts, scientific misconduct, and informed consent. Prereq: Graduate student status. (Same as CD/CNU/PT/RAS 610.)

**CLS 801 INTRODUCTION TO LABORATORY METHODOLOGY. (1)**

This course is designed to develop basic laboratory skills needed for the clinical laboratory sciences curriculum. Required for new junior students. Lecture, one hour; laboratory, four hours for four weeks. Prereq: Admission to the clinical laboratory sciences professional program.

**CLS 802 CLINICAL LABORATORY METHODS. (1)**

This is a four-week course designed to develop skills and didactic content related to laboratory techniques and procedures common to all areas of the clinical laboratory. Required for second-semester juniors in the CLS professional curriculum. There will be a total of eight lectures and eight laboratory periods in the course. Lecture, two hours; laboratory, six hours per week. Prereq: Admission to the professional curriculum or consent of instructor.

**CLS 809 FUNDAMENTALS OF CLINICAL LABORATORY SCIENCE I. (4)**

This course is presented only within the four-week intersession. The course will be presented in modular form and will: 1) develop basic laboratory skills in clinical laboratory sciences; 2) study the qualitative and quantitative chemical and microscopic constituents of urine, cerebrospinal fluid and other body fluids; and 3) study cellular and humoral immunity with emphasis on the laboratory procedures used to evaluate the immune status. Lecture, eight hours; laboratory, twenty-four hours per week. Prereq: B.S. degree in a related science; one course each in biochemistry and microbiology, or their equivalents.

**CLS 810 FUNDAMENTALS OF CLINICAL LABORATORY SCIENCE II. (8)**

This course is a continuation of CLS 809. The course will be presented in modular form and will cover: 1) basic methodologies and instrumentation principle of Clinical Chemistry; 2) introduction to hematologic methods and procedures; and 3) application of serologic laboratory methods and principles. Lecture, eight hours; laboratory, twenty-four hours per week. Prereq: Completion of CLS 809.

**CLS 815 HISTOTECHNOLOGY I. (3)**

The study of basic principles of fixation, processing, infiltration, and embedding techniques and their application for human and animal tissues. Lecture, two hours; laboratory, two hours per week. Prereq: High school science courses.

**CLS 816 HISTOTECHNOLOGY II. (3)**

The study of principles and applications of microtomy, frozen sectioning and some special staining techniques.

**CLS 817 HISTOTECHNOLOGY III. (3)**

A study of the histologic technique and microscopic anatomy of human tissues using routine hematoxylin and eosin, immunoperoxidase and special stains. Emphasis will be placed on proper preparation of stains and their uses, as well as on microscopic examination for interpretation of properly prepared slides. Demonstration slides will be studied in the laboratory. Lecture, two hours; laboratory, two hours per week. Prereq: CLS 815 and CLS 816.

**\*CLS 822 BIOCHEMISTRY FOR CLINICAL SCIENCES. (3)**

A presentation of the biochemistry of carbohydrates, lipids, proteins, amino acids and nucleic acids and exploration of major metabolic pathways as the basis of clinical chemistry. Case studies will be used to emphasize the role of biochemistry in the understanding of clinical science. Prereq: CHE 105, 107 and 115, CHE 230 or CHE 236 or equivalent and consent of instructor.

**†CLS 825 BASIC PHYSIOLOGY FOR THE HEALTH SCIENCES.****\*CLS 832 GENERAL CLINICAL CHEMISTRY AND INSTRUMENTATION. (4)**

A course covering the theory and practice of general clinical chemistry laboratory testing. Emphasis is on laboratory testing, quality control, introduction of instrumentation principles, troubleshooting potential laboratory problems and concern for the accuracy of patient results and their confidentiality. Lecture, four hours per week; laboratory, 12 hours per week for seven weeks. Prereq: Admission to the clinical laboratory sciences professional program, Biochemistry (CLS 822 or equivalent) may be taken concurrently.

**\*CLS 833 CLINICAL HEMATOLOGY AND BODY FLUID ANALYSIS. (4)**

This course will cover the basic theory and practice of clinical hematology, hemostasis and body fluids. Both manual and automated techniques in blood cell and body fluid analysis will be covered. Laboratory reporting, quality control and concern for the patient will be emphasized throughout the course. Lecture, four hours per week; laboratory, 12 hours per week for seven weeks. Prereq: Admission to the Clinical Laboratory Sciences professional program.

**\*CLS 835 CLINICAL IMMUNOLOGY. (4)**

An overview of immunology with a molecular biological basis for the immune responses and the role of genetics in immunological disorders. Molecular biological techniques in the modern clinical laboratory will be emphasized. Prereq: MLT/CLT certification or consent of the instructor.

**CLS 836 LABORATORY ORGANIZATION AND MANAGEMENT. (3)**

An overview of management with an emphasis of problem solving in the clinical laboratory setting. Content will include the management process, managing change, motivation, personnel issues, regulatory issues, delegation, problem solving, leadership, quality improvement strategies and techniques and other relevant topics. Prereq: Admission to the Clinical Laboratory Sciences professional program.



## †CLS 837 COMPUTER APPLICATIONS IN CLINICAL SCIENCES.

## #CLS 838 INTRODUCTION TO IMMUNOHEMATOLOGY. (4)

Introduction to the principles and practice of blood banking including blood group systems, routine serologic testing, blood collection and processing and component therapy. Lecture, four hours; laboratory 12 hours per week for six weeks. Prereq: CLS 835 or consent of instructor.

## #CLS 839 SCIENTIFIC WRITING AND PRESENTATIONS. (2)

An introduction to basic research skills including computer assisted search of professional literature, critical analysis of journal reports, design of a simple research study and the necessary skills for both oral and poster presentations of research findings. Two lectures/discussion per week. Prereq: Admission to the Clinical Laboratory Science professional program or consent of instructor.

## \*CLS 843 ADVANCED CLINICAL HEMATOLOGY. (3)

A study of the principles of hematologic disease processes with emphasis on correlation of laboratory data with disease quality control and problem solving. The lectures will cover the major hematologic disorders as well as advanced techniques for evaluation of blood cells such as cytochemistry, cytoflow and molecular biological methods. The laboratories will be devoted to practice in blood cell identification and problem solving using case studies and problem based learning techniques. Lecture, four hours per week; laboratory 12 hours per week for five weeks. Prereq: CLS 833 or MLT/CLT certification or consent of instructor.

## \*CLS 844 ADVANCED CLINICAL CHEMISTRY. (3)

A study of specialized clinical chemistry testing which will include toxicology, therapeutic drug monitoring, endocrine function and testing as well as quality assurance issues. The theory and evaluation of methodologies involved in the quantitation of these substances and compounds will be discussed in lecture and demonstrated in laboratory. Lecture, four hours per week; laboratory, 12 hours per week for six weeks. Prereq: Admission to the Clinical Laboratory Sciences professional curriculum, CLS 832 or CLS 872; biochemistry and immunology courses, or consent of instructor.

## #CLS 845 CLINICAL IMMUNOLOGY AND SEROLOGY I. (3)

An overview and introduction to the field of immunology will be presented with a focus as to the clinical application of the subject matter. Emphasis will concentrate on the molecular and genetic aspects as they relate to disorders of the immune system. Wherever possible, modern advances such as molecular biological techniques will be emphasized. Prereq: Admission to the Clinical Laboratory Sciences professional program or consent of instructor.

## †CLS 846 BODY FLUID ANALYSIS.

## #CLS 848 ADVANCED IMMUNOHEMATOLOGY. (4)

This course emphasizes clinical interpretation and problem solving. Antibody identification, selection of blood components, transfusion complications, hemolytic disease of the newborn, autoimmune hemolytic anemias and quality assurance are included. Lecture, four hours; laboratory, 12 hours per week for six weeks. Prereq: CLS 838 or MLT/CLT certification or consent of instructor.

## \*CLS 851 INTRODUCTION OF CLINICAL BACTERIOLOGY. (4)

This course will cover medically significant bacteria, including commensals and normal flora, as well as pathogens. Also covered will be microbial physiology, interactions between host and pathogenic bacteria, and the clinical and epidemiological consequences of these interactions. The laboratory will cover conventional microscopic, cultural and immunological techniques used for the recovery, isolation and identification of clinically significant bacteria. Lecture, four hours per week; laboratory, 12 hours per week. Prereq: Admission to the Clinical Laboratory Sciences program or consent of instructor.

## †CLS 852 BASICS OF CLINICAL MICROBIOLOGY LAB.

## †CLS 854 MEDICAL PARASITOLOGY.

## \*CLS 855 CLINICAL IMMUNOLOGY AND SEROLOGY II. (4)

An overview and introduction to the field of immunology will be presented with a focus as to the clinical application of the subject matter. Emphasis will concentrate on the molecular and genetic aspects as they relate to disorders of the immune system. Wherever possible, modern advances such as molecular biological techniques will be emphasized. Lecture, three hours per week; laboratory, three hours per week. Prereq: CLS 845 or consent of instructor.

## \*CLS 856 ADVANCED MICROBIOLOGY. (3)

Course content will cover medically important bacteria, with an emphasis on anaerobes and mycobacteria, and clinically significant fungi, parasites and viruses. The laboratory will focus on the isolation and identification of pathogenic and opportunistic fungi, viruses, parasites, and difficult-to-isolate bacteria from clinical specimens. Knowledge from Clinical Bacteriology will be applied, and theories and advanced techniques used for the diagnosis of bacterial, fungal, viral and parasitic human disease will be presented. Lecture; four hours per week; laboratory, eight hours per week. Prereq: Admission to the Clinical Laboratory Sciences professional program, completion of CLS 851 or equivalent or consent of instructor.

## †CLS 857 MEDICAL MYCOLOGY.

## CLS 858 IMMUNOHEMATOLOGY LECTURES. (3)

Study of immunohematology and blood banking applications in transfusion medicine. This course includes collection and processing of blood, blood group systems, and the handling of special problems in blood banking, such as transplantation. Prereq: Admission to the clinical laboratory sciences professional program and CLS 435 or equivalent.

## \*CLS 860 BLOOD COLLECTION I. (1)

Experience collecting venous blood specimens for laboratory testing. Students will receive instructions on proper procedures for phlebotomy and will practice on mannequin arms and each other prior to collecting blood from adult ambulatory and bed patients. Offered on a Pass/Fail basis only. Prereq: Admission to the Clinical Laboratory Sciences program or consent of instructor.

## #CLS 861 BLOOD COLLECTION II. (1)

Advanced experience in collecting venous blood and capillary blood specimens for many types of studies. This will include collection from pediatric and nursery patients. Offered on a Pass/Fail basis only. Prereq: Admission to Clinical Laboratory Sciences professional program or consent of instructor.

## CLS 863 CLINICAL HEMATOLOGY LABORATORY. (3)

Practice and mastery of the basic skills required in a clinical hematology laboratory to include particle counting, cellular morphology and coagulation with an introduction to special methodologies used in clinical hematology for the diagnosis of diseases. Laboratory, six hours. Prereq: Concurrent registration in CLS 843.

## †CLS 864 CLINICAL CHEMISTRY LABORATORY.

## †CLS 866 CLINICAL BACTERIOLOGY LABORATORY.

## #CLS 867 EDUCATIONAL PRINCIPLES IN CLS. (1)

This course provides the skills necessary to prepare, present and evaluate educational presentations and student supervision in the clinical laboratory and continuing education environments. Students develop a presentation which includes topic selection, writing educational objectives, selecting audiovisual equipment, preparing audiovisual and handout materials, writing evaluation questions and an oral presentation. The principles of clinical education supervision are also provided. Prereq: Admission to the Clinical Laboratory Sciences professional program or consent of instructor.

## CLS 868 IMMUNOHEMATOLOGY AND BLOOD BANKING LABORATORY. (2)

Practice and mastery of the basic skills required in blood banking, including: determination of blood type, detection and identification of antibodies, compatibility testing and special techniques needed in diagnosis of immunohematologic disorders. Laboratory, four hours per week. Concur: CLS 858.

## †CLS 870 CLINICAL LABORATORY SCIENCES SEMINAR.

## CLS 871 SURVEY OF HEMATOLOGY AND LABORATORY MATH. (2)

An overview of basic mathematical computations used in common laboratory procedures. A review of structure, function and identification of abnormal blood cells. Prereq: Associate degree in Medical Laboratory Technology.

## \*CLS 872 CLINICAL CHEMISTRY SURVEY. (1)

An overview of the theory and practice of clinical chemistry, including instrumentation and calculations. Prereq: Admission to the Clinical Laboratory Sciences program or consent of instructor.

## \*CLS 880 CLINICAL PRACTICUM IN CLINICAL LABORATORY SCIENCES. (8)

A supervised clinical practicum which integrates theory and practice in routine clinical chemistry, hematology, blood bank and microbiology. In addition, students, will present 1-2 case studies that address the role of the clinical laboratory in diagnosis and treatment of disease. Offered on a Pass/Fail basis only. Laboratory, 30-40 hours per week for eight weeks. Prereq: Completion of junior year clinical laboratory science courses.

- CLS 881 PRACTICUM IN BLOOD BANKING. (1-4)**  
A supervised clinical practicum in which theory and practice in blood banking are integrated. May be repeated to a maximum of four credits. Lecture, 1 hour; laboratory, 35-40 hours per week. Prereq: CLS 858 or equivalent.
- CLS 882 PRACTICUM IN CLINICAL CHEMISTRY. (1-4)**  
A supervised clinical practicum in which theory and practice in clinical chemistry are integrated. May be repeated to a maximum of four credits. Lecture, 1 hour; laboratory, 35-40 hours per week. Prereq: CLS 844 and CLS 864.
- CLS 883 PRACTICUM IN CLINICAL HEMATOLOGY. (1-4)**  
A supervised clinical practicum in which theory and practice in hematology are integrated. May be repeated to a maximum of four credits. Lecture, 1 hour; laboratory, 35-40 hours per week. Prereq: CLS 843 and CLS 863.
- CLS 884 PRACTICUM IN CLINICAL MICROBIOLOGY. (1-4)**  
A supervised clinical practicum in which theory and practice in microbiology are integrated. May be repeated to a maximum of four credits. Lecture, 1 hour; laboratory, 35-40 hours per week. Prereq: CLS 854, 856, 857, 866.
- CLS 885 SPECIAL TOPICS PRACTICUM. (1-8)**  
This course offers students an opportunity to observe and learn in areas of clinical laboratory sciences not found in the routine laboratory, such as flow cytometry, electron microscopy, DNA analysis. Rotations are arranged to meet needs of each student. May be repeated to a maximum of eight credits. Laboratory, 35-40 hours per week. Prereq: Enrollment in CLS professional program or consent of Division Chair.
- #CLS 890 RESEARCH IN CLINICAL LABORATORY SCIENCES. (5)**  
Students will participate in defining and solving problems within the clinical laboratory. Students will apply the principles of research technique to identify, correlate and analyze problems arising from technical methods, disease correlation, or other pertinent problem areas in laboratory sciences. Students will use library sources, computer skills, and presentation skills in the pursuit of solutions to identified problems. Lecture, eight hours; laboratory, 16 hours per week for five weeks. Prereq: CLS 839 and senior standing within the professional curriculum.
- CLS 895 ADVANCED TOPICS IN CLINICAL LABORATORY SCIENCES (INDEPENDENT STUDY). (1-6)**  
An elective for students in selected subjects in-depth or carry out a limited laboratory project. Prereq: Consent of Division Chair.

## CME Chemical Engineering

- CME 006 THE ENGINEERING PROFESSION (JUNIOR AND SENIOR). (0)**  
Activities of the Student Chapter of the American Institute of Chemical Engineers (for junior and senior year chemical engineering students). Lecture: one hour per week. May be repeated three times. Prereq: Chemical engineering major.
- CME 101 INTRODUCTION TO CHEMICAL ENGINEERING. (1)**  
An introduction to the chemical engineering profession including: problem-solving techniques, use of computers, computer problems and lectures by practitioners.
- CME 200 PROCESS PRINCIPLES. (3)**  
A course in material and energy balances, units, conversions, tie elements, recycle, bypass, equations of state, heat effects, phase transitions, and the first and second laws of thermodynamics applications in separation processes involving equilibrium reactions and energy exchange. Prereq: CHE 115, CS 221; "C" grade or better in MA 113; "C" average or better in CHE 105 and CHE 107; prereq or concur: MA 114, PHY 231.
- CME 320 ENGINEERING THERMODYNAMICS. (4)**  
Fundamentals of thermodynamics, review of first law, second and third laws, VL, LL and SL equilibria, homogeneous and heterogeneous chemical reaction equilibria. Prereq: CME 200, MA 213, PHY 231.
- \*CME 330 FLUID MECHANICS. (3)**  
Introduction to the physical properties of fluids, fluid statics. Equations of conservation of mass, momentum and energy for systems and control volumes. Dimensional analysis and similarity. Principles of inviscid and real fluid flows; flow through pipes and around bodies. Application and design of fluid handling systems. Prereq: Engineering standing, ME 220 or CME 200, CS 221 and MA 214. (Same as ME 330.)
- CME 395 SPECIAL PROBLEMS IN CHEMICAL ENGINEERING. (1-3)**  
Individual work on some selected problems in the field of chemical engineering. May be repeated one time. Prereq: Engineering standing and approval of the chairperson of the department.
- CME 415 SEPARATION PROCESSES. (3)**  
Separations based on both equilibrium stage concepts and mass transfer rate control are addressed for a range of chemical process operations, including distillation, gas absorption, extraction, adsorption, and membrane-based processes. Design problems are conceived to require computer-aided modeling and analysis. Prereq: CME 320, engineering standing.
- CME 420 PROCESS MODELING IN CHEMICAL ENGINEERING. (3)**  
Applications of principles of material and energy balances, thermodynamics, heat and mass transfer, physical chemistry and numerical methods to problems in separation and transport processes and reactive systems. Prereq: CS 221, MA 214; prereq or concur: CME 320, ME 330, engineering standing.
- CME 425 HEAT AND MASS TRANSFER. (4)**  
Fundamental principles of conduction and convective heat transfer, and diffusional and convective mass transfer. Design applications to heat exchanges and packed bed absorbers. Prereq: CME 320, ME 330, engineering standing.
- CME 433 CHEMICAL ENGINEERING LABORATORY. (3)**  
A laboratory course emphasizing experimental work in the areas of fluid flow, heat transfer, mass transfer, and chemical reaction kinetics. Special consideration is given to the development of experimental acumen, mathematical and statistical data handling, report writing, and oral presentation. Lecture, one hour; laboratory, six hours per week. Prereq: CME 415, 420, 425; concur: CME 550, engineering standing.
- CME 455 CHEMICAL ENGINEERING PROCESS DESIGN I. (3)**  
A lecture and problem-solving course devoted to the study of chemical engineering economics as it applies to the design of chemical process units and systems. Prereq: CME 415, CME 420, CME 425, ME 330, CS 221, and engineering standing.
- CME 456 CHEMICAL ENGINEERING PROCESS DESIGN II. (4)**  
A lecture and problem-solving course intended to combine the principles of chemical engineering with optimization as they apply to the design of chemical processes. Results of each design case studied will be presented by both oral and written reports. Prereq: COM 199, CME 455, CME 550 and engineering standing.
- CME 462 PROCESS CONTROL. (3)**  
Basic theory of automatic control devices and their application in industrial chemical plants is emphasized. Identification of control objectives, appropriate measurements and manipulations, and possible loops between these, requires integration of the control system with the original process design. Interactions between process units are analyzed using well-known analytical tools and design strategies. Prereq: Consent of instructor.
- CME 470 PROFESSIONALISM, ETHICS AND SAFETY. (1)**  
Detailed lectures and supervised discussions on standards of ethics and safety as they relate to the engineering profession. Emphasis will be on safety in plant design and safety practice in the laboratory and plant. Sociologic problems inherent with air, water and waste management and professional ethics will be addressed. Prereq: Engineering standing.
- CME 471 SEMINAR. (1)**  
Students carry out literature searches on assigned topics in engineering, prepare for and deliver formal and informal talks at least every two weeks, and submit written summaries of these presentations. Lecture, two hours per week. Prereq: COM 199 and engineering standing.
- CME 505 ANALYSIS OF CHEMICAL ENGINEERING PROBLEMS. (3)**  
The application of differential and integral equations to traditional and non-traditional chemical engineering problems. Prereq: CME 425, CME 550 concurrent or consent of instructor.
- CME 515 AIR POLLUTION CONTROL. (3)**  
Kinetics and equilibria of photochemical and "dark" atmospheric reactions. Atmospheric statics and dynamics including lapse rates, inversions, and vertical and horizontal air motion. Single and area source diffusion. Stack meteorology. Prereq: CME 320 or ME 220.

**CME 550 CHEMICAL REACTOR DESIGN. (3)**

A lecture and problem course dealing with interpretation of rate data and development of performance equations for single and multiple reactor systems. A design problem will be selected for an industrially important chemical reaction system requiring computer solution. Prereq: CS 221, CME 420, CME 425, and engineering standing, or consent of instructor.

**CME 552 POLYMERIC MATERIALS. (3)**

Relating properties to structure; properties of polymer materials, mechanical, electrical and thermal properties of amorphous and crystalline polymers, molding and fabrication, polymers as additives, biomedical application, selection of polymers, design. Prereq: CHE 230 or CHE 236, or consent of instructor. (Same as MSE 552.)

**CME 554 CHEMICAL AND PHYSICAL PROCESSING OF POLYMER SYSTEMS. (3)**

Theory related to the chemical and physical processing of polymer systems, polymer chemistry, non-Newtonian flow behavior, stress and strain tensors, polymer processing operations and technology. Prereq: CHE 232 and CME 425, or consent of instructor. (Same as MSE 554.)

**CME 558 PRINCIPLES OF POLYMER CHARACTERIZATION AND ANALYSIS. (3)**

A lecture course exploring the fundamental chemical and physical aspects of a range of characterization methods as applied to polymeric systems; the primary objective will be the development of a broad understanding of the various tools available for polymer characterization both on the molecular level and as bulk materials. Prereq: CME 320, ME 330, or consent of instructor. (Same as MSE 558.)

**†CME 570 CHEMICAL SEPARATION AND MEASUREMENT FOR CHEMICAL ENGINEERS.****CME 580 DESIGN OF RATE AND EQUILIBRIUM PROCESSES FOR WATER POLLUTION CONTROL. (3)**

The design of chemical and physical processes for the removal and concentration of organic, inorganic, and particulate pollutants from aqueous solution/suspension: adsorption, destabilization, disinfection, membrane processes, thermal processes, flow through beds of solids, etc. Prereq: CHE 440G, CME 425 and prereq or concur: CME 550 or consent of instructor.

**CME 583 FUEL SCIENCE. (3)**

This course is concerned with the structure, chemistry, processing, utilization, environmental aspects, and conversion of hydrocarbon resources: petroleum, natural gas, coal, oil shale, and heavy oil. The laboratory component, which is taught off-campus at the Center for Applied Energy Research, covers characterization methods for fossil fuels. Prereq: CHE 230, CHE 232, and CHE 440G.

**CME 599 TOPICS IN CHEMICAL ENGINEERING. (3)**

A detailed investigation of a topic of current significance in chemical engineering such as: contemporary energy topics, fuels development, membrane science, computer control of chemical processing. A particular topic may be offered twice under the CME 599 number. May be repeated to a maximum of six credits. Prereq: Engineering standing.

**PREREQUISITE FOR GRADUATE WORK:** Students desiring to take any of the following courses should have a thorough working knowledge of chemistry, physics, and mathematics. For major work, a candidate must hold a bachelor's degree in chemical engineering or its equivalent.

**CME 620 EQUILIBRIUM THERMODYNAMICS. (3)**

The criteria for physical and chemical equilibria, including: predictive equations, solution theory, chemical activity, coupled chemical equilibria, and external constraints. Emphasis may be on vapor-liquid equilibrium, chemical reaction equilibrium, or complex ionic equilibria in dilute aqueous solutions and suspensions. Prereq: CHE 440G and CME 320 or consent of instructor.

**CME 621 NONEQUILIBRIUM THERMODYNAMICS. (3)**

An introductory course in the thermodynamics of irreversible processes, including: phenomenological equations relating flows and forces, Onsager's law, and entropy production in continuous processes. Prereq: CME 620, or ME 620, or consent of instructor.

**CME 625 PROPERTIES OF GASES AND LIQUIDS. (3)**

Development, discussion and application of intermolecular force laws as they apply to gases, liquids and mixtures: Chapman-Enskog kinetic theory, virial theorem, Buckingham (6-exp) potential, and theoretical and semitheoretical predictive equations. Estimation of thermodynamic and transport properties. Prereq: CME 620, CME 630, or consent of instructor.

**CME 630 TRANSPORT I. (3)**

A unified study of physical rate processes in liquids and vapors, including: mass, energy, and momentum transport, transport in chemically reacting systems, similarities, turbulence modeling, buoyance-induced transport and multicomponent diffusion. Prereq: ME 330, CME 425, CME 505 concurrent or consent of instructor.

**CME 631 TRANSPORT II. (3)**

A continuation of Transport I. Interphase transport of mass, energy, and momentum is discussed. Boundary Layer theory is applied to combined transport and chemical reaction. Theories of turbulent transport are examined. Prereq: CME 630 or consent of instructor.

**CME 635 STAGED MASS TRANSFER OPERATIONS. (3)**

Design and performance of vapor-liquid or liquid-liquid, and solid-liquid systems, particularly for multicomponent mixtures. Emphasis will depend upon student interest. Prereq: CME 412, 420, and 425.

**CME 637 BIOLOGICAL TRANSPORT PHENOMENA. (3)**

Selected topics concerning momentum and mass transfer in the cardiopulmonary system. Prereq: CME 630 or consent of instructor.

**CME 650 ADVANCED CHEMICAL REACTOR DESIGN. (3)**

Rate expressions for heterogeneous reaction kinetics; energy and mass transport within and external to reacting porous catalysts; design equations for multiphase fixed and moving bed reactors. Prereq: CME 550, CME 630, CME 505, or instructor consent.

**CME 671 BASIC ELECTRODE PROCESSES IN ELECTROCHEMICAL ENGINEERING. (3)**

Provides engineers with an introduction to electrochemical theory and measurement techniques, including relaxation methods. Selected topics in equilibrium electrochemistry, generalized theory of reversibility, double layer structural effects on charge transfer rates, organic redox reactions, chemical power systems, and biomedical engineering. Prereq: CME 620 or consent of instructor.

**CME 680 BIOCHEMICAL ENGINEERING. (3)**

Principles and design of processes involving biochemical reactions, including aerobic and anaerobic respirations and fermentations, and involving pure and mixed cultures. Energy considerations, heat and mass transfer, biochemical kinetics, and application to biological waste treatment. Prereq: CME 550, CME 630, CHE 440G or consent of instructor.

**CME 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**CME 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**CME 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**CME 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)****CME 771 SEMINAR. (0)**

Review of current literature in the field of chemical engineering, general discussion and presentation of papers on departmental research. Lecture, one hour per week. Required for all graduate students in chemical engineering.

**CME 779 MEMBRANE SCIENCES COLLOQUIUM. (1)**

Outstanding membrane scientists present their current research on biological and/or synthetic membranes. Students read a pertinent paper by the speaker prior to his/her talk and write a short paper on the talk; especially important is relevance of the main points of the talk to membrane science in general and the student's own research in particular. May be repeated to a maximum of six credits. (Same as BCH/CHE/PHA/PHR 779.)

**CME 780 SPECIAL PROBLEMS IN CHEMICAL ENGINEERING. (1-3)**

Independent study, design, or research in chemical engineering topics. May be repeated to a maximum of 12 credits. Prereq: Approval of the departmental director of Graduate Studies.

**CNU Clinical Nutrition****CNU 601 CLINICAL NUTRITION. (4)**

An analysis of the process by which man ingests, assimilates and utilizes all of the constituents of food in health and disease. Relationship of biochemical and physiological factors to the nutrient requirements of the human body. Evaluation of dietary status and rationale of dietary management. Course to be taught by lectures, clinical rounds, conferences and written and oral case studies. Prereq: PGY 502, 503; consent of instructor. BCH 501 to be taken concurrently.

**CNU 602 CURRENT TOPICS IN CLINICAL NUTRITION. (1)**

This course is designed to develop in students independent thinking and critical analysis related to various clinical nutrition issues. These skills will be developed through reading assignments related to clinical nutrition. Prereq: CNU 601.

**CNU 603 NUTRITIONAL IMMUNOLOGY. (3)**

Theories and mechanisms of immunity will be introduced. The effects of nutrition on immunity will be discussed from experimental and clinical perspectives. A lecture and problem-based learning approach with incorporation of student presentations, three hours per week. Prereq: PGY 412G and CNU 601, or consent of instructor.

**CNU 604 LIPID METABOLISM. (3)**

Emphasis on factors influencing the absorption of fats and fatty acids, distribution and incorporation of fatty acids into body tissues, the biosynthesis of and catabolism of fatty acids, as well as cholesterol, bioactive eicosanoid production and the involvement of fats in the disease process. Lecture and problem-based learning approach with incorporation of student presentations, three hours per week. Prereq: BCH 401G and PGY 412G or consent of instructor.

**CNU 605 WELLNESS AND SPORTS NUTRITION. (3)**

Emphasis is directed toward nutrition as applied to prevention of disease through lifestyle management and the application of nutrition in exercise and sport. Targeted focus areas are: body composition and energy expenditure, the metabolic basis of weight management, nutrient needs throughout the lifecycle, the metabolic changes associated with obesity, behavioral management of obesity, nutrient metabolism and exercise, water and electrolyte balance during exercise, nutritional ergogenic aids, nutrition-strength and performance enhancement. Prereq: PGY 412G, and BCH 401G or equivalent or consent of instructor. (Same as PT 605.)

**CNU 606 MOLECULAR BIOLOGY APPLICATIONS IN NUTRITION. (2)**

Focus will be on the use of the most recently developed techniques and model systems in molecular biology for studying nutrient regulation of gene expression. Examples include current problems in nutrition such as models for engineering plants containing more desirable nutrient sources (fats); for studying effects of various nutrients in transgenic mice on tumor suppressor genes and oncogene expression, that are important in cancer prevention; and for studying nutrient effects on genes that modulate obesity. Prereq: BCH 501 and 502 or equivalent; or BCH 401G and consent of instructor.

**CNU 610 ETHICS IN CLINICAL SCIENCES RESEARCH. (1)**

Students will examine ethical issues in biomedical research using a case-study approach. Representative issues addressed may include data selection and retention, plagiarism, scientific review of grants and manuscripts, scientific misconduct, and informed consent. Prereq: Graduate student status. (Same as CD/CLS/PT/RAS 610.)

**CNU 701 ADVANCED CLINICAL NUTRITION. (4)**

A course dealing primarily with the clinical application of the principles of nutrition, e.g., gastrointestinal disease and nutrition, nutrition and cancer, electrolytes and acid-base balances, drug-nutrient interactions, nutrition in the burn patient and pediatric nutrition. Prereq or concur: CNU 601.

**CNU 702 CLINICAL NUTRITION PROBLEM-BASED CASE STUDIES. (1-5)**

A problem-based learning approach to case studies is integrated with a traditional didactic approach to offer options in therapeutic nutrition, health promotion and/or management. Efforts are directed toward patient, worksite and laboratory data interpretation as well as patient education. Students are directed to develop independent critical thinking related to case presentations regarding rotations through various medical or health services e.g. surgery, pediatrics, nutrition consultation, health promotion and wellness, hospital administration. Prereq: CNU 601, CNU 701, admission to CNU graduate program.

**CNU 780 CLINICAL NUTRITION RESEARCH. (1-5)**

This course is designed to expose students to scientific research methods, including library research, laboratory experience, data preparation and analysis, etc., utilizing a project of mutual interest to the student and instructor. One semester required, credits to be arranged. May be repeated to a maximum of five credits.

**CNU 781 CLINICAL NUTRITION SEMINAR. (1)**

Seminar presentations on current topics of interest in clinical nutrition.

**CNU 782 INDEPENDENT STUDY. (1)**

Student will investigate a particular aspect of clinical nutrition with appropriate presentation.

**CNU 800 APPLIED NUTRITION FOR THE HEALTH PROFESSIONS: FUNDAMENTALS OF NUTRITION SCIENCE IN NORMAL LIFE CYCLES. (1)**

An interdisciplinary approach to applied nutrition and its role in primary, secondary, and tertiary health care delivery. Covers the fundamental principles and concepts of nutrition science as applied to the human life cycle. Prereq: Currently enrolled in the College of Medicine, Nursing, Dentistry, Pharmacy, or Allied Health Professions. Completion of at least one semester of physiology; one semester of organic chemistry or biochemistry, and preferred, clinical exposure. Special examination credit is possible for this course.

**#CNU 802 APPLIED NUTRITION FOR THE M.D. (2)**

This course is designed to give the medical student an understanding of the basic principles of normal nutrition and medical nutrition therapy during the course of health and disease. Areas to be covered include: general principles of macro- and micronutrients; the Recommended Dietary Allowances; The Food Guide Pyramid; nutritional needs throughout the life cycle; nutrition for health promotion, weight maintenance/weight loss, and for sports/performance; cultural nutrition; the basics of nutritional assessment (what they can do as physicians); determination of kilocalorie and protein requirements; principles of enteral and parenteral nutrition; and nutritional needs of the major disease states (e.g., cardiovascular, diabetes, renal, pulmonary, cancer, AIDS, gastrointestinal, etc.). Prereq: First and second year Medical students.

**COM Communication****COM 101 INTRODUCTION TO COMMUNICATIONS. (3)**

An introduction to the process of communication as a critical element in human interaction and in society. Designed to enhance effective communication and informed use of the mass media.

**COM 181 BASIC PUBLIC SPEAKING. (3)**

A course designed to give the student platform experience in the fundamentals of effective speaking.

**COM 184 INTERCOLLEGIATE DEBATING. (1)**

Preparation for and participation in intercollegiate debating. May be repeated to a maximum of two credits.

**COM 199 PRESENTATIONAL COMMUNICATION SKILLS. (1)**

Introduces students to fundamental oral communication skills needed to prepare and present messages effectively. Note: This course will not substitute for the three-credit course COM 181, Basic Public Speaking. It will count toward partial completion of the oral communication skills component of the University Studies Program.

**COM 249 MASS MEDIA AND MASS CULTURE. (3)**

An examination of the interplay between the technology and content of the mass communications media and culture. Prereq: COM 101 or SOC 101 or its equivalent. (Same as SOC 249.)

**COM 252 INTRODUCTION TO INTERPERSONAL COMMUNICATION. (3)**

Examines basic verbal and nonverbal elements affecting communication between individuals in family, peer group, and work contexts. Course requires participation in activities designed to develop interpersonal communication skills. Topics include: strategy development, relationship and conversation management, effective listening, conflict management, defensive communication, communication anxiety, cultural/sex differences in communication style.

**COM 281 COMMUNICATION IN SMALL GROUPS. (3)**

A study of communication processes in small group situations. Topics include conflict, leadership, and decision-making. Students will participate in group discussion and develop skills in analyzing group performance.

**COM 283 ARGUMENTATION AND DEBATE. (3)**

A course in the theory of argument, with practice in the several forms of debate.

**COM 284 INTERCOLLEGIATE DEBATING. (1)**

Preparation for and participation in intercollegiate debating. May be repeated to a maximum of four credits.

**COM 285 APPLIED PHONETICS. (3)**

Study of the phonetic structure of English language with requirement of mastery of international Phonetic Alphabet. Emphasis will be placed on phonetic transcription, and application will be made for students interested in general speech, speech correction, radio, television, and theatre. (Same as EDS 285.)

**COM 287 PERSUASIVE SPEAKING. (3)**

A study of the processes involved in attitude change, with emphasis on the preparation and delivery of persuasive messages.

**COM 288 ORAL INTERPRETATION. (3)**

An analysis of prose and poetry for oral interpretation. Helpful to those who plan to teach literature.

**COM 319 WORLD MEDIA SYSTEMS. (3)**

A comparison of the communications media in different countries of the world and the theories used to justify them. How various political and social systems affect the media and how the media affect the societies in which they exist. Prereq: COM 101, TEL 101 or consent of instructor. (Same as TEL 319.)

**COM 325 BUSINESS AND INDUSTRIAL COMMUNICATION. (3)**

Reviews the principles of communication in organizations. The most common organizational communication variables are reviewed, e.g., communication distortion, conflict, power, managerial leadership style, roles, interviewing, information overload and underload. Emphasis is on application of the principles reviewed to the organizational setting. Simulations, exercises, case studies, and visits to organizations are used to accomplish this goal. Enrollment priority given to College of Communications majors.

**COM 350 LANGUAGE AND COMMUNICATION. (3)**

An introductory survey course covering syntactic, semantic and pragmatic aspects of language as they relate to communication. Language learning, sign typologies, psycholinguistics, and the nature of meaning are selected topic areas. Emphasis is on behavioral, communication approach. Not open to students who have completed a 300-level (or above) linguistic class.

**COM 351 INTRODUCTION TO COMMUNICATION THEORY. (3)**

Considers various theoretical perspectives which lead to a more thorough understanding of communication processes. Begins with discussion of the development of theory and inquiry. Includes perspectives of systems, cognitive, behavioral, affective, symbolic interactionist, dramatic, cultural and social reality, interpretive and critical theories.

**COM 365 INTRODUCTION TO COMMUNICATION RESEARCH METHODS. (3)**

An introduction to the methods of philosophy of scientific research into the origins, nature, and effects of communication processes. Provides skills necessary for designing research projects and for interpreting and critically evaluating research results. Prereq: One course in statistics.

**COM 381 MANAGING COMMUNICATION IN LARGER GROUPS: THE PARLIAMENTARY PROCESS. (3)**

A study of the principles and history governing decision-making in voluntary organizations and deliberative assemblies. Social and political rationales for group activity, as well as principles of decision making in small groups and larger assemblies. Emphasis is on both traditional and newer forms of parliamentary practice.

**COM 395 INDEPENDENT WORK. (1-3)**

Research and study of special topics in communication. The student proposes the specific study to be undertaken and formally contracts with a faculty supervisor for guidance and evaluation. Ordinarily, projects will require the production of written materials as a basis for the evaluation. May be repeated to a maximum of six credits. Prereq: Either a major and a standing of 3.0 in COM courses or consent of instructor.

**COM 399 INTERNSHIP IN COMMUNICATION. (1-6)**

Provides field-based experience in communication through work in industry, government, education, etc. Pass-fail only. May be repeated to a maximum of six credits. A maximum of three credit hours may be counted toward the communication major. Prereq: 2.6 GPA (with 3.0 GPA in major courses), junior/senior Communication majors only, consent of Department Internship Director prior to registration, and completion of departmental learning contract.

**COM 419 INTERNATIONAL AND INTERCULTURAL COMMUNICATION. (3)**

Studies interpersonal and media communication systems and policies of various cultures within and across nations. Considers the social, economic, and political implications of advances in communication technology. Prereq: COM 319.

**COM 449 SOCIAL PROCESSES AND EFFECTS OF MASS COMMUNICATION. (3)**

The relationship between the organization of modern society and its communication media. Special emphasis is given the way in which cultural processes and social change have an impact upon the mass media, and upon the way in which the mass media influence cultural processes and social change. The social-psychological bases of communication are studied within a context of theory and research. Prereq: SOC/COM 249 or its equivalent. (Same as SOC/EDC 449.)

**COM 452 STUDIES IN INTERPERSONAL COMMUNICATION. (3)**

Examines current theory and research on the nature and development of interpersonal communication ability. Topics include: foundations of communicative development, development of strategic communicative skills, relational communications, conversation analysis, cultural and institutional influences on the development of interpersonal communication ability. Prereq: COM 252.

**COM 453 MASS COMMUNICATION AND SOCIAL ISSUES. (3)**

A course devoted to the examination of criticism of the mass media and an evaluation of the relationship of mass communication to contemporary social issues. Prereq: COM 249.

**COM 454 HONORS SEMINAR IN COMMUNICATION. (3)**

Intensive study of a communication topic in professional, theoretical, and research methodology areas of communication. This seminar will not count toward a communication major; it will count toward credits for graduation. Prereq: 3.3 GPA in communication major.

**COM 482 PERSUASION. (3)**

The principles and methods of persuasion. Of particular benefit to teachers, lawyers, business majors, and other persons whose work is concerned with motivating human conduct.

**COM 483 STUDIES IN ARGUMENTATION. (3)**

A study of the theories of argumentation and debate as derived from rhetorical, philosophical and psychological sources; critical examination of representative examples of oral argument.

**COM 525 ORGANIZATIONAL COMMUNICATION. (3)**

This course reviews theories and research relevant to an understanding of the organizational communication process. Emphasis is on communication in an organization at the interpersonal, small group and whole organizational level. Prereq: COM 325 or consent of the instructor.

**COM 571 HEALTH COMMUNICATION. (3)**

This course offers a broad introduction to communication in health care delivery from a variety of perspectives, combining interpersonal, organizational, and semiotic approaches. Prereq: Consent of instructor.

**COM 581 STUDIES IN SMALL GROUP COMMUNICATION CONTEXTS. (3)**

Examines current theory and research on the nature and development of small group discussion. Includes topics of leadership, interpersonal relations and roles, group goals vs. individual goals, and networks. Prereq: COM 281.

**COM 584 TEACHING OF SPEECH COMMUNICATION. (3)**

An analysis of the field of speech education as related to the teacher of speech.

**COM 591 SPECIAL TOPICS IN COMMUNICATION (Subtitle required). (1)**

Intensive study of a specialized topic area in communication. May be repeated to a maximum of six credits under different subtitles. A maximum of three credits can be counted toward a Communication major. Lecture, three hours per week for five weeks. Prereq: Consent of instructor.

**CON Conjoint (College of Medicine)****CON 841 AMBULATORY MEDICINE. (2)**

This course is provided for senior medical students who are enrolled in the Accelerated Internal Medicine Residency Program. The course is designed to provide the student/resident with a broad survey of outpatient medical care in the primary disciplines that relate to internal medicine. The focus of these rotations will be on the development of clinical skills in interviewing and patient examination, on the use of a comprehensive approach to outpatient diagnosis and management and on the integration of the pathophysiological problems with the psychosocial and economic problems that the patient presents. Each student will be assigned to a single faculty member in the Division of General Internal Medicine who will act as his/her preceptor. The student will work in that faculty member's clinic one half day to two half days a week depending on the other clinic rotations. In addition to the Medicine experience the student/resident will be assigned one half day per week for the eight-week period to Neurology, office Otolaryngology, Gynecology, orthopedics or Sports Medicine, General Surgery, Dermatology and Psychiatry. In each of the clinics, the student/resident will be expected to perform at the level of a house officer under the close supervision of the clinic attending. At the end of each week, the General Internal Medicine course preceptor will review the entire week's experience with the student/resident for the purpose of identifying an appropriate reading program to amplify the patient experience. These reading programs will particularly emphasize interviewing techniques, decision analysis, screening methodologies and preventive medicine. Prereq: Required first three years of Medical School.

**CPC Clinical Pastoral Counseling****CPC 501 PERSPECTIVES IN RELIGION AND HEALTH. (3)**

An interdisciplinary study of significant religious components in health. Prereq: Consent of instructor.

**CPC 899 CLINICAL PASTORAL PRACTICUM. (1-2)**

Students participate in a program of supervised learning consistent with one unit of CPE, according to Standards of the Association for Clinical Pastoral Education, Inc. Each student is assigned to at least one area of the University Hospital for clinical pastoral work. Evening, weekend, and/or overnight assignments may be expected. The course work consists of instruction, group interaction, and experience with patients in the University Hospital. An individualized learning contract is required for each student. May be repeated to a maximum of 18 credits. Offered on a pass/fail basis only. Prereq: Baccalaureate degree, consent of instructor.

**CS Computer Science****CS 101 INTRODUCTION TO COMPUTING I. (3)**

An introduction to computing and its impact on society from a user's perspective. Topics include computation using spreadsheets, beautification using text formatters and word processors, information management with database managers, and problem solving through program design and implementation using a simple programming language. Not open to students who have received credit for higher level computer science courses.

**CS 121 COMPUTER SCIENCE I. (4)**

Fundamentals of computer science including algorithm design and testing, specification, control structures, lists, simple searching and sorting algorithms, recursion, record and file structures, and simple applications. A high-level procedural language is presented. This is the usual first course for students wishing to study computer science above the freshman level.

**CS 122 COMPUTER SCIENCE II. (4)**

A continuation of CS 121 which presents basic machine organization, representations of elementary data types, external file processing, and list processing. Simple data structures are presented for trees, queues, and lists. This course is a prerequisite for most upper level computer science courses. Prereq: CS 121.

**CS 221 FIRST COURSE IN COMPUTER SCIENCE FOR ENGINEERS. (2)**

Characteristics of a procedure-oriented language; description of a computer as to internal structure and the representation of information; introduction to algorithms. Emphasis will be placed on the solution of characteristic problems arising in engineering. Prereq: MA 113. Not open to students who have received credit for CS 150.

**CS 222 COMPUTER SCIENCE FOR ELECTRICAL ENGINEERS. (3)**

Characteristics of a procedure-oriented language; high-level description of computer structure and information representation schemes; introduction to algorithm development and design. Emphasis will be placed on the programming tools used in software engineering. Tools suitable for programming development on microcomputers will be emphasized. Not open to students who have received credit for CS 121 or CS 221.

**CS 223 COMPUTER SCIENCE FOR CIVIL ENGINEERS. (2)**

An introduction to computer-assisted problem solving for civil engineering students using a microcomputer based procedure-oriented language; a description of internal structure and representation of information; an introduction to algorithms. Emphasis will be placed on the solution of characteristic problems arising in civil engineering. Prereq: MA 113, CE 121.

**CS 245 INTRODUCTION TO LOGIC AND DISCRETE COMPUTER MATHEMATICS. (3)**

Introduction to basic mathematical and logical concepts which form the foundation of computer science. Main topics of the course include: propositional and predicate calculi, set theory (including the theory of relations and functions), Boolean algebra, introduction to the logic programming, and introduction to combinatorics. Prereq: CS 121.

**CS 250 COMPUTER ORGANIZATION. (3)**

Number systems, memory organizations, addressing schemes. Representation of data and instructions. Machine language, assembler languages, macros and basic input/output. Prereq: CS 121 or CS 221.

**CS 270 FILE PROCESSING. (3)**

Data management techniques for sequential, direct, and linked access; file structures; list structures; design of large programming systems. Prereq: CS 122.

**CS 321 INTRODUCTION TO NUMERICAL METHODS. (3)**

Floating point arithmetic. Numerical linear algebra: elimination with partial pivoting and scaling. Polynomial and piecewise polynomial interpolation. Least squares approximation. Numerical integration. Roots of nonlinear equations. Ordinary differential equations. Laboratory exercises using software packages available at computer center. Prereq: MA 213 and CS 221 or equivalent. Knowledge of a procedural computer language is required. (Same as MA 321.)

**CS 340 DISCRETE STRUCTURES IN COMPUTER SCIENCE. (3)**

Topics include permutations, combinations and partitions; inclusion-exclusion principle; generating functions and recurrence relations; elementary algorithms concerning graphs and trees; generation of random combinatorial and graphical examples; Boolean algebra, Boolean functions, switching circuits and mathematical logic; introduction to algebraic coding theory. Prereq: CS 245 and CS 270. Restricted to computer science, electrical engineering, mathematics and mathematical sciences majors. Others by permission. (Same as MA 340.)

**CS 370 DATA STRUCTURES. (3)**

Basic data structures and associated algorithms. Arrays, stacks and queues, linked lists, trees, graphs, and sorting algorithms. Prereq: CS 250 and CS 270. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 380 MICROCOMPUTER ORGANIZATION. (3)**

Hardware and software organization of a typical computer; machine language and assembler language programming, interfacing peripheral devices, and input-output programming; real-time computer applications, laboratory included. Prereq: EE 280 or CS 245. (Same as EE 380.)

**CS 395 INDEPENDENT WORK IN COMPUTER SCIENCE. (2)**

A course for computer science majors only. A problem, approved by the chairperson of the department, provides an opportunity for individual research and study. May be repeated to a maximum of six credits. Prereq: Major and a standing of 3.0 in the department and consent of instructor.

**CS 415G GRAPH THEORY. (3)**

Theory of linear undirected graphs, including definitions and basic concepts, trees, connectivity, traversability, factorization, planarity and matrices. In addition, algorithm for finding spanning trees, testing connectivity, finding Euler trails, finding a maximum matching in a bipartite graph, and testing planarity will be presented at appropriate times. Applications of algorithms to operations research, genetics and other areas. About 55 percent of the course will be on general theory of graphs, 30 percent on algorithms and 15 percent on applications of these algorithms. Prereq: Consent of instructor. (Same as MA 415G.)

**CS 416G PRINCIPLES OF OPERATIONS RESEARCH I. (3)**

The course is an introduction to modern operations research and includes discussion of modeling, linear programming, dynamic programming, integer programming, scheduling and inventory problems and network algorithms. Prereq: MA 213 or equivalent. (Same as MA 416G.)

**CS 420G COMPILERS FOR ALGORITHMIC LANGUAGES. (3)**

The techniques of processing, specifying, and translating high level computer languages are studied. Topics include finite state machines and lexical analysis, context-free grammars for language specification, attributed translation grammars, language parsing, and automatic generation of compilers by SLR, LALR, and other methods of analyzing context-free grammars. Other topics may include code optimization, semantics of programming languages and top-down parsing. Prereq: CS 370. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 422 NUMERICAL SOLUTIONS OF EQUATIONS. (3)**

Linear equations: Gaussian elimination, special linear systems, orthogonalization, eigenproblem, iterative methods. Nonlinear equations: solutions of equations in one variable, solutions of systems of nonlinear equations. Optimization. Prereq: CS/MA 321 and MA 322; or consent of instructor. (Same as MA 422.)

**CS 440 FOUNDATIONS OF COMPUTING. (3)**

An introduction to the theoretical foundations of computing via automata and formal language models of computation such as Turing machines, finite automata, push down machines, regular sets, and context free grammars. Applications to programming, compiling, and computing systems. Prereq: CS 340. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 450G FUNDAMENTALS OF PROGRAMMING LANGUAGES. (3)**

An intensive study of fundamental programming concepts exhibited in current high level languages. Concepts include recursion, iteration, coroutines, multiprocessing, backtracking, pattern-matching, parameter passing methods, data structures, and storage management. Typical languages studied are SNOBOL, LISP, PASCAL, and APL. Prereq: CS 370. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 470G SYSTEMS SOFTWARE. (3)**

A study of the use and construction of system software, including assemblers, macro-processors, linkers, loaders, interrupt handlers, and elementary operating systems. Software appropriate for use on small mini/micro computer systems will be emphasized. Prereq: CS 370 or CS 250 and EE 280. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 485G TOPICS IN COMPUTER SCIENCE (Subtitle required). (2-4)**

Studies of emerging research and methods in computer science. A review and extension of selected topics in the current literature. When the course is offered, a specific title with specific credits, the number of hours in lecture-discussion and laboratory will be announced. Lecture/discussion, two-four hours; laboratory, zero-four hours per week. May be repeated to a maximum of eight credits under different subtitles. Prereq: Variable, given when topic is identified; or consent of instructor.

**CS 505 DATABASE MANAGEMENT SYSTEMS. (3)**

This course is primarily concerned with the definition, organization, and manipulation of a database. An overview of the goals of database management is examined. The database management process is broken down into its four constituent parts: data definition, data manipulation, data retrieval, and report generation. Attempts toward standardization in database management are presented with emphasis on the CODASYL activities. The concept of shared files and the deadlock problem are presented. A number of general database management systems are surveyed, and at least one case study is examined in detail. Prereq: CS 370. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 522 MATRIX THEORY AND NUMERICAL LINEAR ALGEBRA I. (3)**

Review of basic linear algebra from a constructive and geometric point of view. Factorizations of Gauss, Cholesky and Gram-Schmidt. Determinants. Linear least squares problems. Rounding error analysis. Stable methods for updating matrix factorizations and for linear programming. Introduction to Hermitian eigenvalue problems and the singular value decomposition via the QR algorithm and the Lanczos process. Method of conjugate gradients. Prereq: MA 322. (Same as MA 522.)

**CS 537 NUMERICAL ANALYSIS. (3)**

Floating point arithmetic. Direct methods for the solution of systems of linear algebraic equations. Polynomial and piecewise polynomial approximation, orthogonal polynomials. Numerical integration: Newton-Cotes formulas and Gaussian quadrature. Basic methods for initial value problems for ordinary differential equations. The emphasis throughout is on the understanding and use of software packages for the solution of commonly occurring problems in science and engineering. Prereq: CS/MA 321 or equivalent or graduate standing or consent of instructor. Knowledge of a procedural computer language is required. (Same as EGR/MA 537.)

**CS 538 NUMERICAL ANALYSIS II. (3)**

A continuation of CS/EGR/MA 537. Roots of a nonlinear equation and minimization of a function of a single variable. Linear difference equations. Numerical methods for ordinary differential equations: initial value problems, and elementary techniques for two-point boundary value problems. Prereq: A grade of B or better in CS/MA 321 or CS/EGR/MA 537 or equivalent. (Same as MA 538.)

**CS 540 SYSTEMS SIMULATION. (3)**

Computer simulation techniques including building and utilizing deterministic and stochastic models for digital computers, Monte Carlo. Prereq: CS 121 and a course in statistics or probability.

**CS 541 ADVANCED COMPILER DESIGN I. (3)**

A study of the theory and practice of implementing compilers for high-level languages with emphasis on the use of compiler-compilers for automatic generation of compiler systems. Topics include specification of languages by grammars, LR, SLR, LALR, and LL parsing algorithms, lexical analysis, syntax directed translation, code optimization and generation, and data flow analysis. Prereq: CS 420G or CS 580 or CS 575. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 545 COMPUTER GRAPHICS. (3)**

The problems of representing and manipulating graphical information in computers are discussed. An overview of the hardware and software techniques is presented for using refresh, storage, and raster scanning devices. Two-dimensional transformations, clipping, and windowing algorithms are developed. The use of display files, graphical databases, and input devices is covered. Three-dimensional graphics is included to present painting algorithms, solid models, and shading. Prereq: MA 213 and CS 370, or consent of instructor. Restricted to Computer Science and Electrical Engineering majors. Others by permission.

**CS 555 LOGIC FOR COMPUTER SCIENCE. (3)**

The course exposes students to intermediate areas of logic, model theory, recursion theory and set theory (basic undergraduate logic is covered by CS 245). It creates foundations for Theory (CS 575 and subsequent courses), Artificial Intelligence (CS 560, CS 660), Expert Systems, and Natural Language Processing areas. Prereq: CS 245.

**CS 560 ARTIFICIAL INTELLIGENCE. (3)**

This course is primarily concerned with general problem-solving methods; production systems, searching of graphs, and automated theorem-proving methods, in particular the resolution method and its variants. Topics include methods of heuristics, games on trees, and minimax methods, as well as a study of various knowledge-representation schemes such as frames, prototypes, predicate logic and basic methodology of expert systems. Prereq: CS 245, CS 340, and CS 370.

**CS 570 OPERATING SYSTEMS DESIGN. (3)**

Concurrent processes, resource management, protection, file management, deadlocks, and memory management. Prereq: CS 470. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 575 THEORETICAL ASPECTS OF COMPUTING. (3)**

Theoretical considerations in computer science. Topics include computability, unsolvability, automata and formal language theory, verification, and computational complexity. Prereq: CS 340. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 580 ALGORITHM DESIGN. (3)**

The design of efficient algorithms on data structures such as lists, trees, sets and graphs. Topics include: sorting, searching and pathfinding by techniques such as divide-and-conquer, back tracking and the greedy method. Prereq: CS 370 and 440. Restricted to computer science and electrical engineering majors. Others by permission.

**CS 585 INTERMEDIATE TOPICS IN COMPUTER SCIENCE (Subtitle required). (3)**

Topics to be selected by staff. May be repeated to a maximum of six credits, but only three credits may be earned by a student under the same topic. Prereq: Restricted to computer science and electrical engineering majors. Others by permission.

**CS 587 MICROCOMPUTER SYSTEMS DESIGN. (3)**

A course in the design of microcomputer systems for hardware engineers which includes the following topics: use of uncommitted logic arrays in instruction set design; hardware support for operating systems and programming languages; customizing microcomputers for specific execution environments; and control of concurrency. Prereq: EE 581 and EE 583, or consent of instructor, engineering standing or upper division computer science standing. (Same as EE 587.)

**CS 610 MASTER'S PROJECT. (3)**

Design and implementation of a large computing project under the supervision of a member of the graduate faculty. Prereq: Satisfactory completion of the departmental foundational examinations.

**CS 612 INDEPENDENT WORK IN COMPUTER SCIENCE. (1-3)**

Reading course for graduate students in computer science. May be repeated to a maximum of nine credits. Prereq: Overall standing of 3.0, and consent of instructor.

**CS 622 MATRIX THEORY AND NUMERICAL LINEAR ALGEBRA II. (3)**

Numerical solution of matrix eigenvalue problems and applications of eigenvalues. Normal forms of Jordan and Schur. Vector and matrix norms. Perturbation theory and bounds for eigenvalues. Stable matrices and Lyapunov theorems. Nonnegative matrices. Iterative methods for solving large sparse linear systems. Prereq: MA 522 or equivalent. (Same as MA 622.)

**CS 630 GEOMETRIC MODELING. (3)**

This course discusses methods for design, modeling, representation, and generation of solids. Topics of curve design, surface design, solid modeling, shapes, and inter-section methods will be covered. Prereq: CS 545, CS 321.

**CS 635 IMAGE PROCESSING. (3)**

The course outlines applications of image processing and addresses basic operations involved. Topics covered include image perception, transforms, compression enhancement, restoration, segmentation, and matching. Prereq: Graduate standing and consent of instructor. (Same as EE 635.)

**CS 636 COMPUTER VISION. (3)**

Topics of human visual system will be discussed first. Then approaches to implementation of visual processes by computers will be described. Prereq: CS/EE 635.

**CS 641 ADVANCED COMPILER DESIGN II. (3)**

Optimization, special purpose languages, compiler-compiler, industrial compiler practice. Prereq: CS 541 or consent of instructor.

**CS 642 DISCRETE EVENT SYSTEMS. (3)**

The objective of the course is to prepare students for research in the field of supervisory control of discrete event systems (DES's). Logical models, supervising control. Stability and optimal control of DES, complexity analysis and other related research areas will be covered. Prereq: Graduate standing or consent of instructor. (Same as EE 642.)

**CS 645 COMPUTER NETWORKS. (3)**

The focus of the course will be on learning various principles and techniques employed in the development of computer communication networks. A study of International Standards Organization's (ISO) seven layer Open Systems Interconnections (OSI) model and the U.S. Department of Defense's ARPA Internet model will be covered. The course will cover details of link and network layer under the OSI model, will examine the model of internetworking with particular emphasis on DARPA Internet. Prereq: CS 570.

**CS 650 PROBLEM SEMINAR. (3)**

A seminar on the identification, analysis, formulation and solution of problems amenable to computer solution. Presupposes knowledge of calculus and programming. Prereq: Consent of instructor.

**CS 655 DESIGN OF PROGRAMMING LANGUAGES. (3)**

A study of techniques for designing programming languages and implementing processors for them. Emphasis is placed on programming languages exhibiting powerful and high level features such as nondeterminism and pattern-directed procedure invocation. The course includes the writing of actual processors. Prereq: CS 575 or CS 580.

**CS 660 TOPICS IN ARTIFICIAL INTELLIGENCE (Subtitle required). (3)**

Advanced topics chosen from the following: knowledge representation, knowledge acquisition, problem solving, very high-level programming languages, expert systems, intelligent and deductive databases, automated theorem proving. May be repeated to a maximum of six credits, but only three credits may be earned under the same topic. Prereq: CS 505 and CS 560 or consent of instructor.

**\*CS 674 HEURISTIC ALGORITHMS. (3)**

Advanced topics in algorithm design emphasizing the application of various heuristics. The course will treat active research topics. These topics include graph algorithms, parallel algorithms, randomization, linear and integer programming, VLSI and geometry problems. Prereq: CS 575 and CS 580.

**CS 675 THEORY OF COMPUTATION. (3)**

Computability by Turing Machines and algorithms. The predicate calculus, syntax, semantics, natural deduction, and the resolution method. Program verification and flowchart schemes. The fixpoint theory of programs. Prereq: CS 575.

**CS 676 PARALLEL ALGORITHMS. (3)**

The study of intrinsic parallelism in computational problems and the design of fast and efficient parallel algorithms. Parallel algorithms for prefix computation, selection, merging, sorting, routing, arithmetic, graph, and systolic algorithms. Prereq: CS 580.

**CS 677 COMPUTATIONAL GEOMETRY. (3)**

Design and analysis of algorithms and data structures for geometric problems. The particular groups of problems addressed include convex hull construction, proximity, Voronoi Diagrams, geometric search, intersection. Prereq: CS 580.

**CS 679 ADVANCED GRAPH ALGORITHMS. (3)**

The design of algorithms for graph problems. In particular, the design of efficient algorithms for optimization problems on graphs, such as minimum spanning tree, shortest paths, maximum matching and maximum flow problems. Design of heuristic (approximation) algorithms. Search trees, heaps, and their self-adjusting variants. Methods of estimating algorithm performance: worst-case analysis, average-case analysis, amortization. Prereq: CS 580 or consent of instructor.

**CS 680 SEMINAR IN COMPUTER SCIENCE. (2)**

May be repeated to a maximum of four credits. Prereq: Consent of instructor, or two 500-level computer science courses.

**CS 682 SWITCHING THEORY. (3)**

Application of the symbolic logic of Boole and Schroeder to the design of switching systems. Topics include Boolean algebra, Boolean analysis, the solution of logic equations, the minimization of Boolean formulas, and the diagnosis of failures in digital systems. Prereq: EE 280 or consent of instructor. (Same as EE 682.)

**CS 683 FINITE-STATE MACHINES. (3)**

Analysis and synthesis of sequential machines via state-tables and regular expressions. Equivalence, minimization and decomposition of machines. Partitions and structure-theory. Identification and diagnosis of finite-state machines by means of input-output experiments. Linear, finite-memory, and information-lossless machines. Prereq: EE 280. (Same as EE 683.)

**CS 685 SPECIAL TOPICS IN COMPUTER SCIENCE (Subtitle required). (3)**

Topics to be selected by staff. May be repeated to a maximum of six credits but only three credits may be earned under the same topic. Prereq: Consent of instructor or two 500-level computer science courses.

**CS 686 SPECIAL TOPICS IN THE THEORY OF COMPUTATION (Subtitle required). (3)**

Advanced topics in the theory of computation and the design and analysis of algorithms, including heuristic approaches for algorithm design, parallel computation, flow problems, parallel and concurrent processes and other areas of current research interest. May be repeated to a maximum of six credits but only three credits may be earned under the same topic. Prereq: Consent of instructor or CS 575 and 580.

**CS 687 SPECIAL TOPICS IN SOFTWARE (Subtitle required). (3)**

Topics to be selected by staff. May be repeated to a maximum of six credits but only three credits may be earned under the same topic. Prereq: Consent of instructor or two 500-level computer science courses.

**CS 688 NEURAL NETWORKS. (3)**

The purpose of this course is to introduce various aspects of the neural networks and neurocomputing. The course starts with an introduction to Learning Machines and analyzes various learning algorithms such as Hebbian, Grossberg's and Kohonen's learning algorithms. Some of the neural networks that will be studied in detail are: Backpropagation nets, Hopfield nets, Adaptive Resonance Theory, Adaline and Madalines, Kohonen's Self learning nets, BAMs, Neocognition, etc. Students will implement a minimum of three learning algorithms. Prereq: Graduate standing. (Same as EE 688.)

**CS 689 SPECIAL TOPICS IN NUMERICAL COMPUTING (Subtitle required). (3)**

Prereq: Consent of instructor or two 500 level computer science courses.

**CS 690 OPERATING SYSTEMS THEORY. (3)**

An advanced study of operating systems theory including cooperating sequential processes, processor scheduling, paging systems, and memory management. Prereq: CS 570.



*1997-1998 Course Descriptions – C*

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- CS 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters.  
Prereq: All course work toward the degree must be completed.
- CS 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.
- CS 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.
- CS 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

## DIP                      Diplomacy and International Commerce

### DIP 720 ECONOMIC STATECRAFT. (3)

This seminar course will explore how economic values and choices shape economic options, and the techniques used to pursue them in the diplomatic arena. Trade and fiscal techniques, financial policies, and sanctions will be explored in relationship to the interplay between economic and political/international relations theory, and the relevance of economic statecraft to achieving both economic and noneconomic goals.

### DIP 730 CROSS-CULTURAL NEGOTIATION AND BARGAINING. (3)

A multidisciplinary graduate course using contemporary studies of negotiation and bargaining from the individual to the international level. Uses both public (Diplomatic) and private (Commercial) examples, including case studies and practice negotiations. Group and national differences are explored as well as the content and environment of negotiations. Prereq: Any one graduate course plus consent of instructor.

### DIP 748 MASTER'S THESIS RESEARCH. (0)

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

### DIP 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)

May be repeated to a maximum of 12 hours.

### DIP 777 RESEARCH PROBLEMS IN INTERNATIONAL RELATIONS. (3)

This seminar focuses on research strategies that can be utilized in dealing with problems in international relations. May be repeated once with consent of instructor. Prereq: PS 674 or consent of instructor.

### DIP 780 INTERNATIONAL SCIENCE AND TECHNOLOGY POLICY. (3)

A multidisciplinary graduate course that investigates policy questions and the policy process surrounding developments in international sciences and technology. This course will focus on the intersection of scientific research, technological applications and change, and business and governmental activities in these areas that impact upon international relations. Prereq: Consent of instructor.

### DIP 795 SPECIAL PROBLEMS IN DIPLOMACY AND INTERNATIONAL COMMERCE. (3)

Specially designed independent study course taken under the supervision of various instructors. May be repeated to a maximum of six credits. Prereq: Permission of instructor.

## DIS                      Decision Science and Information Systems

### DIS 300 QUANTITATIVE ANALYSIS IN OPERATIONS MANAGEMENT. (3)

A study of quantitative approaches to operations management, including decision support systems in decision making applications and efficiency considerations in both service and manufacturing operations. Prereq: CS 101, ACC 202, ECO 261, STA 291, MA 113 or MA 123, 162.

### DIS 320 MANAGEMENT INFORMATION SYSTEMS. (3)

An introduction to information systems for management. Includes basic systems concept, methodology of systems analysis, and implementation of management information systems. Also provides an introduction to decision support systems, database management concepts and design methods, with emphasis on managerial problems related to these systems. Prereq: CS 101.

### DIS 350 QUANTITATIVE ANALYSIS IN MANAGEMENT. (3)

An introduction to quantitative techniques in management decisions. Includes basic linear programming, Monte Carlo, and waiting line theory. Prereq: MA 113 (or MA 162 and 123), STA 291 (or STA 292, 293, 294).

### DIS 390 SPECIAL TOPICS IN DECISION SCIENCE AND INFORMATION SYSTEMS (Subtitle required). (3)

Readings, projects, lectures and/or discussions to illuminate current topics of special interest or concern in decision science and information systems. May be repeated to a maximum of six credits. May not be repeated under the same title. Prereq: DIS 300.

### DIS 395 INDIVIDUAL WORK IN DECISION SCIENCE AND INFORMATION SYSTEMS. (1-3)

Students confer individually with the instructor. Written paper usually expected and filed in chairperson's office. May be repeated to a maximum of six credits. Prereq: Approval of instructor and chairperson.

### DIS 406 PRODUCTION AND INVENTORY CONTROL. (3)

This course covers advanced topics in inventory and production control including forecasting, planning horizon issues, dynamic lot sizing, reorder point determination, optimal periodic and continuous review policies, multiproduct and multifacility inventory problems, multistage shop scheduling, flow-shop scheduling. Prereq: DIS 300, 350, ECO 391.

### DIS 450 DECISION ANALYSIS. (3)

The purpose of this course is to provide students with methodologies of problem solving by developing (a) their analytical maturity, (b) their ability to identify problem-generated alternative actions, and (c) their ability to choose among alternative courses of actions. Prereq: Senior standing in College of Business and Economics and DIS 300. (Same as MGT 450.)

### DIS 506 PRODUCTIVITY AND QUALITY CONTROL. (3)

This course covers advanced topics in productivity and quality control including acceptance sampling, manufacturing control, process control, reliability, product design and process selection, job design, work measurement, and time and motion studies. Prereq: DIS 300, ECO 391.

### DIS 520 ADVANCED BUSINESS DATA PROCESSING AND INFORMATION. (3)

An examination of the use of computers as an aid to business and economic decision making, information, and related problems in business and economics. Prereq: DIS 320 or equivalent, DIS 350.

### DIS 600 PRODUCTION MANAGEMENT. (3)

This course exposes the MBA generalist to the functional area of production in both manufacturing and service sectors. Topics include tactical decisions in production and operative relationships with corporate strategy. The course emphasizes operations planning and control. Prereq: Graduate standing; MGT 611, ECO 610, ACC 628, DIS 650, ECO 611, FIN 600, DIS 651, MKT 600.

### DIS 611 THE MANAGEMENT OF COMPUTER INTEGRATED MANUFACTURING. (3)

This course is to provide a broad introduction to the state of the art developments in computer integrated manufacturing systems and the problems of managing such technologies and systems. Topics dealing with the evolving "factory of the future" such as computer aided design, computer aided manufacturing, group technology, flexible manufacturing systems, etc., will be studied. Strategic and managerial implications will be emphasized. Prereq: DIS 600.

### DIS 620 MANAGEMENT INFORMATION SYSTEMS IN DECISION MAKING. (3)

In-depth consideration of the value of information in managerial decision making. Topics include issues in design and evaluation of management information systems, decision support systems, and business expert systems. Prereq: DIS 651.

### DIS 621 BUSINESS EXPERT SYSTEMS. (3)

Introduction to expert systems and artificial intelligence in the business setting. Discussions include past and current applications of expert systems in business and considerations of future application possibilities. Prereq: DIS 620.

### DIS 622 BUSINESS DATA SYSTEM ANALYSIS AND DESIGN. (3)

An introduction to the comparative analysis and business use of various data models. Topics include the theory and design of information storage and retrieval procedures in the context of business information needs. Prereq: DIS 620, CS 101 or consent of instructor.

### DIS 623 BUSINESS DECISION SUPPORT SYSTEMS. (3)

Discussion of business decision support system concepts and the applications of these concepts in business organizations. The theoretical development of the decision support system concept is analyzed through review of important literature in this area. Emphasis is placed on the impact of technological advances which form the basis of decision support system software. Current decision support systems are studied and future likely applications considered. Prereq: DIS 620.

### DIS 624 MANAGEMENT OF INFORMATION RESOURCES. (3)

The course is designed to prepare students to understand and analyze major issues related to the management of information resources, evaluate the current state of information resources management within an organization, and participate in the management of such resources. Prereq: DIS 620 or consent of instructor. (Same as MGT 624.)

**DIS 650 DATA ANALYSIS FOR DECISIONS. (3)**

Data Analysis for Decisions is designed to provide four objectives for the MBA student: 1) develop a rigorous foundation for problem solving through structured analysis, 2) provide an introduction to data processing and information environment of managerial decision making, 3) provide the skills necessary to write and run simple programs, 4) provide prospective managers with the skills necessary to use information processing and database management techniques. Prereq: Graduate standing and MA 123 or equivalent.

**DIS 651 QUANTITATIVE ANALYSIS IN BUSINESS DECISION MAKING. (3)**

A study of key problem formulation and solution procedures in business decision making. The topics studied include statistical techniques integrated in decision making under uncertainty, decision trees, queuing problems, and value of information. A major segment of the course is devoted to the study of linear programming problems, sensitivity analysis, assignment problems and transportation problems. Prereq: MBA standing.

**DIS 700 TOPICS IN OPERATIONS MANAGEMENT. (3)**

To review the various topics of operations management and to survey the status of the art research in each topic area. Research methodology and research opportunities in each topic area will be identified. May be repeated to a maximum of nine credits.

**DIS 720 MANAGEMENT INFORMATION SYSTEMS THEORY. (3)**

A theoretical consideration of the role of MIS in managerial decision making. Emphasis is placed on current research in MIS and interrelationships with management science and operations management. Prereq: Consent of instructor.

**DIS 751 MANAGEMENT SCIENCE II. (3)**

Continuation of MGT 651 to include dynamic programming, game theory, Bayesian Decision Theory, and Monte Carlo techniques. Prereq: DIS 651 or equivalent.

**DIS 752 TOPICS IN OPTIMIZATION. (3)**

A study of optimization tools employed in decision making in the business and economic setting. Emphasis on characterization and computation of optima with particular attention to modeling. Topics include linear, nonlinear, dynamic, and integer programming, as well as further study of the method of Lagrange, Kuhn-Tucker theory, optimal control theory and sensitivity analysis. Prereq: Consent of instructor.

**DIS 753 SEMINAR IN MANAGEMENT SCIENCE. (3-6)**

Each semester some topic in management science such as simulation, queuing theory, stochastic processes, numerical methods, and Bayesian Decision Theory will be studied intensively. Prereq: DIS 751, 752.

**DIS 760 RESEARCH METHODS IN DECISION SYSTEMS. (3)**

This course presents the methods appropriate for developing and testing heuristics and experimental data systems. Special emphasis is paid to heuristics for NP hard problems in operations management and to the design and analysis of experimental decision systems using a decision support system laboratory. Prereq: STA 524, DIS 751, or consent of instructor.

**DIS 780 STUDIES IN DECISION SCIENCE AND INFORMATION SYSTEMS. (3)**

This course will analyze the current research topics of interest in the decision sciences. Possible areas of study may include: network management, multiple-criteria decision making; data envelopment analysis, combative decisions, and models for service organizations. May be repeated to a maximum of nine credits. Prereq: DIS 751 or consent of instructor.

**DIS 790 SPECIAL TOPICS IN MANAGEMENT DECISION SYSTEMS (Subtitle required). (3)**

This is a variable topic course enabling focused doctoral student investigation of current research areas. It is anticipated that the course grade will be based on individual student semester research papers in the course topic area. May be repeated to a maximum of 12 credits under different subtitles. Prereq: Consent of instructor.

## DMT Interior Design, Merchandising and Textiles

**DMT 114 AN INTRODUCTION TO MERCHANDISING. (3)**

An introduction to merchandising with emphasis on apparel and textiles. A survey of the retail structures which facilitate the merchandising of goods and services.

**DMT 120 TEXTILES FOR CONSUMERS. (3)**

A study of textiles with emphasis on consumer applications. Properties of fibers, yarns, fabric structures, colors, and finishes as related to end use. Survey of legislation and of maintenance requirements. Not open to DMT majors. Credit may not be earned for both DMT 120 and 121.

**DMT 121 TEXTILES. (4)**

The study of the chemical and physical properties of textiles from fiber to finished fabric. Laboratory analysis of the relationship between properties and performance characteristics. Survey of legislation, maintenance requirements, and product specifications. Credit may not be earned for both DMT 120 and 121. Lecture, three hours; laboratory, two hours. Prereq: Departmental majors.

**DMT 142 HISTORY AND THEORY OF INTERIOR DESIGN. (3)**

An historical survey of the development of interior design, architecture and urbanism from the Renaissance to the present, with primary emphasis on the principles of aesthetic philosophy and design theory. Lectures, visuals, readings, discussions, historical analysis, research and field trips.

**DMT 151 CREATIVE DESIGN FOUNDATIONS. (5)**

Exploration of the basic design elements and principles as they relate to two- and three-dimensional design and the development of interior space. Fundamental studio experiences include line analysis and application of line, shape, form, space, texture, and color. Studio, ten hours per week. Prereq: Design major only.

**DMT 232 APPAREL PRODUCTION STUDIO. (3)**

Principles of apparel production for men, women and children. Development of basic construction skills. Studio: Six hours. Prereq: DMT 120 or DMT 121.

**DMT 234 HUMAN FACTORS OF DESIGN THEORY. (3)**

A study of the relationship between the built environment and people. Topics include human factor issues that relate to the design of interior spaces such as proxemics, anthropometrics, ergonomics, perception and the application of behavioral research in design process. Prereq: Three hours in sociology or psychology.

**DMT 237 VISUAL DESIGN IN DRESS. (3)**

An introduction to apparel style terminology. Application of design principles to apparel. Consideration of aesthetic and anthropometric needs of individual body types, color analysis.

**DMT 244 HISTORY AND THEORY OF 20TH CENTURY DESIGN. (3)**

An in-depth analysis of the seminal works in interior design, architecture, and urbanism, with emphasis on the major concepts in design theory and aesthetic philosophy of the 20th century. Lectures, readings, discussions, historical analysis, research, and field trips. Prereq: DMT 141, DMT 142.

**DMT 247 INTERDISCIPLINARY APPROACH TO DRESS. (3)**

A study of the social, cultural, physical, and psychological factors which influence apparel and apparel use in contemporary society. Prereq: Three hours in sociology or anthropology, three hours in psychology.

**DMT 253 INTERIOR DESIGN GRAPHIC COMMUNICATION. (5)**

An introduction to graphic communication theory and the various techniques of drawing employed in the interior design process, including free hand sketching, soft line and hard line schematics and technical drafting conventions. Both formal and informal presentations of drawings are explored. Illustrations are limited to achromatic media. Studio experiences, analyses, discussions, readings and field trips. Prereq: DMT 151.

**DMT 254 COLOR THEORY AND APPLICATION. (5)**

The study of color theory and its application to the field of human environment. Color terminology, introduction to color theories and analysis of color principles in interior environments. An application of color theory to exploration of graphic communication techniques. Lectures, discussion, selected readings, studio appreciation and field trips. Studio, ten hours per week. Prereq: DMT 151 or equivalent and DMT 253.

**DMT 273 INTERIOR DESIGN AWARENESS. (3)**

A survey of interior design principles, practices, theories, products and trends. Visuals, readings, discussions and exercises. Emphasis on increasing participant's awareness of interior space and the inherent physical and psychological qualities of one's personal environment. Nonmajors only.

**DMT 306 ANALYSIS OF APPAREL QUALITY. (3)**

A study of the factors affecting the quality and cost of apparel in the ready-to-wear industry. An analytical approach to evaluating apparel quality and its relation to cost and consumer satisfaction. Industry field trip. Lecture, two hours; laboratory, two hours per week. Prereq: Majors – DMT 121, 237; Nonmajors – consent of instructor.

**DMT 310 APPAREL INDUSTRY.** (3)  
 Organization and operation of the industry; influence of designers, manufacturers, retailers, media and consumers. Introduction to fashion theory, industry terminology and sociopsychological concepts. Field trips. Prereq for majors: DMT 114, DMT 237, COM 181.

**DMT 312 APPLIED MERCHANDISING TECHNIQUES.** (3)  
 Survey of promotional procedures of retail and wholesale organizations including methods of visual merchandising, special event production, and public relations. Field trips. Lecture, two hours; studio, two hours. Prereq: DMT 114, DMT 237, DMT 310.

**DMT 335 INTERIOR BUILDING SYSTEMS I.** (3)  
 An introduction and overview of structural, electrical, mechanical, thermal and acoustical systems of buildings. Emphasis is on case-study analysis and problem-solving related to the integration of building systems and interior environments. Subject matter includes code analysis and interpretation. Lectures, discussions, readings, research and field trips. Prereq: DMT 254.

**DMT 349 ANALYSIS OF HOUSING FORMS.** (3)  
 The influence of social, cultural, political, and economic factors on housing, design, and construction. An historical analysis with emphasis on housing design theories in the U.S. during the 20th century. Lectures, discussions, readings, research and field trips.

**DMT 355 INTERIOR DESIGN STUDIO 1.** (5)  
 Studio problems in interior design related to behavioral responses to static and kinetic spaces in personal and small group situations. Research analyses, discussions, critiques, field trips. Studio, 10 hours per week. Prereq: DMT 244, DMT 254, DMT 264 and approval for continuation from the Sophomore Portfolio Review. Concur: DMT 365.

**DMT 356 INTERIOR DESIGN STUDIO 2.** (5)  
 Intermediate studio problems in interior design. Emphasis on issues of public and private use of interior spaces such as exhibit/retail spaces, private and open office spaces, financial institution spaces and hospitality spaces. Research, analyses, discussions, critiques, field trips. Studio, 10 hours per week. Prereq: DMT 355, DMT 365; concur: DMT 346.

**DMT 359 SPECIAL TOPIC IN INTERIOR DESIGN, MERCHANDISING, AND TEXTILES (Subtitle required).** (1-3)  
 Exploration of specific topic in the field of interior design, merchandising, and textiles. May be repeated to a maximum of six credits. Prereq: Junior standing or consent of instructor prior to registration.

**DMT 365 INTERIOR DESIGN FINISH MATERIALS.** (3)  
 An analysis and evaluation of interior design finish materials and production methods. Emphasis on health-safety factors, performance attributes, and user requirements. Lectures, discussions, field trips, research, analyses, calculations. Prereq: DMT 121; Concur: DMT 355.

**DMT 366 INTERIOR BUILDING SYSTEMS II.** (3)  
 An in-depth study of principles, design requirements and equipment for ambient, task and decorative illumination as utilized in the interior environment. Emphasis is on methods of light generation, control, product analysis, selection, and specification. Lectures, discussion, related readings, calculations and field trips. Prereq: DMT 335.

**\*DMT 367 COMPUTER-AIDED DESIGN.** (3)  
 A study of the methods by which the computer may be used as a tool within the interior design profession. Lectures, laboratory, readings, discussions, functional analysis, research, and field trips. Lecture, two hours; laboratory, two hours per week. Prereq: DMT 253.

**†DMT 385 SPECIAL PROBLEMS.**

**DMT 395 INDEPENDENT STUDY IN INTERIOR DESIGN, MERCHANDISING, AND TEXTILES.** (1-3)  
 Problems involving independent laboratory, studio, and/or library study conforming to the student's special interest under the direction of an appropriate faculty member having proficiency in the area selected. May be repeated to a maximum of six credits. Prereq Consent of instructor and contractual agreement.

**DMT 414 MERCHANDISING PROCEDURES.** (3)  
 Application of retail management and merchandising principles to the distribution of fashion goods and services. Prereq: DMT 114, 310, MKT 300, ACC 201, ECO 201, 202.

**DMT 415 APPLIED INDUSTRY PLANNING AND CONTROL.** (3)  
 Study and application of design, production and retail planning and control procedures which are essential to the industry. Prereq: DMT 114, 310, MKT 300, ACC 201, ECO 201, 202.

**DMT 432 APPAREL DESIGN.** (3)  
 This is an applied design course involving the aesthetic, functional and structural aspects of contemporary clothing. Emphasis is given to women's fashion apparel. Factors affecting the evolution of apparel designs and the cyclic aspects of fashion in addition to aesthetics, function, structure and fabrication are considered. Studio work involves study of the design process and development of competency in fashion sketching. Sketching techniques are utilized in both exploring design problems and communication solutions. Analysis of specific human needs to be met by apparel items, problems of fabrication and marketing are basic for effective apparel design problem solution. Prereq: DMT 232 or DMT 306, 237 and 310.

**DMT 450 INTRODUCTION TO RESEARCH IN MERCHANDISING, APPAREL AND TEXTILES.** (3)  
 Study of research theory and its application to issues in merchandising, apparel and textiles. Prereq: DMT 310, MKT 300 and STA 200.

**\*DMT 466 INTERIOR DESIGN PROFESSIONAL PRACTICE.** (3)  
 The development of custom design elements and studies within the framework of professional business practices and documentations. Lectures, discussions, guest speakers, field trips and design exercises, including developmental sketches, material selection, shop drawings, and scaled prototypes. Prereq: Senior standing.

**DMT 480 MERCHANDISING AND DESIGN STUDY TOUR.** (1-3)  
 A domestic or foreign study tour to include investigation of interests related to merchandising, apparel, and design. Professional visits are planned according to particular itineraries. Application and payment dates are determined each semester by the instructor. This course may be repeated one time if tour destinations are different. Prereq: Priority is given to majors and upperclassmen. All students are subject to instructor approval.

**\*DMT 490 INTERNSHIP.** (3, 6, or 9)  
 Supervised experience with a cooperative retail, design, or industrial establishment. Fall and summer semesters. Applications must be submitted spring semester according to a designated schedule established by the department. Prereq: Senior standing and approval of department.

**DMT 515 SPECIFICATION AND EVALUATION OF TEXTILES AND APPAREL.** (3)  
 The course will focus on product development and quality control in textile products (Apparel and Interiors), by developing specifications and evaluating the quality of a textile product. Prereq: DMT 121, DMT 306 or consent of instructor.

**DMT 520 TEXTILES FOR INTERIORS.** (3)  
 Selection, cost, expected performance and care of textiles used in residential and commercial interiors. Prereq: DMT 120, 121.

**DMT 522 HISTORY OF TEXTILES.** (3)  
 Survey of the development of textiles from ancient to modern times. Emphasis on social, economic, technological and political effects on the evolution of textile fibers, fabric structures, color and design. Field trips. Prereq: DMT 120 or 121, plus six hours in European history, Western culture, or art history.

**DMT 525 ECONOMICS OF THE APPAREL AND TEXTILE INDUSTRY.** (3)  
 A critical review of the apparel and textile industries, including structure, marketing practices, and government policies that affect merchandising and consumption of apparel and textile products. Factors such as the role of labor unions will be examined as well as the effects of international trade on apparel and textile products. Prereq: DMT 120 or 121, ECO 201, 202.

**DMT 532 ADVANCED APPAREL PRODUCTION STUDIO (Subtitle required).** (3)  
 Analysis and interpretation of apparel design or production methods. Application of techniques for patternmaking, special construction, new equipment, or experimental materials. May be repeated under a different topic to a maximum of nine credits. Studio, six hours per week. Prereq: DMT 232, 306 and consent of instructor.

**DMT 533 HISTORY OF COSTUME.** (3)  
 Development of costume from ancient to modern times with consideration of historic, social, and economic setting. Field trips. Prereq: Six hours in European history, Western culture, or art history; or consent of instructor.

**DMT 545 CLOTHING FOR SPECIFIC NEEDS.** (3)  
 A study of the social, psychological, and functional needs of clothing related to specific populations such as the elderly, children, handicapped persons, and occupational groups. Field trips. Prereq: DMT 247.

**DMT 547 SOCIAL AND PSYCHOLOGICAL ASPECTS OF APPAREL.** (3)  
An advanced study of the social, psychological factors which influence apparel and apparel use with particular emphasis on research. Prereq: DMT 247 for majors only. Non-majors: three hours in sociology or anthropology and three hours in psychology. (Same as SOC 547.)

**DMT 557 INTERIOR DESIGN STUDIO 3.** (5)  
Advanced studio problems in interior design related to commercial spaces: retail, office, financial and hospitality. Studio experiences, analyses, discussions, readings and field trips. Studio, 10 hours per week. Prereq: DMT 356.

**DMT 558 INTERIOR DESIGN STUDIO 4.** (5)  
Specialized studio problems in interior design related to institutional spaces such as schools, hospitals and health care facilities. Studio experiences, analyses, discussions, readings and field trips. Studio, 10 hours per week. Prereq: DMT 557.

**DMT 559 SPECIAL TOPIC IN INTERIOR DESIGN, MERCHANDISING, AND TEXTILES. (Subtitle required).** (1-3)  
Advanced in-depth study of interior design, merchandising, and textiles. May be repeated to a maximum of six credits. Prereq: Senior standing or consent of instructor prior to registration.

**DMT 589 RES/PRES I: INTRODUCTORY CONCEPTS OF RESTORATION AND PRESERVATION.** (3)  
A general introduction to the separate and definable qualities of restoration and preservation as employed by the client/designer. A survey of 18th and 19th century architectural characteristics, related government agencies, local and national case studies. Class emphasis on readings, discussions, visuals, site visitations, and guest speakers. Prereq: Senior standing or consent of instructor.

†**DMT 593 PRO/PRAC II: PROFESSIONAL PRACTICE AND FIELD EXPERIENCE.**

**DMT 595 INDEPENDENT STUDY IN INTERIOR DESIGN, MERCHANDISING, AND TEXTILES.** (1-3)  
Problems involving independent laboratory, studio, and/or library study conforming to the student's special interest under the direction of an appropriate faculty member having proficiency in the area selected. May be repeated to a maximum of six credits. Prereq: Senior standing or consent of instructor and contractual agreement.

**DMT 600 RESEARCH METHODOLOGY IN HUMAN ENVIRONMENTAL SCIENCES.** (3)  
Students will study scientific techniques and accepted research methodologies in human environmental science research. Emphasis is placed on understanding the research process and developing the skills necessary to evaluate and implement research methods and design procedures. Prereq: Graduate standing. (Same as HES 600.)

**DMT 622 ADVANCED HISTORY OF TEXTILES.** (3)  
An in-depth investigation into the developments of historic textiles from ancient to modern times. An analysis of the social, economic, technological and political effects on the evolution of textile fibers, fabric structures, color and design. A research project will include an analysis of a historic textile or textile application. Prereq: Three credits of History of Textiles or consent of instructor.

**DMT 633 ADVANCED HISTORY OF COSTUME.** (3)  
An in-depth investigation into the history of costume from ancient to modern times with application of history, social and economic factions. A research project will transform the information into an analytical problem of a historic costume. Prereq: Three credits of History of Costume or consent of instructor.

**DMT 641 REGIONAL VARIATIONS IN COLONIAL AMERICAN DESIGN.** (3)  
An analysis of regional variations in American furnishings, interior finishes, and architecture from colonization to 1783; consideration will be given to historical, economic, social, political, and religious influences on design. Prereq: DMT 142 or consent of instructor.

**DMT 642 HISTORIC AMERICAN INTERIORS.** (3)  
An in-depth analysis of social, economic and technological forces from 1783 to the early twentieth century that influenced decoration in historic American interiors. Emphasis will be placed on interior space planning, surface materials and treatments, furnishings, and the decorative arts with specific application toward preservation and adaptive use projects. Prereq: DMT 589 or equivalent or consent of instructor.

**DMT 646 CURRENT RESEARCH ISSUES IN ENVIRONMENTAL DESIGN.** (3)  
A seminar focusing on the current research pertaining to the relationship between the built environment and human behavior, performance or response. Various typical design facilities will be reviewed. Concurrent with HES 600. Prereq: DMT 346 or equivalent.

**DMT 650 SURVEY OF CURRENT THEORIES AND LITERATURE.** (3)  
An intensive survey of the theoretical and empirical literature related to the area of interior design, merchandising, apparel and textiles. Emphasis will be placed on research literature and theory building.

**DMT 655 ISSUES IN CREATIVITY AND DESIGN.** (3)  
This course will examine theory and research on creativity. The emphasis will be on social structure, social roles, norms and socialization processes related to creativity such as personality, process, and press. Throughout the course, emphasis will be given to theoretical frameworks and methodological procedures necessary to advance understanding of creativity to help students form a knowledge base for developing an in-depth research topic. Prereq: Graduate standing.

**DMT 659 INTERIOR DESIGN STUDIO 5.** (3)  
Advanced studio problems in an aspect of the human environment. Emphasis is placed on design research and programming. Studio experiences, analyses, discussions, readings, and field trips. Studio, six hours per week. Prereq: DMT 558 or consent of instructor.

**DMT 660 INTERIOR DESIGN STUDIO 6.** (3)  
Advanced studio problems in an aspect of the human environment. Emphasis is placed on design application. Studio experiences, analysis, discussions, readings, and field trips. Studio, six hours per week. Prereq: DMT 659 or consent of instructor.

**DMT 665 ENVIRONMENTAL ISSUES RELATED TO INTERIOR DESIGN.** (3)  
An examination of the philosophical and ethical issues in the practice of interior design. Discussions covered will focus on designer's responsibilities in regard to product specification and interior construction or product technology. Various issues such as preservation of the global environment, socioeconomic concerns, and health, safety and welfare of the users will provide the topics for review. Prereq: DMT 365 or equivalent.

**DMT 669 ADVANCED COLOR THEORY AND APPLICATION.** (3)  
Advanced color theory will examine the physical, psychological, historical and technical perspectives. Application of color theory to textiles and apparel and the built environment. Including color forecasting, technical processes, color specification, and quality control. Prereq: Introduction to Textiles, Introduction to Color Theory.

**DMT 700 RESEARCH PROBLEMS IN INTERIOR DESIGN, MERCHANDISING, AND TEXTILES.** (3)  
Independent research for the exploration of a specific problem in interior design, merchandising, and textiles. May be repeated to a maximum of six credits. Prereq: Eighteen credit hours of graduate work.

**DMT 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**DMT 759 SPECIAL TOPICS IN INTERIOR DESIGN, MERCHANDISING, AND TEXTILES (Subtitle required).** (1-3)  
Advanced work on a specific topic in interior design, merchandising, and textiles. May be repeated to a maximum of twelve credits. Prereq: Graduate standing.

**DMT 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.

**\*DMT 772 SEMINAR IN INTERIOR DESIGN, MERCHANDISING AND TEXTILES.** (1-3)  
Current investigation of interior design, merchandising and textiles. May be repeated to a maximum of six credits.

**DMT 785 INDEPENDENT STUDY IN INTERIOR DESIGN, MERCHANDISING, AND TEXTILES.** (1-3)  
Problems involving independent laboratory, studio, and/or library study conforming to the student's special interest under the direction of an appropriate faculty member having proficiency in the area selected. May be repeated to a maximum of six credits. Prereq: Nine credit hours of graduate study, consent of instructor, contractual agreement.

**DR Diagnostic Radiology**

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**DR 850-899 FOURTH-YEAR ELECTIVE  
FOR MEDICAL STUDENTS.**

**(1-6)**

With the advice and approval of the Third and Fourth Year Curriculum and Student Progress Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or by the permission of Third and Fourth Year Curriculum and Student Progress Committee.

**Approved electives:**

**DR 850 FOURTH-YEAR ELECTIVE IN DIAGNOSTIC RADIOLOGY**

**DR 855 NUCLEAR MEDICINE**

**DR 856 PEDIATRIC RADIOLOGY**

**DR 890 OFF-SITE CLERKSHIP IN DIAGNOSTIC RADIOLOGY**

## ECO Economics

### ECO 101 CONTEMPORARY ECONOMIC ISSUES. (3)

A basic course in the analysis of contemporary economic issues with emphasis on current economic topics such as inflation, poverty and affluence, urban congestion, and environmental pollution. (Credit will not be given for this course to students who have received prior credit in ECO 201 and/or 202, and/or ECO 260 and/or 261.)

### ECO 201 PRINCIPLES OF ECONOMICS I. (3)

The study of the allocation of scarce resources from the viewpoint of individual economic units. Topics include household and firm behavior, competitive pricing of goods and resources, and monopoly power. (Credit will not be given for this course to students who have received credit in ECO 261.)

### ECO 202 PRINCIPLES OF ECONOMICS II. (3)

A study of how society's needs are satisfied with the limited resources available. Topics include contemporary issues such as inflation, unemployment, economic growth, international dependencies, and how public policy deals with them. (Credit will not be given for this course to students who have received credit in ECO 260.) Prereq: ECO 201 or equivalent.

### ECO 391 ECONOMIC AND BUSINESS STATISTICS. (3)

A survey of statistical techniques relevant to modern economics and business, with major emphasis on correlation and regression, Bayesian decision theory, index numbers, time series analysis, and forecasting models. Prereq: STA 291 or equivalent.

### ECO 395 INDIVIDUAL WORK IN ECONOMICS. (1-6)

Students confer individually with the instructor. Written paper usually expected and filed in chairperson's office. May be repeated to a maximum of six credits. Prereq: GPA of 3.0 in major, approval of instructor and chairperson.

### ECO 400 SEMINAR IN ECONOMICS (Subtitle required). (3)

Readings, research and discussion in a seminar format to illuminate problems of historical and contemporary interest in areas of special faculty competence. May be repeated to a maximum of nine credits, but may not be repeated under the same subtitle. Will be limited to a maximum of 15 students. Prereq: ECO 201, 202, plus two additional economics courses.

### ECO 450G THE ECONOMICS OF POVERTY AND WELFARE PROGRAMS. (3)

Examines the economic conditions of the poor in the U.S., theories of poverty, and major redistribution programs in the U.S. The course will study the economic impacts of such programs as Social Security, Medicare, Aid to Families with Dependent Children, Food Stamps, Medicaid, and child care subsidies. Prereq: ECO 202 or consent of instructor.

### ECO 461 MARKET STRUCTURE AND ANTI-TRUST POLICY. (3)

A study of the relationship between industry performance and market structure, and the role and effect of the government's anti-trust policies. Prereq: ECO 202 or equivalent.

### ECO 463 ANALYSIS OF BUSINESS CONDITIONS. (3)

A study of economic factors causing fluctuations in aggregate economic activity and the methods of forecasting business activity. Prereq: ECO 202 or equivalent, and ECO 391.

### ECO 465G COMPARATIVE ECONOMIC SYSTEMS. (3)

This course deals with the theoretical underpinning of the major economic systems in existence today. The classical model of competitive market capitalism is reviewed first, followed by the Marxian and neo-Marxian (Leninist) critique of capitalism. Next, the contemporary Keynesian and the neo-Keynesian models are analyzed. This course concludes with a review of the Lange model of decentralized (market) socialism. Prereq: ECO 202 or equivalent.

### ECO 467 AMERICAN ECONOMIC HISTORY. (3)

The development of the American economy will be examined within the general framework of economic theory. Major emphasis will be given to the long-run process of economic growth of the economy from the colonial period to the present. Prereq: ECO 202 or equivalent.

### ECO 471 INTERNATIONAL ECONOMICS. (3)

The basic exchange model is the most important topic in this course. The exchange model is used to illustrate the gains from trade, the role of opportunity costs, and the properties of relative prices. Production considerations, the concept of comparative advantage, and the resulting factor rewards are introduced. Trade distortions are introduced and studied from the point of view of protectionism and its consequences. Fixed and flexible exchange rates and the concept of balance of payments are also covered. Prereq: ECO 202 or equivalent. (Same as AEC 471.)

### ECO 473G ECONOMIC DEVELOPMENT. (3)

A comparative study of economic progress in selected countries; growth patterns, theories of development and capital formation, interaction of social and economic change. Prereq: ECO 202 or equivalent.

### ECO 477 LABOR ECONOMICS. (3)

Application of economic principles to analyze the operation of labor markets. Topics covered include: theories of labor movements, comparative analysis of unionism in different economies, labor supply, labor demand, human capital, collective bargaining, public policy and the operation of labor markets. In addition, selected topics such as female and minority employment, social security, and industrial conflict will be covered. Prereq: ECO 202 or equivalent.

### ECO 479 PUBLIC ECONOMICS. (3)

An application of economic analysis to the study of the role of government. Emphasis is on the reasons for and the effects of government intervention in the economy. Topics covered include: market failure, public goods and externalities, welfare policy, voting and public choice, taxation, public debt and cost-benefit analysis. Prereq: ECO 202 or equivalent. (Same as AEC 479.)

### ECO 485G MONETARY ECONOMICS. (3)

A detailed discussion of the financial sector of basic static macroeconomic models, including the views of both the monetarist and neo-Keynesian schools. Institutional aspects of the financial system are discussed. The course stresses problems of economic stabilization. Prereq: ECO 202 or equivalent.

### ECO 487G INTERMEDIATE MACROECONOMIC THEORY. (3)

National income concepts, the determination of aggregate income and employment, the theory of money and inflation and problems of economic growth. Prereq: ECO 202 or equivalent.

### ECO 488G INTERMEDIATE MICROECONOMIC THEORY. (3)

An analysis of the behavior of consumers and firms, price determination, various market structures, and income distribution. Prereq: ECO 202 or equivalent.

### ECO 492G ECONOMIC MODELING AND DATA ANALYSIS. (3)

To provide the student with a firm foundation in the concepts and procedures for the design, estimation, and analysis of economic models. Emphasizes the structure and utilization of economic models, the availability of economic information, and consideration of computer systems available for data base management. Prereq: ECO 391, 487G or consent of instructor.

### ECO 590 INTRODUCTION TO QUANTITATIVE ECONOMICS I. (3)

An introduction to mathematical approaches to economic theory. Emphasis on linear models, constrained optimization, and techniques used in comparative statics. Prereq: ECO 488G; MA 113; or consent of instructor. (Same as AEC 590.)

### ECO 610 MANAGERIAL ECONOMICS. (3)

Analysis of applications of economic theory to management decision making. Such problems as demand and cost determination, pricing, and capital budgeting are treated. Prereq: Graduate standing, MA 123 or its equivalent.

### ECO 611 BUSINESS CONDITIONS ANALYSIS. (3)

Applied macroeconomics course that covers general economic conditions affecting organizations. Topics include national income accounts, price indices, and the determination of national income through IS-LM and aggregate supply and demand analysis. Additional problems studied include deposit creation, monetary aggregates, business cycles, stabilization policy, expectations, inflation, and unemployment. Prereq: Graduate standing, ECO 610, MGT 650.

### ECO 626 TIME SERIES ANALYSIS. (3)

Time series and stochastic processes, auto-correlation functions and spectral properties of stationary processes; linear models for stationary processes, moving average, auto-regressive and mixed auto-regressive-moving average processes; linear nonstationary models, minimum mean square error forecasts and their properties; model identification, estimation and diagnostic checking. Prereq: STA 422G or its equivalent. (Same as STA 626.)

### ECO 636 HEALTH ECONOMICS. (3)

This course applies general theoretical principles of economics to the health care sector. The basic approach is to recognize the importance of scarcity and incentives, allowing for differences peculiar to health. The demand and supply of health and medical care are examined as they involve physicians, nurses and hospitals. The competitiveness of their markets, health insurance and the role of government are explored. Special topics include regulation and planning, benefits-cost analysis, and reform health plans. Prereq: PA 652, HA 601, HA 621, MHA or MPA program status. (Same as HA/PA 636.)

**ECO 652 PUBLIC POLICY ECONOMICS. (3)**

Principles and practices of economical resource management in the governmental sector: tax and expenditure types, intergovernmental fiscal cooperation, debt financing, budgeting and financial planning. Prereq: MPA or MHA program status; prereq or concur: completion of MPA or MHA computer skills program requirement. (Same as HA/PA 652.)

**ECO 660 ADVANCED MICROECONOMIC THEORY. (3)**

An intensive course covering microeconomic theory and its various methodological and analytical techniques. Prereq: ECO 488G or consent of instructor.

**ECO 661 MACROECONOMIC THEORY. (3)**

National income and employment theory, theories of inflation, and problems of economic growth. Not open to those with credit in ECO 761. Prereq: ECO 487G or consent of instructor.

**ECO 662 RESEARCH METHODS AND PROCEDURES IN ECONOMICS. (3)**

The basic procedures and methods of research in economics are considered from the standpoint of their applicability to problem solving and discovery of new scientific facts and generalizations in economics. Definition of the problem, statement of hypothesis, research design, data collection methods, and data analysis constitute the major topics. Attention is given to proper style and preparation of research reports in economics. Prereq: Second semester standing as a graduate student in economics.

**ECO 665 HISTORY OF ECONOMIC THOUGHT I. (3)**

The background and development of English political economy up to 1848.

**ECO 670 ECONOMICS OF INTERNATIONAL FINANCIAL INSTITUTIONS. (3)**

An in-depth study of financial markets, commercial banking, and business finance in an international setting. Prereq: ECO 471G, 485G.

**ECO 671 INTERNATIONAL ECONOMICS SEMINAR I. (3)**

History and analysis of theories of international trade; theories of international equilibrium and mechanisms of equilibrium adjustments; theory of economic integration. Prereq: ECO 471G.

**ECO 672 WORLD TRADE AND COMMERCIAL POLICY. (3)**

An analysis of trade patterns and the implication of government policy on trade, in the light of both economic theory and empirical findings. Prereq: Successful completion of an upper division undergraduate or graduate level economics course.

**ECO 674 AGRICULTURE AND ECONOMIC DEVELOPMENT. (3)**

Analytical consideration of the role of agriculture in economic development in relation to overall development strategy at various stages of growth. Theoretical and policy issues of particular relevance to the agricultural development in underdeveloped agrarian economies with various resource, social, political and economic systems. Prereq: ECO 473G or consent of instructor. (Same as AEC 626.)

**ECO 676 LABOR ECONOMICS I. (3)**

The theory and estimation of the demand for and the supply of labor are introduced. Topics include demographic changes, minimum wages, retirement, and secular trends in labor force participation. The concept of human capital is examined, including applications to income distribution. Theory and evidence on the structure of wages in the U.S. is considered. Topics include compensating wages and race and gender differences. Prereq: ECO 487G and ECO 488G or consent of instructor.

**ECO 679 PUBLIC ECONOMICS. (3)**

An advanced study of both how government activities influence allocation, relative prices and welfare and what is the proper role of the public sector in resource allocation. Relevant topics include: public goods, externalities, tax incidence, optimal taxation, benefit-cost analysis, public pricing, fiscal federalism, state-municipal finance and public choice. Prereq: ECO 487G, 488G or consent of instructor.

**ECO 680 BENEFIT-COST ANALYSIS. (3)**

Principles, practices and applications of applied welfare analysis are the content of this course. The basic theory of benefit-cost analysis is presented and the relevance of implementation analysis in policy analysis is established. Prereq: PA 652. (Same as PA 680.)

**ECO 683 URBAN AND REGIONAL ECONOMICS. (3)**

An intensive study of the theory, evidence and policy concerning urban areas and regions. Topics typically covered include: nature of regions and urban areas, size and distribution of cities, location decisions, housing, transportation, migration and regional growth. Prereq: ECO 487G, 488G, 492G or consent of instructor.

**ECO 684 ENVIRONMENTAL ECONOMICS, REGULATION AND POLICY. (3)**

This course takes a balanced practitioner approach to the problems of the environment and environmental regulation. Efficiency aspects will be developed carefully, so as to provide a background for an extensive coverage of various available alternative policies. Prereq: PA 652 and MPA or economics program status or consent of instructor. (Same as PA 727.)

**ECO 686 MONETARY ECONOMICS: THEORY. (3)**

Demand and supply of money and other assets. The financial sector in macro-static and dynamic models of the economy. Prereq: ECO 760, 761 or consent of instructor.

**ECO 687 MONETARY ECONOMICS: POLICY. (3)**

Theory of public policy making. Central bank policy instruments and the effectiveness of monetary policy. Debt management and the term structure of interest rates. Econometric studies of the financial sector. Reforming financial institutions. Prereq: ECO 686 or consent of instructor.

**ECO 688 OPTIMIZATION AND ECONOMIC THEORY I. (3)**

A study of the applications of optimization techniques such as search theory, the calculus of variations, optimal control theory, and dynamic programming through economics. Applied topics may include the economics of information, economics of uncertainty, and modern theories of consumer and firm behavior. Prereq: ECO 762.

**ECO 691 INTRODUCTION TO ECONOMETRICS I. (3)**

The first course in the introduction to econometrics. A comprehensive survey of the general linear regression, autocorrelation, errors in variables and distributed lag models. Prereq: STA 424G, STA 525 or consent of instructor.

**ECO 692 INTRODUCTION TO ECONOMETRICS II. (3)**

The second course in the introduction to econometrics. A comprehensive survey of identification, estimation and hypothesis testing in the context of simultaneous equations model. Prereq: ECO 691 or consent of instructor.

**ECO 700 TEACHING METHODS IN BUSINESS. (1)**

A three part course that examines what constitutes good teaching and explores effective techniques for college instruction. Seminars emphasize practical information for both the principal activities and the details of teaching. Departmental discussions allow students to discuss issues that arise in their teaching practice. Reviews of classroom performance provide professional feedback in order to enhance on-the-job learning. Seminar, two hours per week. Prereq: Approval of Director of Graduate Studies. (Same as BA 700.)

**ECO 741 THEORY OF THE FIRM AND MARKET STRUCTURE. (3)**

A study of firms and markets covering such topics as organizational structure and objectives of firms; product selection, advertising and quality; price discrimination; vertical control; entry, accommodation and exit; cost structure and market organization, market structure and performance; and public policy. Prereq: ECO 660.

**ECO 742 INDUSTRIAL ORGANIZATION. (3)**

A comprehensive survey of the literature in industrial organizations including static theories of oligopoly, dynamic theories of oligopoly, information about strategic behavior, research and development, patents, and adoption of new technology.

**ECO 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**ECO 752 THE ECONOMICS OF POLICY ANALYSIS. (3)**

This course examines economic approaches to policy analysis. Included is an analysis of the major concepts of economic analysis and their application to a number of policy problems. Prereq: PA 652 or equivalent, and Ph.D. program status or consent of instructor. (Same as PA 752.)

**ECO 760 NEOCLASSICAL MICROECONOMIC THEORY. (3)**

The Neoclassical theory of consumer behavior, production, market equilibrium and imperfect competition. Prereq: ECO 448G, 590 or consent of instructor.

**ECO 761 ADVANCED MACROECONOMIC THEORY. (3)**

The rigorous development of a general equilibrium macroeconomic model in the context of the recent literature. Prereq: ECO 487G, 661 or consent of instructor.

**ECO 762 GENERAL EQUILIBRIUM ANALYSIS AND WELFARE ECONOMICS. (3)**

Existence, stability, efficiency and Pareto satisfactoriness of competitive equilibrium. Recent developments in general equilibrium and welfare theory. Prereq: ECO 488G, 590 or consent of instructor.



**ECO 763 SEMINAR IN MACROECONOMIC THEORY. (3)**  
Recent developments and major issues in contemporary macroeconomic theory. Prereq: ECO 761.

**ECO 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**ECO 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

**ECO 771 INTERNATIONAL ECONOMICS SEMINAR II. (3)**  
Trade and economic development; determination of international payments equilibrium; econometric studies in world trade; computation of terms of trade; new developments in trade theory. Prereq: ECO 471G.

**ECO 776 LABOR ECONOMICS II. (3)**  
Dynamic and cyclical labor demand are examined theoretically and empirically. Models of unemployment are considered, including search theory and the implicit contract model. Aspects of labor unionism are examined including changes in union membership, strikes, and union wages and employment. The incentive effects of compensation are discussed, including sorting models and the principal-agent problem. Prereq: ECO 660 or consent of instructor.

**ECO 788 OPTIMIZATION AND ECONOMIC THEORY II. (3)**  
A continuation of ECO 688. The specific areas of study may differ from one semester to the next, but will be selected from such subjects as general equilibrium theory, social choice, game theory, economics of uncertainty, and the economics of information. Prereq: ECO 688.

**ECO 792 ECONOMETRICS I. (3)**  
The first course in the econometrics area of specialization. A comprehensive survey of general linear regression analysis; autocorrelation; errors in variables models; distributed lag models. Prereq: ECO 692, or consent of instructor.

**ECO 793 ECONOMETRICS II. (3)**  
The second course in the econometrics area of specialization. A comprehensive survey of identification, estimation, and hypothesis testing in the context of the simultaneous equations model. Prereq: ECO 792.

**ECO 796 SEMINAR. (1-6)**  
An extended original investigation of some specific topic with a view to giving training in methods of research and studying intensively a particular subject in the field of economics. May be repeated to a maximum of six credits.

**ECO 797 RESEARCH PROBLEMS IN ECONOMICS. (1-6)**  
Students confer individually with the instructor. May be repeated to a maximum of six credits.

## EDA Education – Administration and Supervision

**EDA 401 THE PROFESSIONAL TEACHER: LEGAL PERSPECTIVES. (1)**  
Study of legal concerns of public school teachers. Emphasizes legal rights and responsibilities of teachers and pupils. Lecture, two hours per week for eight weeks. Prereq: Admission to the Teacher Education Program.

**EDA 600 ORGANIZATION AND ADMINISTRATION OF AMERICAN EDUCATION. (3)**  
An analysis of the administration of local, state and federal education agencies and their relationships. A study of the administrative tasks in these agencies.

**EDA 601 ADMINISTRATION OF EDUCATIONAL ORGANIZATIONS. (3)**  
A study of the historical development of educational administration, administrative processes, the application of theory and values in decision making and an introduction to modern management methods applied to education.

**EDA 603 CONSTITUTIONAL AND LEGAL BASIS OF PUBLIC SCHOOL ADMINISTRATION. (3)**  
A study of court decisions to discover the legal principles involved in practical problems of school administration. Prereq: Admission to program in administration and supervision.

**EDA 608 INTERNSHIP IN EDUCATIONAL ADMINISTRATION AND SUPERVISION. (3)**  
Field experiences are provided for prospective administrators under the cooperative supervision of University personnel and principals, supervisors, and superintendents in Kentucky public school systems. May be repeated for a maximum of six credits. Prereq: Admission to program in administration and supervision.

**EDA 629 THE PRINCIPAL. (3)**  
An analysis of the building unit as a sub-system within a larger complex organization. Special emphasis on the changes in the role of the principal as a result of changes in society and in the schools. Prereq: Admission to department program or consent of instructor.

**EDA 632 ADMINISTRATION OF EDUCATIONAL REFORM. (3)**  
Study of administrative responsibilities associated with the development and implementation of educational reform and improvement projects and programs. Focus on knowledge and skills needed to work effectively with others in promoting successful program implementation. Prereq: Admission to Department program or consent of instructor.

**EDA 633 ADMINISTRATION AND SUPERVISION OF INSTRUCTIONAL PROGRAMS. (3)**  
A study of the role of organizational leadership in the development of instructional goals, instructional programs, evaluation procedures and procedures for educational changes.

**EDA 634 ADMINISTRATION OF EDUCATIONAL PERSONNEL. (3)**  
Consideration of the motivation and management of educational personnel with special emphasis on the professional in complex organizations. Attention is given to the theory and practice of collective bargaining in education.

**EDA 635 BUSINESS ADMINISTRATION AND FINANCE OF PUBLIC EDUCATION. (3)**  
A course for prospective superintendents. Emphasizes school support, including state, local, and federal revenues; budgetary policy; procedures for purchasing, accounting, and reporting costs; management of funds, property, equipment, and supplies; payroll procedures, records and reports.

**EDA 639 THE SUPERVISOR. (3)**  
A study of the role of the supervisor of instruction as part of administrative leadership in improving instructional programs with special emphasis on in-service education of staff. Prereq: Admission to program or consent of instructor.

**EDA 641 ORGANIZATION AND ADMINISTRATION OF SCHOOL COMMUNITY RELATIONS. (3)**  
Examination of issues and responsibilities attendant to the organization and administration of a school community relations program at the school district and the school building level. Focus on administrative tasks, duties, and responsibilities and research supporting school community interactions. Prereq: Consent of the instructor.

**EDA 642 MICROCOMPUTER APPLICATIONS IN ADMINISTRATION. (3)**  
This course provides prospective and practicing administrators with the opportunity to gain practical and theoretical knowledge in the subject matter related to microcomputer applications in the school environment.

**EDA 649 THE SCHOOL SUPERINTENDENCY. (3)**  
A study of the work of the chief executive of a school district. Special emphasis upon the development and implementation of policy. Prereq: Admission to the program and consent of instructor.

**EDA 651 FOUNDATIONS OF INQUIRY. (3)**  
Introductory study of assumptions and procedures of systematic inquiry used to investigate administrative, leadership and supervisory phenomena in education. Issues regarding both quantitative and qualitative models of inquiry are included. Prereq: ADSU major or consent of instructor.

**EDA 701 LEADERSHIP IN EDUCATIONAL ORGANIZATIONS I. (3)**  
A study of leadership with particular emphasis on understanding the nature, defining characteristics, responsibilities, contextual determinants, and importance of leadership within educational organizations. Prereq: Admission to Department program or consent of instructor.

**EDA 702 LEADERSHIP IN EDUCATIONAL ORGANIZATIONS II. (3)**  
A study of leadership with particular emphasis on examining the lives and actions of individual leaders for the purpose of understanding the nature, requirements and importance of leadership within educational organizations. Leadership theory is used to inform the discussion about each leader identified and studied. Prereq: Admission to the Department program or consent of instructor.

**EDA 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**EDA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

**#EDA 770 TOPICAL SEMINAR IN EDUCATIONAL LEADERSHIP. (1-3)**  
Advanced graduate students enroll in this topical seminar to enhance their portfolios for educational leadership through concentrated study of innovations in the specialized functions of administration. These specializations include, but are not limited to, the study of curriculum and instructional leadership, educational law, personnel administration, school and community relations, education for diverse populations, budgeting and financing of schools.

**EDA 771 SEMINAR IN ADMINISTRATION. (1-3)**  
A variable topic seminar on selected problems in school administration. Activities designed to improve skill in planning, decision making, organizing, communicating, evaluating, negotiating, and resolving conflict will be provided as appropriate. Educational innovations and processes of implementing change may be analyzed. May be repeated to a maximum of six credits. Prereq: Admission to program or consent of instructor.

**EDA 785 INDEPENDENT WORK IN SCHOOL ADMINISTRATION. (3)**  
Includes research on a practical problem in school administration. Open only to students with at least one semester of graduate work in education. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**EDA 792 RESEARCH IN EDUCATIONAL ADMINISTRATION AND SUPERVISION. (3)**  
Critical examination of representative research studies in administration and related fields. Emphasis upon the students' defining and delimiting an appropriate problem in educational administration and supervision, generating a design appropriate to the problem and selecting appropriate techniques of analysis. Prereq: Admission to program.

## EDC Education – Curriculum and Instruction

**EDC 317 INTRODUCTION TO INSTRUCTIONAL MEDIA. (1)**  
An introductory instructional media experience including basic production and utilization techniques for media materials and operation of commonly used educational media equipment. Topics include graphic preservation, transparency production, audio materials, motion pictures, 35mm photographic techniques, and an introduction to videotape television. Prereq: Admission to a Teacher Education Program.

**EDC 322 ELEMENTARY PRACTICUM. (1-3)**  
Planned and supervised practicum in teaching elementary science, reading, social studies, and mathematics. Observation, selecting objectives and materials, questioning strategies, learning centers, instructional units, and assessment techniques will be emphasized. May be repeated to a maximum of three credits. Lecture, one hour; laboratory, six to twelve hours per week. Prereq: Admission to Early Elementary TEP. Concur: EDC 323, EDC 326, EDC 328, EDC 337, and EDC 339.

**\*EDC 323 CLASSROOM MANAGEMENT AND DISCIPLINE. (3)**  
EDC 323 should be taken in conjunction with EDC 329. Prereq: Admission to Teacher Education Program.

**EDC 325 TEACHING IN THE ELEMENTARY SCHOOL. (3)**  
A course designed to develop understandings relative to program planning, daily schedule, record keeping, evaluation, reporting to parents, professional organizations, and teacher ethics. The unit approach as a method of organizing learning experiences in the elementary school is introduced.

**EDC 326 TEACHING SOCIAL STUDIES IN THE ELEMENTARY SCHOOL. (3)**  
A study of methods and materials for teaching social studies at the elementary level. The course will include a critical analysis of a variety of objectives, instructional materials and strategies, and evaluation techniques for elementary social studies. Consideration will be given to addressing the individual needs of a diverse student population. Special emphasis is placed on instruction in grades K-4. Twenty hours of field experience are required in conjunction with EDC 322. Prereq: Admission to TEP and 15 hours of social sciences. Coreq: EDC 322.

**EDC 328 TEACHING SCIENCE IN THE ELEMENTARY SCHOOL. (3)**  
A critical analysis of a variety of objectives, instructional materials and evaluation techniques for teaching elementary school science, with a special emphasis on grades K-4. Consideration will be given to addressing the individual needs of a diverse student population. Twenty hours of field experience are required in conjunction with EDC 322. Prereq: Admission to TEP and 12 hours of science. Coreq: EDC 322.

**EDC 329 TEACHING READING AND LANGUAGE ARTS. (3)**  
Development of competencies for the teaching of reading and other language arts to groups. Course will also provide an overview of the nature of reading and language arts development from grade K-8. Twenty hours of laboratory work in the schools are required. Prereq: Admission to Early Elementary Education TEP or Middle School TEP.

**EDC 330 DESIGNING A READING AND LANGUAGE ARTS PROGRAM FOR THE MIDDLE SCHOOL. (3)**  
A study of materials and techniques useful in the diagnostic teaching of reading and other language arts with students in grades 5-8. The course will emphasize materials, techniques, and procedures which diagnose individual strengths and weaknesses, and prescriptive instruction based upon the diagnosis. Lecture, three hours; laboratory, one hour. Prereq: EDC 329 or consent of instructor; admission to the Teacher Education Program.

**EDC 334 ORAL AND WRITTEN LANGUAGE DEVELOPMENT IN THE ELEMENTARY SCHOOL. (3)**  
A study of language differences, methods for teaching children with language differences, ways to integrate oral language instruction with the total curriculum, ways to enhance students' expressive writing abilities, and ways to teach grammar, spelling, and handwriting through functional and creative writing activities. Prereq: EDC 329 and admission to the elementary teacher education program.

**EDC 337 TEACHING MATHEMATICS IN ELEMENTARY SCHOOLS. (3)**  
Fundamental concepts of numbers, their relationships, geometry and other mathematics topics for children of grades K-4. Emphasis on use of concrete materials and the development of language, appropriate learning experiences, computational skills, and problem-solving abilities. Prereq: Admission to TEP and MA 202. Coreq: EDC 322.

**EDC 339 DESIGNING A READING AND LANGUAGE ARTS PROGRAM FOR THE ELEMENTARY SCHOOL. (3)**  
A study of materials and procedures for developing reading and language arts skills with elementary students, with an emphasis on grades K-4. Course will emphasize how to diagnose individual student skill strengths and weaknesses and build a prescriptive program based upon the diagnosis. Prereq: EDC 329; admission to the TEP or permission of instructor. Coreq: EDC 322.

**EDC 341 MIDDLE SCHOOL CURRICULUM AND INSTRUCTION. (3)**  
This course is designed to acquaint teachers of early adolescents with the rationale behind the middle school concept, and, in particular, the techniques of teaching as an individual and as a member of an interdisciplinary team. The development of generic teaching skills such as planning, implementing, managing, and evaluating learning programs is emphasized. Prereq: Admission to Teacher Education Program.

**EDC 342 STUDENT TEACHING IN ART. (3-12)**  
Designed to give the student practical experience through observation, planning, teaching, and evaluating procedures. The student works with children on all grade levels under the guidance of the supervising teacher. Offered on a pass-fail basis only. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 343 THE EARLY ADOLESCENT LEARNER: PRACTICUM. (3)**  
This course is designed to extend and apply knowledge of the social, emotional, intellectual, and physical characteristics of the early adolescent learner through observation and interaction in school settings. The course format will include a weekly seminar and a supervised field placement in a middle school setting. Lecture, one hour; laboratory, six hours per week. Prereq: Admission to Teacher Education Program.

**†EDC 344 PRINCIPLES AND TECHNIQUES OF TEACHING IN THE SECONDARY SCHOOL.**

**EDC 345 TEACHING MATHEMATICS IN THE MIDDLE SCHOOL. (3)**

A study of theoretical models and methodological strategies for teaching arithmetic, informal geometry, and introductory algebra at the middle school level. The course will include a critical analysis of a variety of objectives, instructional materials and strategies and evaluation techniques. Consideration will be given to addressing the individual needs of a diverse student population. Prereq: Admission to Teacher Education Program; 18 hours of undergraduate mathematics. Concur: EDC 330 and EDC 343.

**EDC 346 TEACHING SOCIAL STUDIES IN THE MIDDLE SCHOOL. (3)**

A study of theoretical models and methodological strategies for teaching social studies at the middle school level. The course will include a critical analysis of a variety of objectives, instructional materials and strategies, and evaluation techniques for middle school social studies. Consideration will be given to addressing the individual needs of a diverse student population. Prereq: Admission to TEP; completion of 24 hours in social studies. Concur: EDC 330 and EDC 343.

**EDC 347 TEACHING ENGLISH AND COMMUNICATION IN THE MIDDLE SCHOOL. (3)**

This course will explore various approaches to teaching English and communication in the middle school with special emphasis on the nature of language development. Prereq: Admission to the TEP and 24 hours in English/communication specialization. Concur: EDC 330 and 343.

**EDC 348 TEACHING SCIENCE IN THE MIDDLE SCHOOL. (3)**

A study of theoretical models and methodological strategies for teaching science at the middle school level. This course will include a critical analysis of a variety of objectives, instructional materials and strategies, and evaluation techniques for middle school science. Special needs of individuals in a diverse middle school population are emphasized. Prereq: Admission to TEP and 24 hours of science. Concur: EDC 330 and 343.

**EDC 349 STUDENT TEACHING IN THE MIDDLE SCHOOL. (3-12)**

This course is designed to give the student experience teaching within a middle school setting. Weekly seminars will be held to discuss issues relevant to the student teacher's experience. Offered on a pass-fail basis only. Lecture, 1 hour; laboratory, 30 hours per week. Prereq: Must meet published college requirements for student teaching.

**EDC 353 STUDENT TEACHING IN ENGLISH. (3-12)**

Observation and practice in teaching high school English. Included are objectives and content of English courses in high school, planning and methods of teaching, testing, textbook analysis, audio-visual material and equipment, and safety education. Offered on a pass-fail basis only. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 354 STUDENT TEACHING IN LANGUAGES. (3-12)**

Aims and objectives, courses of study, materials, methods, and testing in French, Spanish, and Latin. Includes observation and practice in the content field, safety education, audio-visual aids, and planning conferences with the supervising teacher. Offered on a pass-fail basis only. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 355 STUDENT TEACHING IN THE SCIENCES. (3-12)**

Aims and objectives, courses of study, methods, tests, equipment, general science, biology, physics, and chemistry. The course includes observation and practice, safety education, audio-visual aids, and planning conferences with the supervising teacher. Offered on a pass-fail basis only. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 356 STUDENT TEACHING IN MATHEMATICS. (3-12)**

Aims and objectives, course of study, materials, methods, and testing in algebra, geometry, and trigonometry. Includes observation and practice in the content field, safety education, audio-visual aids, and planning conferences with the supervising teacher. Offered on a pass-fail basis only. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 357 STUDENT TEACHING IN THE SOCIAL STUDIES. (3-12)**

Includes a study of the development and present status of social studies programs, classroom methods and activities, teaching materials, testing and evaluation, professional aids to teachers, safety education, and observation and participation in actual classroom experiences. Offered on a pass-fail basis only. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 358 STUDENT TEACHING IN PSYCHOLOGY. (3-12)**

Culminating in intensive half to full semester field experience in teaching psychology. Forty-hour laboratory per week. May be repeated to a maximum of 12 credits. Offered on a pass/fail basis only. Prereq: Completion of the academic and professional sequence required in social studies education prior to student teaching.

**EDC 362 FIELD EXPERIENCES IN SECONDARY EDUCATION. (1-3)**

Supervised experiences in schools, other education agencies, and the community. Required of all students receiving a bachelors degree in secondary education. Includes field trips, work in schools, and involvement in community projects.

**EDC 377 STUDENT TEACHING IN MUSIC. (3-12)**

A course planned for teachers who expect to become either instructors or supervisors of music in the public schools. Observation, teaching, work on research problems, and conferences with the supervising teacher included. Offered on a pass-fail basis only. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 421 SURVEY OF SECONDARY MATHEMATICS CURRICULUM. (3)**

This course will examine the content of the mathematics curriculum of the secondary school and issues related to that curriculum. Students are expected to demonstrate competency in this content.

**EDC 433 STUDENT TEACHING IN THE ELEMENTARY SCHOOL. (3-12)**

A course designed to give the student experience with and practice in the program of an elementary school. Actual work with children in all learning situations is the basic part of the course. A required weekly seminar will include sessions on: beginning teacher internship, school law and students' rights, administrative organization, and professional development. Offered on a pass/fail basis only. Prereq: Must meet the published college requirements for student teaching.

**EDC 449 SOCIAL PROCESSES AND EFFECTS OF MASS COMMUNICATION. (3)**

The relationship between the organization of modern society and its communication media: Special emphasis is given to the way in which cultural processes and social change have an impact upon the mass media, and upon the way in which the mass media influence cultural processes and social change. The social-psychological bases of communication are studied within a context of theory and research. Prereq: COM/SOC 249 or its equivalent. (Same as COM/SOC 449.)

**EDC 454 CULTURE, EDUCATION AND TEACHING ABROAD. (3)**

Introduction to the social, political, economic, and educational institutions of another country in preparation for student teaching in that country. The process and problems of adjusting to life in another culture will be included as well as instruction in the language of the host country as needed. Faculty from other departments in the University will be used as well as informants from the country involved. Lecture, three hours per week; laboratory, two hours per week for language practice. Prereq: Permission of instructor for students outside of the College of Education. (Same as EPE 454.)

**EDC 500 CLINICAL AND LABORATORY TEACHING. (3)**

The course focuses on generic teaching skills that can be used effectively in a range of school and clinical settings. Included are preparation of instructional objectives, teaching methodologies, materials selection and utilization, and assessment. Lecture, two hours; laboratory, two hours per week. Prereq: 12 hours of social and/or behavioral science and consent of instructor; NUR 814.

**EDC 513 TEACHING ENGLISH AS A SECOND LANGUAGE. (3)**

The course will examine the current theories and methods of teaching English as a second language. The course will include (1) language learning theory as it relates to other disciplines; (2) methods and techniques of contrastive analysis. Prereq: One course in linguistics or consent of instructor. (Same as ENG 513.)

**EDC 521 MATERIALS AND METHODS IN TEACHING MATHEMATICS IN THE SECONDARY SCHOOL. (3)**

A course emphasizing the methods and materials used in teaching secondary school mathematics, including simulated teaching of selected topics from arithmetic, algebra, geometry and upper level school mathematics. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 522 MATERIALS AND METHODS IN TEACHING SOCIAL STUDIES IN THE SECONDARY SCHOOL. (3)**

A course for prospective secondary school social studies teachers in the utilization of materials, resources, equipment and techniques appropriate for modern teaching strategies. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 524 MATERIALS AND METHODS FOR TEACHING SCIENCE IN THE SECONDARY SCHOOL. (3)**

A course designed to provide practical experience in curriculum materials and methods for the development of teaching models in secondary school science. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 525 MATERIALS AND METHODS OF TEACHING ENGLISH IN THE SECONDARY SCHOOL. (3)**

A course designed to develop frames of reference from which to make appropriate selection of materials and methods for the teaching of secondary school English. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 533 TEACHING READING IN THE SECONDARY SCHOOL. (3)**

A study of current methods and materials useful in teaching reading in secondary schools with particular emphasis on the improvement of reading in the content areas. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDC 534 READING AND STUDY SKILLS IN ENGLISH. (3)**

An introductory course for teachers of English. The emphasis is on developing competencies necessary for teaching reading and study strategies in the English and humanities curriculum, especially at the junior and senior high school levels. Lecture, three hours; laboratory, one hour. Prereq: Junior standing, admission to the TEP in English education, or consent of instructor.

**EDC 543 VIDEO TECHNOLOGY IN INSTRUCTION. (3)**

A variety of video applications for educational use are investigated. Classroom exercises and projects develop basic video skills and production experience. Topics include instructional video research studies, video equipment, terminology, and systems; video and computer interface configurations and applications, and aesthetics and visual interpretation.

**EDC 544 USE AND INTEGRATION OF EDUCATIONAL MEDIA. (3)**

Students use a range of traditional, interactive, and emerging technological interventions in analog and digital formats. Students gain skill in the operation, production, and integration of basic media such as video, graphics, videodisk, and CD-ROM in a variety of instructional settings (training, exploratory learning, on-line databases, etc.). Students demonstrate skills via the composition and production of several media documents using available tools and resources.

**EDC 547 INSTRUCTIONAL COMPUTING I. (3)**

Students use instructional computing applications and understand the roles and uses of computers in instruction. Students select and use instructional computing hardware and software appropriate to instructional goals and settings. Students use electronic networks for instructional purposes. Students demonstrate skill using basic productivity software through structured assignments and collaborative projects.

**EDC 548 INSTRUCTIONAL COMPUTING II. (3)**

Students develop skill in advanced aspects of the operation and use of the range of instructional technologies from desktop to distributed computing environments. Students use operating systems, learn network administration, do technology planning, and work with basic authoring tools. Skill is demonstrated through a series of projects including development of a technology plan for a specified work setting and authorship of a prototype program. Prereq: EDC 547 or consent of instructor.

**EDC 550 EDUCATION IN A CULTURALLY DIVERSE SOCIETY. (3)**

A critical study of the concept of disadvantage, relevant teaching practices, institutional programs, and curricula.

**EDC 565 MODERN EDUCATIONAL PROBLEMS. (GENERAL CURRICULUM). (3)****EDC 575, 576 MODERN EDUCATIONAL PROBLEMS. (UNCLASSIFIED). (3 ea.)****EDC 580 INTRODUCTION TO GIFTED EDUCATION. (3)**

This course reviews the historical development of and the theoretical and empirical support for differentiated educational programs for gifted and talented children. Specific issues addressed include defining and identifying giftedness, teacher competencies and training, providing differentiated curricula and program evaluation. (Same as EDP 580.)

**EDC 602 CURRICULA AND PROGRAMMING FOR THE GIFTED. (3)**

Students in this course will examine and evaluate curricular models appropriate of gifted students, and will consider methods for adapting existing curricula to meet the needs of gifted students. The design, implementation and evaluation of program delivery models will be discussed. Prereq: EDC/EDP 580 and teacher certification, or consent of instructor.

**EDC 607 INSTRUCTIONAL DESIGN I. (3)**

Introduction to the instructional design process from needs assessment and goal definition through evaluation. Each student will design prototype instructional materials based on an instructional design model and/or procedures. The course will also introduce students to the field of instructional design and technology.

**EDC 608 INSTRUCTIONAL DESIGN II. (3)**

Critical analysis of instructional design models and their theoretical foundations including the impact of various models and perspectives on the practice and the products of instructional design. Prereq: EDC 607 or consent of instructor.

**EDC 609 INTERACTIVE MULTIMEDIA RESEARCH AND DESIGN. (3)**

Students integrate theory and practice in the design of interactive multimedia for instruction. Students use a wide range of interactive technology and critique existing interactive programs. Research findings in the interdisciplinary field of human-computer interaction and interactive learning concepts are applied to interface design problems. Students design, develop and evaluate a prototype interactive program. Prereq: EDC 544, EDC 547 or consent of instructor.

**EDC 610 DISCIPLINE AND CLASSROOM MANAGEMENT. (3)**

The course is designed to examine the causes of and solutions to disruptive and noncompliant behavior and classroom management problems that are within the control of the classroom teacher. The course content is designed around two approaches: (1) identifying prevalent problems and exploring specific solutions to them; (2) presenting selected strategies and applying them to a variety of problems. In both cases, alternatives are considered in the light of relevant theory, law, research and experience. Prereq: Teacher certification and EDU 203.

**EDC 611 AUTHORIZING APPLICATIONS FOR TECHNOLOGY-BASED INSTRUCTION. (3)**

Focuses on individual and collaborative authoring applications for technology based instructional materials. Topics include linear and non-linear information structures, instructional message design, compositional issues related to audience focus, information density, language control, and organization, and prototype production with industry standard authoring software. Prereq: EDC 547 and EDC 607 or consent of instructor.

**EDC 612 INSTRUCTIONAL DESIGN AND TECHNOLOGY FOUNDATIONS. (3)**

Provides an in-depth survey of the field of instructional design and technology. Topics covered include the history of instructional design and technology, critical issues, current trends and future prospects for the field, instructional development, research, certification, and professional development.

**EDC 615 ADVANCED INSTRUCTIONAL APPLICATIONS FOR THE EARLY ADOLESCENT LEARNER. (3)**

This course for middle school teachers examines the complex nature of the 10 to 14 year old student. Analysis of recent research-based effective instructional strategies to meet the needs, interests, and characteristics of these students will be included. Prereq: Teacher Certification or consent of instructor.

**EDC 616 THE MIDDLE SCHOOL. (3)**

The purpose of this course is to provide middle school teachers with an in-depth analysis of the characteristics of effective middle school facilities. An examination of current curricular models, issues, trends, and exemplary middle schools will comprise the primary focus of this course. Prereq: EDC 615 or consent of instructor.

**EDC 618 ADVANCED STUDY IN THE TEACHING OF READING. (3)**

An advanced course for classroom teachers which focuses on selection and implementation of reading assessment and instructional procedures. The theoretical bases of the reading process and the knowledge of research in reading will be related to the design of classroom instruction. This course is to become an option in Area 7 of both the Elementary and Secondary Standard Certification programs. Prereq: EDC 330 or 339 or 533 or equivalent.

**EDC 619 ASSESSMENT OF READING GROWTH AND DEVELOPMENT. (3)**

Clinical techniques for the diagnosis of reading disabilities. A course designed to develop both theoretical understandings and operational skills in clinical diagnosis of reading problems. Classroom application of the techniques is discussed. Lecture, two hours; laboratory, two hours. Prereq: EDC 330 or 533, or 534 or consent of instructor.

**EDC 620 DESIGN AND IMPLEMENTATION OF READING INSTRUCTION. (3)**

Clinical techniques used in the remediation of reading problems. A course designed to develop individualized procedures related to diagnosis. Classroom application of the instructional procedures is discussed. Lecture, two hours; laboratory, two hours. Prereq: EDC 619, or consent of instructor.

**EDC 621 LINGUISTIC AND COGNITIVE FOUNDATIONS OF READING IN EARLY CHILDHOOD. (3)**

A study of reading as a language-based process with an emphasis upon developing observational skills to assess the child's growth in oracy and literacy skills and upon designing a language learning environment to meet these needs. Prereq: EDC 339 or permission of instructor.

**EDC 631 MATHEMATICS PEDAGOGY IN THE SECONDARY SCHOOL. (0-3)**

Through campus and school-based experiences, students will learn how to engage young people in learning mathematics and how to make decisions about planning instruction and develop assessment based on a sound knowledge base for applying content, materials, and methods (including educational technology) appropriate for high school students. May be repeated to a maximum of three credits. Lecture, 1-3 hours; laboratory, 3-6 hours per week. Prereq: Admission to the Teacher Education Program and the M.A./M.S. in Education (Initial Certification Option-Secondary Education).

**EDC 632 SOCIAL STUDIES PEDAGOGY IN THE SECONDARY SCHOOL. (0-3)**

Through campus and school-based experiences, students will learn how to engage young people in learning social studies and how to make decisions about planning instruction and develop assessment based on a sound knowledge base for applying content, materials, and methods (including educational technology) appropriate for high school students. May be repeated to a maximum of three credits. Lecture, 1-3 hours; laboratory, 3-6 hours per week. Prereq: Admission to the Teacher Education Program and the M.A./M.S. in Education (Initial Certification Option-Secondary Education).

**EDC 633 BUSINESS PEDAGOGY IN THE SECONDARY SCHOOL. (0-3)**

Through campus and school-based experiences, students will learn how to engage young people in learning business and how to make decisions about planning instruction and develop assessment based on a sound knowledge base for applying content, materials, and methods (including educational technology) appropriate for high school students. May be repeated to a maximum of three credits. Lecture, 1-3 hours; laboratory, 3-6 hours per week. Prereq: Admission to the Teacher Education Program and the M.A./M.S. in Education (Initial Certification Option-Secondary Education).

**EDC 634 SCIENCE PEDAGOGY IN THE SECONDARY SCHOOL. (0-3)**

Through campus and school-based experiences, students will learn how to engage young people in learning science and how to make decisions about planning instruction and develop assessment based on a sound knowledge base for applying content, materials, and methods (including educational technology) appropriate for high school students. May be repeated to a maximum of three credits. Lecture, 1-3 hours; laboratory, 3-6 hours per week. Prereq: Admission to the Teacher Education Program and the M.A./M.S. in Education (Initial Certification Option-Secondary Education).

**EDC 635 ENGLISH PEDAGOGY IN THE SECONDARY SCHOOL. (0-3)**

Through campus and school-based experiences, students will learn how to engage young people in learning English and how to make decisions about planning instruction and develop assessment based on a sound knowledge base for applying content, materials, and methods (including educational technology) appropriate for high school students. May be repeated to a maximum of three credits. Lecture, 1-3 hours; laboratory, 3-6 hours per week. Prereq: Admission to the Teacher Education Program and the M.A./M.S. in Education (Initial Certification Option-Secondary Education).

**#EDC 636 METHODS OF TEACHING FOREIGN LANGUAGE, K-12. (3)**

The course provides training in teaching and managing instruction in second languages, modern and classical, grades K-12. It anticipates and integrates the objectives, content, and performance outcomes of the Field Experiences course and the Student Teaching experience. Topics include: the history and issues of foreign language education in the United States; current trends and research in language acquisition, learning, and teaching; proficiency-based models of instruction and assessment compatible with national standards and the Kentucky Education Reform framework; selection and development of instructional materials; the integration of technology; curriculum development; school reform, peer assistance, and advocacy. Prereq: Admission to the Teacher Education Program or Kentucky State Teacher Certification in Foreign Languages or in English as a Second Language.

**EDC 641 RESEARCH AND THEORY IN TEACHING READING IN THE ELEMENTARY SCHOOL. (3)**

A systematic study of the research and theory and their application to the teaching of reading in the elementary school. Attention will be given to new developments in the field. Prereq: EDC 330 or consent of instructor.

**EDC 642 RESEARCH AND THEORY IN TEACHING LANGUAGE ARTS. (3)**

A systematic study of research and theory in oral and written language acquisition and the implications of this knowledge for facilitating the development of listening, speaking and writing in classroom settings. The interrelationships among all of the language arts (reading, writing, listening and speaking) will be stressed. Prereq: EDC 330, or 553, or 534, or consent of instructor.

**EDC 670 ADVANCED STUDY IN THE TEACHING OF ELEMENTARY SCHOOL MATHEMATICS. (3)**

New developments in modern elementary mathematics for teachers in the elementary schools will be reviewed. Special emphasis will be given to a study of new teaching methods, application of published research, techniques and trends in mathematics in the elementary school. Prereq: Graduate standing.

**EDC 676 PRACTICUM IN GIFTED EDUCATION. (3)**

Supervised experience in the instruction of gifted children. Requires placement in an approved program designed for serving gifted children plus participation in a weekly supervisory seminar. Lecture, two hours; laboratory, nine hours per week. Prereq: EDP 580, EDC 602, EDP 612 or consent of instructor. (Same as EDP 676.)

**EDC 710 ADVANCED TOPICS IN INSTRUCTIONAL DESIGN. (3)**

An identification and analysis of current theories and programs of research in instructional systems design. Students will develop the skills necessary to conduct and write a scholarly literature review and identify potential areas and questions needing further study. Prereq: EDC 608, EDP 610, EDC 612, or consent of instructor.

**EDC 712 THE ELEMENTARY SCHOOL. (3)**

Recent research and modern trends in teaching the skills and content subjects in the elementary school. Planned for supervisors, superintendents, principals, and teachers for better understanding of a modern elementary school.

**EDC 714 THE SECONDARY SCHOOL. (3)**

A course designed to acquaint the secondary teacher and the administrator with the nature and function of the secondary school.

**EDC 724 ORGANIZATION AND SUPERVISION OF STUDENT TEACHING. (3)**

A course designed for teachers preparing to become supervising teachers. The basic principles apply both to elementary and secondary education. Includes a presentation of the experiences deemed important in developing students into effective teachers.

**EDC 730 PROBLEMS OF THE SCHOOL CURRICULUM. (3)**

Problems in the field of the school curriculum and in the preparation of instructional materials. Students enrolling in this course are required to leave on file with the College of Education a complete report of each problem studied. May be repeated once for a maximum of six credits.

**EDC 732 PRINCIPLES OF CURRICULUM CONSTRUCTION. (3)**

Study of basic principles of curriculum development. Relationship of social and psychological factors to curriculum change. Survey of current approaches to curriculum organization. Considerations of means of curriculum development in the school systems.

**EDC 740 PRACTICUM IN TEACHING READING AND RELATED LANGUAGE ARTS. (3)**

Supervised practicum in analyzing problems in reading and related language arts and providing remedial work. Requires six hours per week in practicum with individual children or groups, plus two hours per week in seminar. May be repeated to a maximum of six credits. Prereq: EDC 619, 620.

**EDC 746 SUBJECT AREA INSTRUCTION IN THE SECONDARY SCHOOL. (0-9)**

Students will teach in their subject areas in the schools full-time, meet regularly to discuss teaching effectiveness and strategies for improvement and develop their professional portfolios. May be repeated to a maximum of nine credits. Lecture, 3-9 hours; laboratory, 6-18 hours per week. Prereq: The appropriate methods course in the subject area (EDC 631, 632, 634 or 635). Admission to the Teacher Education Program and the M.A./M.S. in Education (Initial Certification Option-Secondary Education).

**EDC 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**EDC 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**EDC 750 INTERNSHIP IN INSTRUCTIONAL SYSTEMS DESIGN.** (3)  
Students will apply their knowledge of instructional systems design in a real-life setting. The work setting will be selected based on the professional goals of each student and student work will be supervised and reviewed by the internship coordinator. May be repeated to a maximum of nine credits. Prereq: Consent of program coordinator.

**EDC 755 INSTRUCTIONAL SYSTEMS DESIGN RESEARCH COLLOQUIUM.** (1)  
Students and faculty will discuss current research and related issues in instructional systems design. May be repeated to a maximum of two credits. Prereq or concur: EDC 547 and EDC 608.

**EDC 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.

**EDC 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.

**EDC 777 SEMINAR IN CURRICULUM AND INSTRUCTION (Subtitle required).** (1-3)  
A critical analysis of recently developed materials and techniques in curriculum and instruction for precollege education. Includes analysis of evaluative research related to new materials and techniques. May be repeated to a maximum of nine credits. Prereq: Consent of instructor.

**EDC 781 INDEPENDENT STUDY IN CURRICULUM AND INSTRUCTION.** (1-3)  
An independent study course for graduate students who have completed at least half of the program course requirements in clinical and college teaching, curriculum and instruction, early childhood education, elementary education, reading or secondary education. May be repeated to a maximum of nine credits. Prereq: Consent of the Director of Graduate Studies.

**EDC 791 RESEARCH PROBLEMS IN CURRICULUM AND INSTRUCTION.** (1-3)  
A research problems course for graduate students who have completed at least half of the program course requirements in clinical and college teaching, curriculum and instruction, early childhood education, elementary education, reading or secondary education. May be repeated to a maximum of nine credits. Prereq: Consent of the Director of Graduate Studies.

## EDP Educational and Counseling Psychology

**EDP 202 HUMAN DEVELOPMENT AND LEARNING.** (3)  
Theories and concepts of human development, learning, and motivation are presented and applied to interpreting and explaining human behavior and interaction in relation to teaching across the developmental span from early childhood to adulthood. A field experience in a school or other educational agency is a required and basic part of the course. Prereq: PSY 100.

**EDP 203 TEACHING EXCEPTIONAL LEARNERS IN REGULAR CLASSROOMS.** (3)  
An introduction to the characteristics and instructional needs of exceptional learners is presented with an overview of principles, procedures, methods, and materials for adapting educational programs to accommodate the integration of exceptional children in regular classrooms, when appropriate. A field experience in a school or other educational agency is a required and basic part of the course. Lecture, three hours per week; laboratory, two hours per week for a maximum of six weeks. Prereq: Successful completion of EDP 202 with an earned grade of C or higher.

**EDP 518 MENTAL HYGIENE.** (3)  
A general orientation to the subject of mental hygiene, its historical development, its scope and relation to various sciences. The individual and cultural determinants of behavior will be discussed. Not open to students who have had CH 520. Prereq: PSY 100 or 215, or EDP 202.

**EDP 522 EDUCATIONAL TESTS AND MEASUREMENTS.** (3)  
Problems of measurement in the school program with special emphasis on standardized tests. General principles of test construction, teacher-made tests, examinations, criteria of evaluation and marking systems.

**EDP 548 EDUCATIONAL PSYCHOLOGY.** (3)  
An introduction to the application of principles of psychology to classroom learning and teaching problems.

**EDP 557 EDUCATIONAL STATISTICS.** (3)  
A study of the applications of statistical and graphical methods to educational data. Basic descriptive statistics, correlation, the normal distribution, and hypothesis testing will be covered. Prereq: MA 109 or equivalent; undergraduate or graduate status in the College of Education; or consent of instructor.

**EDP 570 INTRODUCTION TO PSYCHOLOGICAL SERVICES IN SCHOOLS.** (3)  
A review of the historical development and models of organization and administration in the field of school psychology and the relationship between school psychology and other educational and psychological specialties. Prereq: Admission to School Psychology Program or consent of instructor.

**EDP 580 INTRODUCTION TO GIFTED EDUCATION.** (3)  
This course reviews the historical development of and the theoretical and empirical support for differentiated educational programs for gifted and talented children. Specific issues addressed include defining and identifying giftedness, teacher competencies and training, providing differentiated curricula and program evaluation. (Same as EDC 580.)

**EDP 600 LIFE SPAN HUMAN DEVELOPMENT AND BEHAVIOR.** (3)  
A survey of human development across the life span of the individual from conception to death. Content includes changes in motor skills, biological growth and decline, learning behavior, language, social, emotional, moral, and intellectual development as well as the roles of the family, the school, peers, and work in relation to individual development. Critical evaluation of current theories which describe human development. (Same as FAM 654.)

**EDP 601 HUMAN SOCIAL DEVELOPMENT.** (3)  
Survey of current research and theory regarding motor skills, social development, imitation, dependency, aggression, affiliation, moral development and peer group behavior. Prereq: EDP 600 or consent of instructor.

**EDP 603 HUMAN COGNITIVE DEVELOPMENT.** (3)  
Theory and research concerning the development of attitudes, motives, self-concept and other cognitive processes are presented and the educational implications explored. Prereq: EDP 548 or EDP 610 or EDP 600.

**EDP 604 LIFESPAN GENDER DEVELOPMENT.** (3)  
An in-depth examination of theory, research, and personal attitudes concerning gender development over the lifespan. Interaction of gender with effective personal functioning in family, educational, and work-related settings. Prereq: EDP 600 and 601 or equivalent.

**EDP 605 INTRODUCTION TO COUNSELING: TECHNIQUES I.** (3)  
A survey of counseling psychology, philosophy, procedures and practices. Consideration of the roles of the counselor in relation to counseling services in the community and educational settings. In-depth training in initial counseling skills, interviewing (listening) and relationship building skills. Prereq: Acceptance to the graduate program in counseling psychology with the following major codes: RECO, ECGO, CPEC, ECPY, ECPC, CNPS, ESPP, ESPY, ECPP, or consent of instructor via permit.

**EDP 606 PROFESSIONAL ISSUES IN COUNSELING PSYCHOLOGY.** (3)  
A first course in the graduate curriculum in counseling psychology. Addresses professional identity, A.P.A. ethical guidelines, legal aspects of psychological practice including licensing and confidentiality, historical perspectives, training issues, and current topics of professional concern in counseling psychology. Prereq: Enrollment in a post-master's program in counseling psychology.

**EDP 610 THEORIES OF LEARNING IN EDUCATION.** (3)  
Consideration of the theoretical origins of learning within the context of education. Topics include major theories of learning, physiological bases for learning, relationships between learning theory and instruction, and major applications of learning theories in educational settings.

**EDP 611 HUMAN COGNITIVE LEARNING.** (3)  
Major cognitive learning theories which explain thinking and problem-solving behavior are compared and contrasted, especially as they are applied to arrange for effective instruction. Prereq: EDP 610 or EDP 548 or PSY 507 or equivalent.

**EDP 612 DEVELOPMENT OF CREATIVITY AND CRITICAL THINKING. (3)**

Reviews the theoretical and empirical literature related to developing creativity and critical thinking and describes practical and effective methods of measuring and developing these cognitive abilities in gifted and nongifted students. Prereq: EDP 580 or consent of instructor.

**EDP 613 SOCIAL PSYCHOLOGICAL ISSUES IN EDUCATION. (3)**

This course is designed to meet the needs of graduate students in the College of Education, particularly those in educational, school, and counseling psychology, for a course in theory and principles of social psychology. While the course will survey basic concerns in social psychology, the material will be geared toward application in schools and other educational settings. For example, while the theories of attitude formation will be surveyed, principle focus will be on the measurement of attitudes in education. Further, in the study of group dynamics, applications to group learning, administrative leadership, and organizational theory will be stressed. In addition to the theories and principles of social psychology, research paradigms, social change, social influence, system consultation, and community issues as they relate to social psychological considerations will be covered. Prereq: One course in psychology or consent of instructor.

**EDP 614 MOTIVATION AND LEARNING. (3)**

This course will provide a review of current educational and psychological theories of motivation. After examining various theories (e.g., attributions, goals, self efficacy, expectancy X value), the course will examine applications of these theories to contemporary issues such as violence, substance abuse, dropping out of school, health maintenance, etc.

**EDP 615 PROSEMINAR IN HISTORY AND SYSTEMS OF PSYCHOLOGY. (3)**

A study of the philosophical precursors and scientific traditions of psychology. The schools of 19th and 20th century psychology are surveyed as are the major theoretical positions and content areas of contemporary psychology. Prereq: Graduate standing in department of Psychology or department of Educational and Counseling Psychology. (Same as PSY 620.)

**EDP 620 TOPICS AND METHODS OF EVALUATION. (3)**

An examination of a subset of evaluation methods, topics, and problems. An introductory course in the area with minimal emphasis on quantitative methods. The course is designed to: provide a perspective from which evaluation studies may be viewed; and, to provide experiences for those who will learn from or conduct evaluations. Prereq: Consent of instructor, and a basic course in statistics or research. (Same as ANT/EPE 620/SOC 622.)

**EDP 621 ADVANCED TOPICS AND METHODS OF EVALUATION. (3)**

An advanced course in evaluation methods and techniques with an emphasis on quantitative methodology. State of the art ideas and methods of conducting evaluation studies and analyzing data from those studies are presented. The course is designed primarily for those who are conducting or will conduct evaluation studies. Prereq: A basic course in statistics or its equivalent; EDP/EPE/ANT 620; and consent of instructor. (Same as ANT/EPE 621.)

**\*EDP 630 PRINCIPLES OF PSYCHOLOGICAL ASSESSMENT. (3)**

An overview of the principles and methods of psychological assessment including observational methods, interviewing, behavioral analysis, and standardized psychological testing as a means of arriving at a comprehensive individual analysis and of creating a treatment plan for both children and adults. Students develop skills in selection and evaluation of psychological tests (personality, interests, and aptitudes), integration of multi-modal assessment methods, and report writing. Prereq: Acceptance to the graduate programs in Educational and Counseling Psychology with the following major codes: CPEC, ECPY, ECPC, CNPS, ECPE, EEPS, ESPY, ECPS or consent of the instructor via permit.

**EDP 640 INDIVIDUAL ASSESSMENT OF COGNITIVE FUNCTIONING. (3)**

This course provides theoretical material and advanced laboratory practice in the measurement of intelligence by individual techniques. Lecture, two hours; laboratory, two hours. Prereq: EDP 630 or equivalent and enrollment in a professional program in Educational and Counseling Psychology and consent of instructor.

**EDP 642 INDIVIDUAL ASSESSMENT OF PERSONALITY FUNCTIONING. (3)**

An in-depth study of the nature and measurement of human emotion, temperament and personality. Laboratory and field experience in the administration, scoring, and interpretation of tests related to personality functioning and underlying dynamics of personality. Lecture, two hours; laboratory, two hours per week. Prereq: Successful completion of EDP 640 with a grade of B or better or consent of instructor.

**EDP 649 GROUP COUNSELING. (3)**

An overview of the theoretical bases and practical procedures used in the organization, and effective use of group counseling in the facilitation of psychological and educational goals. Prereq: EDP 652 and EDP 661 or consent of instructor.

**EDP 650 DIAGNOSIS AND PSYCHOPATHOLOGY IN COUNSELING PSYCHOLOGY. (3)**

An integrative seminar in diagnosis and application of theories, techniques and assessment tools in Counseling Psychology. Special consideration of methods of classification of psychological states and characteristics including DSM-III temperament, analysis, and other research methods of integrating assessment and treatment alternatives. Prereq: EDP 630, 640 and admission to one of the doctoral programs in Educational and Counseling Psychology and consent of instructor.

**EDP 652 THEORIES OF COUNSELING. (3)**

A survey of theories and methods in facilitating personality growth, character maturation, problem solving, decision making, crisis resolutions, and behavior change, through individual and group counseling. Prereq: Acceptance to a graduate program in EDP with the following major codes: EGCO, CPEC, ECPY, ECPC, ESPP, ECPS, ECPE, EEPS, CNPS, EDPS, or consent of instructor via permit.

**EDP 656 METHODOLOGY OF EDUCATIONAL RESEARCH. (3)**

An introduction to research methods applicable to education; the scientific method, research designs, measurement techniques, statistical analysis, and writing the research report.

**EDP 658 PROBLEMS IN EDUCATIONAL PSYCHOLOGY. (1-3)**

Special topics in psychological theories and research applicable to educational practices. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**EDP 659 ADVANCED EDUCATIONAL MEASUREMENT. (3)**

Theory and application in educational measurement with emphasis on the appropriate selection, administration, and interpretation of standardized tests used in educational assessment. Prereq: EDP 522 or equivalent.

**EDP 660 RESEARCH DESIGN AND ANALYSIS IN EDUCATION. (3)**

A study of the research methodologies applicable in the several aspects of education. Emphasis is on the design of research and analysis of accumulated data. Prereq: EDP 557.

**EDP 661 TECHNIQUES OF COUNSELING II. (3)**

Practice in interviewing, simulated problems, observational techniques, role of the counselor. Study of films, tapes and transcripts of leading practitioners of several schools of counseling. Supervised practice with selected clients. Lecture, two hours; laboratory, two hours. Prereq: EDP 605 and consent of instructor.

**EDP 664 PRE-MASTERS PRACTICUM IN COUNSELING PSYCHOLOGY. (1-6)**

Supervised experience in application of diagnostic and interviewing techniques in a counseling service. May be repeated to a maximum of twelve credits. Lecture, three hours; laboratory, eight hours per three credit hours. Prereq: EDP 652 and EDP 661 and Master's candidacy in counseling and approval of departmental counseling committee.

**EDP 665 POST-MASTERS PRACTICUM IN COUNSELING PSYCHOLOGY. (1-6)**

Supervised experience in application of diagnostic and interviewing techniques in a counseling service. Prereq: A Master's degree in Counseling Psychology or equivalent, approval of departmental counseling committee and EDP 661.

**EDP 666 PSYCHOLOGY OF CAREER COUNSELING. (3)**

Tests of vocational interests and aptitudes. Collection and retrieval of occupational and educational information. Facilitation of sound decision-making. Prereq: EDP 652.

**EDP 669 DIAGNOSTIC CLASSIFICATION IN SCHOOL PSYCHOLOGY. (3)**

Review of theory and research related to individual differences in physical, intellectual, social, and emotional development of preschool and school-aged children and adolescents. Compares psychological and educational approaches to diagnostic classification of such differences. Prereq: PSY 533 or consent of instructor.

**EDP 670 PSYCHOEDUCATIONAL STRATEGIES OF INTERVENTION. (3)**

A general review of and development of basic competence in the major intervention strategies applicable to the amelioration of children's common learning and adjustment difficulties in the school setting. Prereq: EDP 640, EDP 669 and Admission to School Psychology Program.

**EDP 671 SEMINAR IN PSYCHOEDUCATIONAL CONSULTATION IN SCHOOLS.****(3)**

A study of the rationale and techniques used in consultation with teachers, parents, administrators and other school personnel for the purpose of both preventing and alleviating the learning and adjustment difficulties of individual or groups of school-aged children. Prereq: Admission to School Psychology Program, advanced standing in a professional educational program or permission of the instructor.

**EDP 675 PRACTICUM IN SCHOOL PSYCHOLOGY.****(1-6)**

Supervised experience in the application of psychoeducational, diagnostic assessment, intervention, and consultation services in a clinic, school, or community setting. Requires three hours of on-site activities per credit hour and weekly supervision meetings. May be repeated to a maximum of 18 credits. Prereq: Admission to the School Psychology Program and consent of instructor.

**EDP 676 PRACTICUM IN GIFTED EDUCATION.****(3)**

Supervised experience in the instruction of gifted children. Requires placement in an approved program designed for serving gifted children plus participation in a weekly supervisory seminar. Lecture, two hours; laboratory, nine hours per week. Prereq: EDP 580, EDC 602, EDP 612 or consent of instructor. (Same as EDC 676.)

**EDP 680 PARENT AND CHILD COUNSELING.****(3)**

Theories, methods, and techniques of counseling psychology as applied to planned interventions with parents and their children. Contemporary approaches to family and child dysfunctioning are studied within a framework of human development; applied practice utilizing simulated problems. Prereq: EDP 600, 652, and 661, or consent of instructor.

**EDP 683 TOPICS IN COUNSELING PSYCHOLOGY.****(1-3)**

Counseling for special problems with special methods. Topics may vary from semester to semester. Seminar, one-three hours per week. May be repeated to a maximum of 12 credits. Prereq or coreq: EDP 652 and consent of instructor.

**EDP 685 ISSUES AND TECHNIQUES IN THE COUNSELING OF WOMEN.****(3)**

The course is designed to improve students' knowledge of the special counseling needs of women and to facilitate students' development of highly skilled techniques for counseling with women. Skill and knowledge areas include such topics as rape, spouse abuse, mastectomy, career, assertiveness, single parenting, and sex discrimination. Prereq: EDP 661, 652, 604 and consent of instructor.

**\*EDP 686 THEORY AND METHODS IN MARRIAGE AND FAMILY THERAPY.****(3)**

A survey of theories and methods used in marriage and family therapy. Designed to provide students with a knowledge of the theoretical bases for marriage and family therapy, including an introduction to procedures used to assess, diagnose and treat marriage and family dysfunctions. Prereq: EDP 661, EDP 652 or consent of instructor.

**EDP 701 COGNITIVE-BEHAVIORAL COUNSELING.****(3)**

Theory and applications of cognitive-behavioral techniques. Assessment, intervention, and evaluation procedures are applied to problems treated by cognitive-behavioral counseling. Prereq: EDP 652 and 661 or consent of instructor.

**EDP 702 CAREER DEVELOPMENT: RESEARCH, THEORIES AND PRACTICES.****(2-3)**

Overview of theories of career development and current research. Emphasis on use of vocational assessment techniques in counseling and decision-making. (Same as EDV 702.)

**EDP 703 SEMINAR IN CLINICAL SUPERVISION.****(1-3)**

An advanced seminar covering theories, issues, methods and techniques in supervision of counseling and psychotherapy. Seminar topics will vary depending on the interests of the professor and students. May be repeated to a maximum of six credits. Prereq: EDP 652, EDP 661, and EDP 665 or equivalent.

**EDP 707 MULTIVARIATE ANALYSIS IN EDUCATIONAL RESEARCH.****(3)**

A study of several techniques for the analysis of educational outcomes utilizing multiple variables. Prereq: EDP 660 or equivalent.

**EDP 708 INTERNSHIP IN EDUCATIONAL AND COUNSELING PSYCHOLOGY.****(0-9)**

Full-time practice in an operational setting such as a school or government agency, with on-site supervision provided by the host agency and with academic supervision provided by a University faculty member. Practicum: full-time field experience. May be repeated to a maximum of 12 credits. Prereq: Completion of a minimum of one year of graduate study in the department and consent of instructor.

**EDP 748 MASTER'S THESIS RESEARCH.****(0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**EDP 749 DISSERTATION RESEARCH.****(0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**EDP 762 ORGANIZATION AND OPERATION OF PUPIL SERVICES.****(3)**

A study of the professional roles among counselors, social and health workers, and school psychologists. Content includes supervision of these roles, community participation, in-service education, and evaluation of integrated pupil services. Prereq: Provisional credentials in a pupil services field or consent of instructor.

**EDP 765 INDEPENDENT STUDY IN COUNSELING PSYCHOLOGY.****(1-4)**

Independent study course for advanced graduate students who desire to investigate special problems in counseling psychology. May be repeated to a maximum of six credits. Prereq: One year of graduate work in counseling psychology and consent of instructor.

**EDP 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.****(1-6)**

May be repeated to a maximum of 12 hours.

**EDP 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.****(0-12)**

May be repeated indefinitely.

**EDP 776 SEMINAR IN SCHOOL PSYCHOLOGY (Subtitle required).****(3)**

Topical consideration of philosophical, technical, professional and theoretical positions in school psychology theory and practice. May be repeated to a maximum of nine credits under different subtitles. Prereq: Graduate standing in School Psychology or consent of instructor.

**EDP 777 SEMINAR IN COUNSELING PSYCHOLOGY.****(1-3)**

Topical consideration of philosophical, technical and theoretical positions in counseling theory and practice. May be repeated to a maximum of six credits. Prereq: Doctoral standing, EDP 665, or consent of instructor.

**EDP 778 SEMINAR IN EDUCATIONAL PSYCHOLOGY (Subtitle required).****(3)**

Intensive study of selected topics in human learning and development. Particular emphasis on research topics. Students will design sample studies in their areas of interest. May be repeated to a maximum of nine credits under different subtitles. Prereq: Doctoral standing in the College of Education or consent of instructor.

**EDP 782 INDEPENDENT STUDY IN EDUCATIONAL PSYCHOLOGY.****(1-3)**

Independent study course for advanced graduate students who desire to investigate special problems and conduct research in educational psychology. May be repeated to a maximum of 12 credits. Prereq: One year of graduate work in educational psychology and consent of instructor.

**EDS Education – Special****EDS 357 INITIAL PRACTICUM IN SPECIAL EDUCATION.****(1)**

An introductory supervised field experience for special education majors. Students will participate in two special education programs as teacher aides. Placements will include public schools and other agencies serving children with disabilities. May be repeated to a maximum of three credits. Lecture, one hour; field experience, three hours per week. Prereq or concurrent: EDS 375.

**EDS 375 INTRODUCTION TO EDUCATION OF EXCEPTIONAL CHILDREN.****(3)**

An introduction to the various contemporary areas of special education. Topics include special education diagnostic categories, programming, service delivery models, career education, child advocacy and litigation affecting public education for students with disabilities.

**EDS 395 INDEPENDENT STUDY IN SPECIAL EDUCATION.****(1-6)**

An independent study course for undergraduate students with an interest in a specific problem in special education. Offered by appointment.



**EDS 459 STUDENT TEACHING IN SPECIAL EDUCATION. (3-12)**

Supervised student teaching experience utilizing the special techniques used in working with individuals with exceptional educational problems such as speech handicaps, physical handicaps, visual impairments, hearing disabilities, neurological impairments (learning disabilities), mental retardation, and the gifted. To be offered only on a pass-fail basis. Prereq: Must complete the published College requirements for admission to student teaching; admission to the Teacher Education Program or permission of instructor.

**EDS 510 EARLY CHILDHOOD SPECIAL EDUCATION. (3)**

An overview of the field of early childhood special education including discussions of historical and empirical support for providing early intervention services, screening, assessment, instructional programming, integration of children with and without disabilities, family involvement, and service delivery models. Emphasis is placed on assessing and promoting attainment of cognitive, language, social, self-help, and motor skills. Prereq: EDS 375 or EDP 203 or consent of instructor.

**EDS 511 SPEECH-LANGUAGE DEVELOPMENT AND DISORDERS FOR THE SEVERELY HANDICAPPED. (3)**

An introduction to communication development and intervention for language disordered individuals whose language age is at or below four years, including cognitive, social, auditory, visual, and motor components. Topics include prerequisites for language, normal communication development, evaluation of language functioning, and approaches to altering communication behavior. Prereq: CD 277 or EDS 375 or consent of instructor. (Same as CD 511).

**EDS 512 SPEECH-LANGUAGE DEVELOPMENT AND DISORDERS FOR THE MILDLY HANDICAPPED. (3)**

An introduction to the characteristics of receptive and expressive language disorders in language-disordered children whose language age is four years or higher, including auditory, visual, cognitive, and motor components. Topics include language development, language disorders, language evaluation, and techniques for receptive and expressive language stimulation. Prereq: CD 277 or EDS 375 or permission of instructor. (Same as CD 512).

**\*EDS 513 LEGAL ISSUES IN SPECIAL EDUCATION. (3)**

A review of pertinent legislation concerning human and constitutional rights related to persons with disabilities. Teachers' specific responsibilities and liabilities are described and related to current requirements for development of appropriate educational programs. Emphasis is given to how, through active parent participation, teachers can facilitate each student's developmental progress. Prereq: EDS 375 or consent of instructor.

**#EDS 514 INSTRUCTIONAL TECHNOLOGY IN SPECIAL EDUCATION. (3)**

An overview of ways technology can be used to facilitate the education of students with disabilities. Topics include personal computer operation, personal productivity tools, instructional software evaluation and integration into the curriculum, multimedia applications, telecommunications, and emerging technologies. Lecture, three hours; laboratory, two hours per week. Prereq: EDS 375 or EDP 203.

**\*EDS 516 PRINCIPLES OF BEHAVIOR MANAGEMENT AND INSTRUCTION. (3)**

Basic principles of applied behavior analysis and modification which employ social learning theory and operant conditioning models are taught. Emphasis is placed on designing individualized learning environments, selecting and implementing behavior management strategies, writing behavior objectives, and performing task analyses. Prereq: EDS 375 or permission of the instructor.

**\*EDS 517 ASSISTIVE TECHNOLOGY IN SPECIAL EDUCATION. (3)**

A general introduction to the theory, need, and use of assistive devices in the classroom. Review of physical disabilities and basic operation, maintenance, and trouble shooting techniques will be presented. Service personnel typically associated with training in the use of assistive devices will be discussed. Students will be required to simulate a disability and use an assistive device. Prereq: EDS 375 or permission of instructor.

**EDS 520 SURVEY OF SEVERE DEVELOPMENTAL DISABILITIES. (3)**

Introductory course surveying the medical and behavioral characteristics of children and youth with severe disabilities. Other topics will include the historical, social, political, economic, and legal issues pertaining to the education and treatment of persons with severe disabilities. Prereq: Consent of instructor and course in applied behavior analysis.

**EDS 527 CHARACTERISTICS OF INDIVIDUALS WITH ORTHOPEDIC AND NEUROLOGICAL DISABILITIES. (3)**

A survey of causes, treatment, and educational implications of physical and neurological disabilities in school age children. Attention given to rehabilitation and life adjustment problems of individuals with single and multiple disabilities.

**\*EDS 528 EDUCATIONAL ASSESSMENT FOR STUDENTS WITH MILD DISABILITIES. (3)**

Procedures for administering formal and informal tests to determine specific educationally relevant strengths and deficits of children with learning and behavior disorders. The characteristics of children with learning and behavior disorders are surveyed, as they relate to special education programming. Lecture, three hours; field experience, two hours. Prereq: EDS 375, EDS 516 and admission to the Teacher Education Program; or consent of instructor.

**\*EDS 529 EDUCATIONAL PROGRAMMING FOR STUDENTS WITH MILD DISABILITIES. (3)**

Design, implementation, and evaluation of individualized programs based on the educationally relevant characteristics of children with mild disabilities. Includes educational assessment and programming in reading, math, and language. Prereq: Admission to the Teacher Education Program, EDC 329, EDS 513, and 516, or consent of instructor; prereq or concur: EDS 528.

**\*EDS 530 MODERATE AND SEVERE DISABILITIES. (3)**

Special education issues with individuals exhibiting moderate to severe intellectual and developmental disabilities. A critical examination of contemporary research with regard to the educational, behavioral, developmental issues of individuals exhibiting moderate to severe intellectual and developmental disabilities. Issues and research describing the full educational inclusion and community integration of persons with moderate to severe intellectual and developmental disabilities will be addressed. Lecture, three hours; field experience, three hours.

**\*EDS 548 CURRICULUM DESIGN FOR STUDENTS WITH MODERATE AND SEVERE DISABILITIES. (3)**

Educational and adaptive behavior assessment and curriculum prescription for individuals exhibiting moderate intellectual and development disabilities. The course participant will acquire skills in the use of current formal and informal educational and adaptive behavior assessment procedures for use in prescribing curriculum, instructional, behavioral intervention with individuals exhibiting moderate intellectual and developmental disabilities. Specific attention will be focused on procedures for using assessment data and curriculum prescription that enhances the full inclusion of school age individuals with disabilities with their non-disabled peers. Lecture, three hours; field experience, four to six hours per week. Prereq: EDS 516, 530; or consent of instructor.

**\*EDS 549 METHODS FOR STUDENTS WITH MODERATE AND SEVERE DISABILITIES. (4)**

The course participant will serve as a teacher aide in a classroom or other service delivery setting under the supervision of a person certified to teach students with moderate to severe disabilities. Course requirements include application of direct observation, formal and informal assessment of pupil performance, clinical writing and instructional and behavioral intervention in both individualized and small group settings. Practicum settings used by course participants will model best practices with regard to instruction, behavior management, and the full inclusion of persons with moderate to severe disabilities with their non-disabled peers. Lecture, two hours; field experience, six to eight hours per week. Prereq: Admission to the Teacher Education Program, EDS 516, 548, or consent of instructor.

**\*EDS 550 STUDENT TEACHING: MODERATE/SEVERE DISABILITIES. (6-12)**

Student teaching in the low-incidence disabilities classroom. Supervised student teaching in a classroom for students identified as having moderate to severe disabilities. To be offered on a letter grade basis only. Prereq: Must complete the published College requirement for admission to student teaching, including admission to the Teacher Education program; or consent of instructor.

**\*EDS 558 ISSUES IN SPECIAL EDUCATION. (1-9)**

In-depth study of a current and topical problem or issue in the education of exceptional children and youth. May be repeated to a maximum of nine credits. A title is assigned each time the course is offered.

**\*EDS 570 EMOTIONAL AND BEHAVIORAL DISABILITIES. (3)**

The emotional and behavioral problems of exceptional children and youth are considered in the context of normal child development. A survey of the major categories of emotional and behavioral disabilities includes identification, description, and etiology, with material drawn from clinical, theoretical, and research sources. Approaches to remediation cover both community resources and the roles of various professional personnel. Prereq: EDS 375 or equivalent.

**\*EDS 589 FIELD EXPERIENCES: MILD DISABILITIES. (3)**  
 Supervised pre-student teaching experiences with children having learning and behavioral disabilities, including practica experience with public school students in at least two different special education sites. Approximately two hours lecture-discussion and two three-hour observations and/or practica per week. Prereq: EDS 513, 516, admission to the Teacher Education Program; or consent of instructor. Prereq. or concur: EDS 528. Must take EDS 529 concurrently. Must not take concurrently with the Middle School methods block (EDS 330, EDS 343, and two methods classes).

**EDS 600 SURVEY OF SPECIAL EDUCATION. (3)**  
 A survey of current status of the field of special education. Emphasis is on analysis of the major research literature pertaining to exceptional children and their education. Prereq: Graduate standing.

**\*EDS 601 APPLIED BEHAVIORAL ANALYSIS. (3)**  
 The focus of this course is on the technology of applied behavior analysis, including the functional analysis of children's behavior and the development, implementation, evaluation of behavior management programs with children and youth. Prereq: Completion of EDS 516 or equivalent, with a grade of "B" or better.

**\*EDS 602 ADMINISTRATION AND PROGRAMS IN SPECIAL EDUCATION. (3)**  
 The organization, management and supervision of programs for exceptional children at the local, state and national levels. Roles and functions of the special education administrator are considered. Experiences drawn from special residential, private and public day schools are studied. Prereq: Certification in special education; six hours of course work in educational administration and supervision.

**EDS 603 BEHAVIORAL CONSULTATION IN THE SCHOOLS. (3)**  
 Principles and techniques of behavioral consulting with classroom teachers and other school personnel, with particular focus on supporting handicapped children in mainstream education programs. The consultant's role in providing indirect service to children, through inservice teacher training and consultation, is emphasized. Lecture, two hours; laboratory, two hours. Prereq: EDS 601, or equivalent; EDP 671 (may be taken concurrently); or permission of instructor.

**\*EDS 610 ADVANCED EDUCATIONAL ASSESSMENT FOR STUDENTS WITH MILD DISABILITIES. (3)**  
 An intensive study of, and laboratory experience in, the assessment of educational problems of children with mild disabilities. Special emphasis is given to the relationship of physical, intellectual, emotional and behavioral disabilities to performance in the individual or group setting. Lecture, two hours; laboratory, two hours. Prereq: EDS 528 or consent of instructor.

**\*EDS 611 ADVANCED EDUCATIONAL PROGRAMMING FOR STUDENTS WITH LEARNING DISABILITIES. (3)**  
 An in-depth study of learning disabilities, including characteristics, issues, and research-based interventions for academic and social behaviors. Prereq: EDS 529 and EDS 610 or equivalents, or consent of instructor.

**\*EDS 612 ADVANCED PRACTICUM: SPECIAL EDUCATION. (3-6)**  
 Intensive clinical experience with exceptional children in day and residential schools, hospitals and private agencies. Students engage in prescriptive teaching with persons with disabilities in individualized, small group and special class settings. Laboratory, 6-12 hours per week. Prereq: Graduate standing; major in special education.

**\*EDS 620 INSTRUCTIONAL PROGRAMMING AND ASSESSMENT IN EARLY CHILDHOOD SPECIAL EDUCATION. (3)**  
 An in-depth study of the rationale and research history of the early education of exceptional children. A wide variety of assessment tools commonly used in the education of young children with disabilities will be presented, used and discussed. Individualized program planning based on test results and techniques for working with groups of exceptional children will be presented, implemented and discussed. Prereq: EDS 375 or 600 and EDS 510 or equivalent or permission of instructor.

**EDS 621 ISSUES IN EARLY CHILDHOOD EDUCATION OF THE HANDICAPPED. (3)**  
 Students will review, discuss and participate in supervised practicum experiences related to the preparation of special education teachers. Field work will include observation of sites of regular and special preschool programs, infant intervention programs, interdisciplinary child evaluation and demonstration of instructional methods and materials. Lecture: one hour; laboratory: two hours. Prereq: Admission to Master's Program in Special Education or permission of instructor and EDS 620.

**\*EDS 623 ADVANCED PRACTICUM: EARLY CHILDHOOD SPECIAL EDUCATION. (3-9)**  
 This course will provide supervised field experience in preparation of teachers or supervisors in early childhood special education. May be repeated to a maximum of nine credit hours. Laboratory, nine clock hours per credit hour. Prereq: Admission to Master's program in Special Education, or permission of instructor.

**\*EDS 630 METHODS FOR TEACHING STUDENTS WITH DISABILITIES. (3)**  
 An intensive study of the principles and procedures used in programming learning activities for students with disabilities. Topical areas include the acquisition of stimulus control and programming for generalization and maintenance of induced behavior change. Lecture, three hours. Prereq: EDS 601 and consent of instructor.

**\*EDS 631 PROGRAMMING FOR STUDENTS WITH MODERATE AND SEVERE DISABILITIES. (3)**  
 Intensive review of instructional programs designed for use with students with moderate and severe disabilities. Emphasis is on assessment of and developing learning activities/sequences for students with moderate and severe disabilities. Lecture, three hours. Prereq: Consent of instructor.

**\*EDS 632 ADVANCED PRACTICUM: MODERATE AND SEVERE DISABILITIES. (1-12)**  
 Intensive educational experience with students with moderate and severe disabilities in educational, residential and hospital settings. Site and practicum responsibilities will be based on students' competencies and area of interest. May be repeated to a maximum of 21 credits. Prereq: Graduate standing and consent of instructor.

**\*EDS 633 SINGLE SUBJECT RESEARCH DESIGN. (3)**  
 Principles and methods in designing Single Subject Research in educational settings. Students will be required to design and defend a research proposal. Prereq: EDS 601 or 630 or consent of instructor.

**#EDS 640 ASSISTIVE TECHNOLOGY. (3)**  
 An introduction to the techniques and devices which assist individuals with disabilities in performing functional tasks and achieving increased independence. Emphasis is placed on the functional use of technology by persons with disabilities and the integration of assistive technology into the home, community, school, and workplace. Topics include the transdisciplinary approach to service delivery, toy adaptation, switch construction and use, environmental control, alternate computer access, curricular adaptations, and augmentative communication. Prereq: EDS 514 and EDS 600, or permission of instructor.

**#EDS 641 ASSISTIVE TECHNOLOGY ASSESSMENT. (3)**  
 A study of procedures for conducting assessments that will result in the selection and use of assistive technologies that people with disabilities can use to improve their ability to function in the environment. Topics will include the use of assessment models and protocols, environmental adaptations, assistive technology resources, preparation of assessment reports, team decision making, and evaluation of assistive technology use. Students will engage in assistive technology assessment observations, role play, authentic assessments, and interdisciplinary collaboration. Prereq: EDS 640, or permission of instructor.

**#EDS 643 TELECOMMUNICATION IN SPECIAL EDUCATION AND REHABILITATION. (3)**  
 A study of telecommunication systems and their implications for special education and rehabilitation. Students will learn how to set up and configure hardware and software for telecommunication access, use software to telecommunicate, access special education and rehabilitation resources from remote sites, and design telecommunication applications for individuals who are enrolled in special education or rehabilitation programs. Students also will learn how to develop and use World Wide Web pages that focus on special education or rehabilitation topics. Prereq: EDS 514 and EDS 600, or permission of instructor.

**#EDS 645 HYPERMEDIA DEVELOPMENT FOR SPECIAL EDUCATION. (3)**  
 Students will study ways that hypermedia can be developed for use in special education programs. Topics will include hypermedia concepts, principles of designing visual displays, computer painting programs, computer-human interface guidelines, integration of CD-ROM and videodisc technology, digital scanning of images, sound synthesis and digitizing, use of digital movies and developing audio and visual special effects. Special emphasis will be devoted to the development of computer scripts for controlling the presentation of hypermedia programs. Prereq: EDS 514 and EDS 600, or permission of instructor.

**#EDS 647 SEMINAR IN SPECIAL EDUCATION TECHNOLOGY (Variable topic). (1-3)**  
A topical seminar on technology applications in special education. Seminars will address different topics of timely interest, current issues, and various approaches to providing assistive technology and instructional technology services for people with disabilities. Prereq: EDS 514 and EDS 600, or permission of instructor.

**#EDS 648 COORDINATING SPECIAL EDUCATION TECHNOLOGY PROGRAMS. (3)**  
Students will study procedures for planning and implementing special education technology programs in schools. Topics will include use of planning models, philosophy and mission development, generating program goals and objectives, procedures for preparing strategic plans, establishing policies and procedures, identifying resource requirements, managing program implementation, evaluation of program effectiveness, and preparation of proposals for funding. Prereq: Six credits of prior technology coursework or permission of instructor.

**#EDS 649 ADVANCED PRACTICUM: SPECIAL EDUCATION TECHNOLOGY. (1-9)**  
Students will engage in supervised practicum activities associated with the delivery of technology services to individuals with disabilities. Practicum settings may include schools, rehabilitation agencies, clinics, hospitals, technology resource centers, administrative offices, and other facilities involved in the development or delivery of technology services. May be repeated to a maximum of nine credits. Prereq: EDS 514 and EDS 600, or permission of instructor.

**\*EDS 701 SEMINAR FOR SPECIAL EDUCATION LEADERSHIP PERSONNEL. (1)**  
Study of issues and topics affecting the preparation of special education personnel and of research issues involving persons with disabilities and educational programs. May be repeated to a maximum of six credits. Lecture, two hours per week. Prereq: Admission into the Ed.S. or Ed.D. program.

**\*EDS 710 SEMINAR IN MILD DISABILITIES. (3)**  
Advanced study of issues related to mild disabilities in children, including etiology, assessment, intervention, theories, and contemporary research findings. Prereq: Admission to Ed.S. or Ed.D. program in Special Education or consent of instructor.

**\*EDS 711 SEMINAR IN MODERATE AND SEVERE DISABILITIES. (3)**  
Advanced study of issues related to moderate and severe disabilities, including problems of identification and assessment, program alternatives, curricula, theories, and contemporary research findings. Prereq: Admission to Ed.S. or Ed.D. program in Special Education or consent of instructor.

**EDS 712 SEMINAR IN SPECIAL EDUCATION PROFESSIONAL SERVICES. (3)**  
Study of procedures for providing special education professional services including consultation, technical assistance, continuing education programs, professional organization development, committee and advisory board involvement, professional writing and editing, leadership training, and funding proposal development. Prereq: Admission to the Ed.S. or Ed.D. program in special education or consent of instructor.

**EDS 720 SEMINAR IN SPECIAL EDUCATION TEACHER PREPARATION. (3)**  
Study of the design and implementation of special education teacher preparation programs, including syllabus development, organization of class presentations, instructional alternatives, scheduling, student assessment, professor-student interactions, student advising, resource identification and utilization and program evaluation. Prereq: Admission to the Ed.S. or Ed.D. program in special education or consent of instructor.

**EDS 721 PRACTICUM IN SPECIAL EDUCATION PERSONNEL PREPARATION. (1-9)**  
Supervised practicum experiences related to the preparation of special education teachers, including practice in delivering lectures, conducting class discussions, leading seminars, directing independent studies, guiding student research projects, demonstrating instructional methods and materials, supervising special education student teachers and advising. Laboratory, three-nine hours. May be repeated to a maximum of nine credits. Prereq: Admission to the Ed.S. or Ed.D. program in special education or consent of instructor.

**EDS 730 SEMINAR IN SPECIAL EDUCATION ADMINISTRATION. (3)**  
Administration of special education programs at the local and state levels. Emphasis is on program planning, staffing, fiscal management and program evaluation. Prereq: EDS 602 and admission to the Ed.S. or Ed.D. program in special education or consent of instructor.

**\*EDS 731 ADVANCED PRACTICUM: SPECIAL EDUCATION ADMINISTRATION. (1-9)**  
Supervised practicum experiences related to the administration of special education programs at the local and state levels, and project management, including staff management and development, program planning, evaluation, fiscal management, organization, reporting, communications, and coordination. Laboratory, three-nine hours. May be repeated to a maximum of nine credits. Prereq: Admission to the Ed.S. or Ed.D. program in special education administration or in certification program for special education administrators.

**EDS 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**EDS 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**EDS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**\*EDS 769 RESIDENCE FOR THE DOCTORAL DEGREE. (0-12)**  
May be repeated indefinitely.

**EDS 779 SEMINAR IN SPECIAL EDUCATION (Variable topic). (1-3)**  
Study of philosophy, principles, trends and research in education of exceptional children. Students will carry on an extensive study of a problem dealing with education of the exceptional child. May be repeated to a maximum of nine credits.

**EDS 789 INDEPENDENT STUDY IN SPECIAL EDUCATION. (1-6)**  
An independent study course for advanced graduate students with an interest in a specific problem in special education. Class hours by appointment. Prereq: Minimum of 12 semester hours in graduate work and consent of instructor.

**EDS 799 RESEARCH TECHNIQUES IN SPECIAL EDUCATION. (3)**  
A study of the basic research techniques and their application to special education. Unique problems in special education will be discussed with emphasis on designing and conducting a research study. Computer usage will be discussed and students encouraged to use the computer as a research tool. Prereq: 12 graduate semester hours in special education including EDP 657 or equivalent.

## EDU Education

**EDU 300 SPECIAL COURSE. (1-3)**  
This course is being proposed to provide an opportunity for offering experimental, topical or interdisciplinary courses on a one-time or two-time basis without creating a permanent course. The description will be submitted each time the course is offered. Prereq: Permission of instructor.

**EDU 305 CONTEMPORARY ISSUES FACING THE AT-RISK SCHOOL-AGE/ADOLESCENT CHILD. (3)**  
To provide background information, experience, and skills for undergraduate students to interact with elementary and middle school children in a consulting role. Special emphasis will address the needs of the "at-risk" student population. The "at-risk" student is associated with families with incomes below the poverty level, as well as other significant problems which plague contemporary society—e.g., homelessness, child abuse/neglect, single parent homes, non-English speaking parents, fetal alcohol or substance abuse syndrome, mentally and/or physically handicapped parents or siblings, and high incidence of academic achievement declines and dropout rates. Lecture, two hours; laboratory, two hours per week. Prereq: Consent of instructor.

**EDU 645 FOUNDATIONS OF PEDAGOGICAL THEORY AND PRACTICE IN THE SECONDARY SCHOOL. (0-9)**  
Students will participate with other secondary education majors in a variety of disciplines in the reflective study of adolescent behavior, secondary school curriculum, school law, learning theory, learning styles, effective teaching and learning, instructional technology, working with special populations, cultural diversity in the schools, school context, and professional development. Students will spend time in the schools applying concepts. May be repeated to a maximum of nine credits. Lecture, 3-9 hours; laboratory, 6-18 hours per week. Prereq: Admission to the Teacher Education Program and the M.A./M.S. in Education (Initial Certification Option-Secondary Education).

**EDU 745 INTERDISCIPLINARY INSTRUCTION IN THE SECONDARY SCHOOL. (0-3)**  
 Students will participate with other secondary education majors from a variety of disciplines in the reflective study of the context of schooling, classroom management, individual student differences, and professional development. Students will be in the schools applying concepts on a full-time basis. May be repeated to a maximum of three credits. Lecture, 1-3 hours; laboratory, 3-6 hours per week. Prereq: Admission to the Teacher Education Program and the M.A./M.S. in Education (Initial Certification Option-Secondary Education).

## EDV Education – Vocational

### AGRICULTURAL EDUCATION

**EDV 211 INTRODUCTION TO TRAINING AND DEVELOPMENT. (3)**  
 An orientation to the field of training and development from the human resource management perspective. Visits to organizations with training programs and supervised “shadowing (field experience)” experiences required.

**EDV 301 PLANNING, DESIGN, AND EVALUATION OF VOCATIONAL TRAINING. (3)**  
 To provide the student with a practical introduction to the major function of the training professional; planning, designing, and evaluating training programs for the workplace. Prereq: EDV 211.

**EDV 370 STUDENT TEACHING IN VOCATIONAL AGRICULTURE. (9)**  
 Practical application of methods in teaching various phases of vocational agriculture. To be taken concurrently with EDV 580, 581 and 583. Laboratory, 20 hours. Offered on a pass-fail basis only. Prereq: Second semester senior; admission to the Teacher Education Program or permission of instructor.

**EDV 580 MATERIALS AND METHODS FOR TEACHING VOCATIONAL AGRICULTURE. (3)**  
 Designed to develop teacher competency in methods of teaching with emphasis on the problem-solving procedure and use of demonstrations, field trips, and audiovisual materials. Evaluation of teaching-learning is emphasized. A study of facilities and instructional materials needed by a department of vocational agriculture is made. Prereq: Admission to the Teacher Education Program or permission of instructor.

**EDV 583 EXPERIENCE PROGRAMS IN VOCATIONAL AGRICULTURE. (3)**  
 Designed to develop teacher competencies to guide students to select, plan, carry out, and evaluate supervised experience programs in vocational agriculture, both production and off-farm. Prereq: Second semester senior; admission to the Teacher Education Program or permission of instructor.

### BUSINESS EDUCATION

**EDV 615 PROBLEMS IN BUSINESS EDUCATION. (3)**  
 A study of advanced problems of interest to business teachers such as testing in business subjects, guidance, job studies, placement and follow-up, equipment, and supervision. May be repeated three times for a maximum of 12 credits.

**EDV 626 CLASSIFICATION AND POSSIBLE USE OF COMMUNITY RESOURCES IN BUSINESS EDUCATION. (3)**  
 Course provides for community analysis, and the development of possible ways and means to supplement the business education course in the secondary school with a study of vital community resources.

### DISTRIBUTIVE EDUCATION

**\*EDV 517 DETERMINING TEACHING CONTENT IN MARKETING AND DISTRIBUTIVE EDUCATION. (2-3)**  
 Course construction in the field of marketing education. This course is planned to meet the needs of persons engaged as instructors in the field of marketing education. May be repeated to a maximum of six credits.

**\*EDV 528 TECHNIQUES OF TEACHING MARKETING AND DISTRIBUTIVE EDUCATION. (2-3)**  
 A study of the methods of teaching as applied to marketing education. The purpose of the course is to train prospective teachers to teach in the field of marketing education. May be repeated to a maximum of six credits.

### HOME ECONOMICS EDUCATION

**EDV 365 STUDENT TEACHING IN HOME ECONOMICS. (3-12)**  
 Practical application of methods in teaching various phases of home economics. Offered on a pass-fail basis only. Prereq: EDV 586; admission to the Teacher Education Program or permission of instructor.

**EDV 588 HOME ECONOMICS EDUCATION PROGRAMS. (3)**  
 History, organization, and administration of home economics education programs. Study of career opportunities for home economics educators.

**EDV 685 HOME ECONOMICS CURRICULUM CONSTRUCTION. (3)**  
 A study of the underlying principles of curriculum building for junior and senior high school and adult education in home economics. Prereq: EDV 586, 362.

### INDUSTRIAL EDUCATION

**EDV 109 INSTRUCTIONAL MATERIAL IN INDUSTRIAL EDUCATION. (2-3)**  
 Components of a comprehensive course of study are identified and students engage in the validation and preparation of materials to be used in teaching. Emphasis is placed on planning and preparing those materials that individualize instruction in the vocational industrial course.

**EDV 110 PRINCIPLES OF INDUSTRIAL TEACHING. (2-3)**  
 Designed for the beginning vocational industrial teacher. Study is made of various accepted teaching procedures and class managerial activities with which the new shop teacher must be familiar.

### VOCATIONAL EDUCATION

**EDV 211 INTRODUCTION TO TRAINING AND DEVELOPMENT. (3)**  
 An orientation to the field of training and development from the human resource management perspective. Visits to organizations with training programs and supervised “shadowing (field experiences)” required.

**EDV 501 PRACTICUM IN VOCATIONAL EDUCATION. (1-12)**  
 Planned and supervised practicum in teaching agriculture, business, home economics and vocational industrial education at middle and high school levels. Requires the integration of observation skills, application of instructional objectives, teaching strategies, selection of instructional materials, assessment of student progress, and use of student organizations. Regularly scheduled seminars included as an integral part of course. Open only to students in the master’s degree combined with initial teaching certification program. May be repeated to a maximum of 12 credits. Prereq: Consent of instructor.

**EDV 516 PROBLEMS OF THE COORDINATOR IN VOCATIONAL EDUCATION. (2-3)**  
 A course to prepare coordinators of vocational education programs, including planning of local or area programs, use of advisory committees, selection of instructional materials and equipment, organizing instructional programs, and overall planning and operating of the program. May be repeated to a maximum of six credits.

**EDV 520 THE ADULT LEARNER IN VOCATIONAL SETTINGS. (3)**  
 An overview of adult education practices and their relevance to adult learning in the work setting. Prereq: EDV 211 or consent of instructor.

**EDV 535 PRINCIPLES AND PHILOSOPHY OF VOCATIONAL EDUCATION. (2-3)**  
 Study is made of philosophy, accepted principles, and legislation affecting programs in vocational education. May be repeated to a maximum of six credits.

**EDV 702 CAREER DEVELOPMENT: RESEARCH, THEORIES AND PRACTICES. (2-3)**  
 Overview of theories of career development and current research. Emphasis on use of vocational assessment techniques in counseling and decision-making. (Same as EDP 702.)

**EDV 748 MASTER’S THESIS RESEARCH. (0)**  
 Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**EDV 749 DISSERTATION RESEARCH. (0)**  
 Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**EE Electrical Engineering****EE 101 ELECTRICAL ENGINEERING PROFESSIONS SEMINAR.****(1)**

Introductory seminar on professional practice, growth, conduct and ethics. Presentations on computers in electrical engineering and the University computer system. Presentations from career engineers and professional societies and reading assignments in professional journals. Pass/fail only.

**EE 211 CIRCUITS I.****(4)**

Fundamental laws and principles for linear circuits whose elements consist of passive and active components used in present day engineering practice. Determination of the sinusoidal steady state responses using the algebra of complex numbers. Lecture, three hours; recitation-laboratory demonstration, one two-hour session. Prereq: MA 114; prereq, or concur: PHY 232, 242.

**EE 221 CIRCUITS II.****(3)**

General analysis methods for linear circuits and systems. Discrete time approximations. State variable methods for both analog and digital circuits. Prereq: EE 211. Concur: MA 214.

**EE 222 ELECTRICAL ENGINEERING LABORATORY I.****(2)**

Laboratory exercises in the use of measuring instruments. Experiments in R-L-C circuit analysis. Lecture, one hour; laboratory, three hours. Prereq or concur: EE 221.

**EE 280 DESIGN OF LOGIC CIRCUITS.****(3)**

Boolean algebra; combinational logic circuits, synchronous sequential circuits; asynchronous sequential circuits; design problems using TTL integrated circuits. Prereq: CS 222.

**EE 305 ELECTRICAL CIRCUITS AND ELECTRONICS.****(3)**

A study of DC and AC electrical circuits, electronics principles and applications to instrumentation. Prereq: PHY 232, MA 114.

**EE 306 ELECTRICAL CIRCUITS AND MACHINERY.****(3)**

A study of AC and DC electrical circuits, single and three-phase systems, AC and DC machines and their control. Prereq: MA 114, PHY 232.

**EE 307 CIRCUIT ANALYSIS WITH APPLICATIONS.****(4)**

A service course covering electrical engineering principles for engineering or science students with majors outside of electrical engineering. Topics include circuit analysis, applications to electromechanical machines and analog and digital electronics. Not available to electrical engineering majors. Prereq: PHY 232.

**EE 380 MICROCOMPUTER ORGANIZATION.****(3)**

Hardware and software organization of a typical computer; machine language and assembler language programming, interfacing peripheral devices, and input-output programming; real-time computer applications, laboratory included. Prereq: EE 280 or CS 245. (Same as CS 380.)

**EE 395 INDEPENDENT WORK IN ELECTRICAL ENGINEERING.****(1-6)**

Special research and problems for individual students who are capable of pursuing independent investigations. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**EE 402G ELECTRONIC INSTRUMENTATION AND MEASUREMENTS.****(3)**

Elementary laboratory treatment of electronic circuits. Topics will include AC circuits, filters, simple circuits using transistors and other semiconductor devices, simple treatment of operational amplifiers, and an introduction to digital circuits. Lecture, two hours; laboratory, three hours. Prereq: EE 305 or PHY 242 or consent of instructor. (Same as PHY 402G.)

**EE 415G ELECTROMECHANICS.****(3)**

Study of electric machines and electromechanical systems. Prereq: EE 221 with a C or better and PHY 232.

**EE 416G ENERGY CONVERSION LABORATORY.****(2)**

Laboratory practice and experimental studies related to EE 415G. Lecture one hour; laboratory, three hours. Prereq or concur: EE 415G.

**EE 421G SIGNALS AND SYSTEMS I.****(3)**

An introduction to the modeling and analysis of signals and systems. Topics include convolution, Fourier series, Fourier Transform bandwidth, basic filter design, modulation techniques, random variables and random processes and spectral density. Prereq: MA 214 and a "C" or better in EE 221.

**EE 422G SIGNALS AND SYSTEMS II.****(3)**

A continuation of the analysis of signals and linear systems with an emphasis on feedback and discrete-time systems. Topics include the Laplace and Z-transforms, frequency domain modeling techniques, feedback principles, state variables, sampling and digital filter design. Prereq: EE 421G, engineering standing.

**EE 461G INTRODUCTION TO ELECTRONICS.****(3)**

Analysis and design of electronic circuitry incorporating nonlinear electronic elements such as transistors, FET's, and vacuum tubes. Applications to amplifiers. Prereq: A grade of C or better in EE 221.

**EE 462G ELECTRONIC CIRCUITS LABORATORY.****(2)**

Experimental exercises in the design and analysis of useful electronic circuits incorporating semiconductor devices: transistors, tunnel and Zener diodes; also, vacuum tubes, integrated circuits and operational amplifiers. Lecture, one hour; laboratory, three hours. Prereq: EE 222, CS 222; prereq or concur: EE 461G.

**EE 468G FIELDS AND WAVES.****(4)**

Applications of electromagnetic theory; electrostatic and magnetostatic fields; Maxwell's field equations; plane waves; transmission lines and waveguides; antennas and radiation. Prereq: Engineering standing.

**EE 481 LOGICAL DESIGN LABORATORY.****(2)**

A laboratory involving the design and implementation of logic circuits. Combinational and sequential (both synchronous and asynchronous) design examples using small and medium scale integrated circuits. Lecture, one hour; laboratory, one three-hour session. Prereq: EE 222, EE 280, and a C or better in EE 221.

**EE 499 ELECTRICAL ENGINEERING DESIGN****(Subtitle required).****(3)**

A course for senior students in electrical engineering with an emphasis on the engineering design processes requiring the creative involvement of students in open-ended problems relating to actual designs that are appropriate to the profession of electrical engineering. Prereq: Senior standing in electrical engineering and consent of the course coordinator.

**EE 511 INTRODUCTION TO COMMUNICATION SYSTEMS.****(3)**

An introduction to the basic signal processing operations in communications systems. Topics include frequency and time domain signal and system representation, random signals, modulation, sampling, pulse modulation, information theory. Prereq: EE 421G and engineering standing.

**EE 512 DIGITAL COMMUNICATION SYSTEMS.****(3)**

A treatment of the basic signaling concepts involved in the communication of digital information. Topics include transmission requirements and distortion of digital signals; discrete amplitude, frequency, and phase modulation; error control coding. Prereq: EE 421G and engineering standing or consent of instructor.

**EE 516 POWER SEMICONDUCTOR MODELS.****(3)**

Analyze and develop circuit models for power semiconductor devices. Develop an understanding of their design and application. Develop the background to be an intelligent user of modern electronic circuit simulation programs and open a window to understanding the literature on semiconductor devices. Prereq: EE 461G, EE 468G and engineering standing.

**EE 517 ADVANCED ELECTROMECHANICS.****(3)**

Dynamics of electromechanical systems and rotating electrical machines. Applications of electro-magnetic theory to electrical machines. Certain special topics of current interest. Prereq: EE 415G and engineering standing.

**EE 518 ELECTRIC DRIVES.****(3)**

Introduction to common power electronic converters used in electric motor drives. Steady-state analysis methods for electric machines fed by power conditioning converters. Performance prediction of electric machines by electromagnetic field theory and by coupled oil models. Prereq: EE 415G and engineering standing.

**EE 522 ANTENNA DESIGN.****(3)**

Principles of radiation, potential solution to Maxwell's equations for current in empty space, electrically small antennas, antenna arrays, wire antenna principles, introduction to numerical methods, aperture antennas, frequency scaling antennas, receiving properties of antennas, antenna measurement techniques. Prereq: EE 468G and engineering standing.

**EE 523 MICROWAVE CIRCUIT DESIGN.****(3)**

Physical and mathematical descriptions of wave propagation in guided structures; microstrip lines; microwave integrated circuits; passive components; two-terminal devices; four-terminal devices; S-parameter concept; equivalent circuit concept; solid state microwave amplifiers and oscillators. Prereq: EE 468G and engineering standing.

**EE 525 NUMERICAL METHODS AND ELECTROMAGNETICS. (3)**

This course covers the basics of numerical methods and programming with applications in electromagnetics. Examples range from statics to radiation/scattering problems involving numerical solutions to integro-differential and finite difference equations. Prereq: EE 468G plus one additional electromagnetics course, knowledge of one advanced-level programming language, or consent of instructor.

**EE 527 ELECTROMAGNETIC COMPATIBILITY. (3)**

Design of electronic systems to minimize 1) emission of electromagnetic signals that cause interference in other electronic systems, 2) the susceptibility of that system to electromagnetic signal from other electronic systems, and 3) the susceptibility of that system to its own, internally generated signals. A set of brief laboratory experiments demonstrate the design principles and provide familiarity with modern test equipment. Prereq: EE 468G and engineering standing.

**EE 530 ROBOTICS. (3)**

Methods of analysis, design, and operation of industrial and mobile robots. Kinematic and dynamic models of mechanical manipulators. Electromechanical drive systems. Robotic vision and sensors. Control and optimization of motion trajectories. Control programming. Current topics of interest from the literature. Prereq: EE 415G or EE 306, EE 422 or ME 343, EM 313 or EM 230, and engineering standing.

**EE 537 ELECTRIC POWER SYSTEMS I. (3)**

Application of symmetrical components to power system fault studies, calculation of transmission line parameters. Prereq: EE 468G.

**EE 538 ELECTRIC POWER SYSTEMS II. (3)**

Introduction to modern power system practices, basic transient and steady-state stability analysis with emphasis on digital techniques. Prereq: Engineering standing and consent of instructor.

**EE 560 SEMICONDUCTOR DEVICE DESIGN. (3)**

Theory, development and discussion of equivalent circuit models of transistor devices, negative resistance, semiconductor devices and pretersonic devices based on electronic processes in solid state elements. High and low frequency, as well as the Ebers-Moll and charge control switching models and their application in computerized electronic circuit analysis will be developed. Prereq: EE 461G or equivalent, and engineering standing.

**EE 561 ELECTRIC AND MAGNETIC PROPERTIES OF MATERIALS. (3)**

Study of dielectric and magnetic materials. Topics include dielectric relaxation, conduction and breakdown mechanisms, liquid crystals, ferroelectrics, magnetic resonance and relaxation, measurement techniques. Prereq: MSE 212 and PHY 361 or EE 461G or consent of instructor. (Same as MSE 561.)

**EE 562 ANALOG ELECTRONIC CIRCUITS. (3)**

Feedback amplifiers, tuned and untuned amplifiers, oscillators, AM and FM transmitters. Prereq: EE 461G and engineering standing.

**EE 564 DIGITAL ELECTRONIC CIRCUITS. (3)**

Timing, scanning, trigger/logic and pulse circuits; video and broad band R-F amplifiers. Prereq: EE 461G and engineering standing.

**EE 566 HYBRID MICROELECTRONICS. (3)**

The purpose of this course is to study design, material selection, and fabrication of hybrid microelectronic circuits. Students will learn the general features of thick film, thin film, ceramic substrate, surface mount, and multichip module technologies. Both fabrication and electrical properties of circuit elements will be emphasized. Prereq: Engineering standing or consent of instructor. (Same as MSE 566.)

**EE 567 INTRODUCTION TO LASERS AND MASERS. (3)**

Basic principles of laser action; atomic transitions; population inversion; two and three level systems; optical resonators; pumping methods; applications. Prereq: Engineering standing or consent of instructor. (Same as PHY 567.)

**EE 568 FIBER OPTICS. (3)**

The course presents theory and practice related to (a) fiber optic cable and their fabrication, (b) fiber optic transmitters and detectors, (c) fiber optic communication systems and (d) fiber optic remote sensors. Prereq: EE 468G. (Same as MSE 568.)

**EE 569 ELECTRONIC PACKAGING SYSTEMS AND MANUFACTURING PROCESSES. (3)**

Study of packaging systems which interconnect, support, power, cool, protect, and maintain electronic components. The course will address systems at the chip, board, and product levels. Topics include design, properties, materials, manufacture, and performance of various packaging systems. Laboratory will provide familiarity with design software and production equipment and processes. Prereq: EE 211 or EE 305 or EE 307. (Same as MSE 569.)

**EE 571 FEEDBACK CONTROL DESIGN. (3)**

System representation via transfer function and state variables, root locus analysis; Bode plots; compensation by root-locus and frequency response methods; state variable feedback; sensitivity analysis; tracking via output feedback; digital control systems. Prereq: EE 421G and engineering standing.

**EE 572 DIGITAL CONTROL OF DYNAMIC SYSTEMS. (3)**

Zero and first order hold, theory of analog to digital and digital to analog conversion. Z-transform analysis, discrete state variable analysis, discrete estimation techniques, error analysis of discrete systems. Prereq: EE 422G, engineering standing.

**EE 581 ADVANCED LOGICAL DESIGN. (3)**

Medium-scale and large-scale digital components; register-transfers; bus-structures; controller/process organizations. Design of arithmetic processors and stored-program computers. Microprogramming. Prereq: EE 280 and EE/CS 380; engineering standing or upper division computer science standing.

**EE 583 MICROPROCESSORS. (3)**

A course in the hardware and software of microprocessors. Assembly language programming, address decoding, hardware interrupts, parallel and serial interfacing with various special purpose integrated circuits. Each student is expected to do homework assignments using microprocessor hardware. This will be arranged by special appointment through the instructor. Prereq: EE 280 and EE/CS 380; engineering standing or upper division computer science standing.

**EE 584 INTRODUCTION OF VLSI DESIGN AND TESTING. (3)**

Introduction to the design and layout of Very Large Scale Integrated (VLSI) Circuits for complex digital systems; fundamentals of the VLSI fabrication process; and introduction to VLSI testing and structured design for testability techniques. Prereq: Engineering standing and EE 461 or consent of instructor.

**EE 585 FAULT TOLERANT COMPUTING. (3)**

Fault models in logic networks will be developed and then various testing techniques for detection of faults in logic networks will be discussed. Systematic approach for designing logic networks for testability will be introduced. Self testing and fault tolerant design of logic systems using coding theory will be covered. Prereq: EE 581 or consent of the instructor, engineering standing or upper division computer science standing.

**EE 587 MICROCOMPUTER SYSTEMS DESIGN. (3)**

A course in the design of microcomputer systems for hardware engineers which includes the following topics: use of uncommitted logic arrays in instruction set design; hardware support for operating systems and programming languages; customizing microcomputers for specific execution environments; and control of concurrency. Prereq: EE 581 and EE 583, or consent of instructor, engineering standing or upper division computer science standing. (Same as CS 587.)

**EE 595 INDEPENDENT PROBLEMS. (1-3)**

For electrical engineers. A problem, approved by the chairperson of the department, provides an objective for study and research. May be repeated to a maximum of six credits. Prereq: 2.5 standing and engineering standing.

**EE 599 TOPICS IN ELECTRICAL ENGINEERING (Subtitle required). (2-3)**

A detailed investigation of a topic of current significance in electrical engineering such as biomedical instrumentation, digital filter design, active networks, advanced electrical devices, digital communications, display of electronics. May be repeated to a maximum of six credits, but only three credits can be earned under the same title. A particular topic may be offered at most twice under the EE 599 number. Prereq: Equivalent of two 400-level courses in electrical engineering, consent of instructor and engineering standing.

**PREREQUISITE FOR GRADUATE WORK:** Students desiring to take any of the following courses should have a thorough working knowledge of chemistry, physics and mathematics. For major work, a candidate must hold a bachelor's degree in electrical engineering or its equivalent.

**EE 601 ELECTROMAGNETIC ENERGY CONVERSION I. (3)**

Generalized electric machine theory; parameter determination. Energy conversion in continuous media including magnetohydrodynamics. Prereq: Consent of instructor.

**EE 603 POWER ELECTRONICS. (3)**

Study of solid-state power electronic devices and their applications in power conditioned electric motor drive systems. Examination of control philosophies, steady-state models, and numerical simulation of characterizing differential equations. Current topics of interest from the literature. Prereq: EE 517 and EE 571 or consent of instructor.

**EE 604 SWITCH MODE CONVERTERS. (3)**

Study of analysis techniques for switching mode converters and associated control practices. Boost, buck, buck-boost, flyback, and Cuk topologies in both continuous and discontinuous conduction modes are presented. Numerical solution, state-space averaging, and linearization techniques are applied to predict performance and formulate transfer characteristics. Prereq: EE 517 or consent of instructor.

**EE 605 SYSTEMS FOR FACTORY INFORMATION AND CONTROL. (3)**

Systems approach to manufacturing. Hardware and software for real time control and reporting. Sensor and actuators, controllers, networks, databases, hierarchical and distributed control, CAD/CAM systems, flexible manufacturing systems, group technology, modeling and simulation of factory operations. Lecture, two hours; laboratory, two hours. Prereq: MFS 505. (Same as MFS 605.)

**EE 606 SEMINAR AND PROJECT IN MANUFACTURING SYSTEMS ENGINEERING. (3)**

A project course for manufacturing systems. Course consists of seminar presentations by outside professionals and faculty and a course project on a realistic manufacturing systems assignment. Lecture, two hours; laboratory, two hours. (Same as ME/MFS 606.)

**EE 607 ELECTRIC MACHINE DESIGN. (3)**

Design principles; specifications; magnetic and electric loadings, and output coefficients; magnetic circuit performance from design; design optimization techniques; sample designs. Prereq: EE 415G or equivalent.

**EE 608 ADVANCED TOPICS IN POWER ELECTRONICS (Subtitle required). (3)**

Study of emerging research and design practices in power electronic circuits and power conditioned electric motor drives. A review and extension of selected topics in the current literature. May be repeated to a maximum of six credits under different subtitles. Prereq: Consent of instructor.

**EE 611 DETERMINISTIC SYSTEMS. (3)**

Concepts of linear systems, singularity functions, convolution and superposition integrals, state-variable method for linear systems, relation between transfer function and state-variable equations, fundamental matrix, state-transition matrix, unit-impulse response matrix, and transmission matrix. Prereq: EE 421G.

**EE 613 OPTIMAL CONTROL THEORY. (3)**

State-space modeling of control systems; variational techniques; system optimization by maximum principle, dynamic programming; Hamilton-Jacobi equations design of linear optimal systems; computational methods for solving boundary value problems. Prereq: EE 611.

**EE 614 SAMPLED-DATA CONTROL SYSTEMS. (3)**

Basic theory of sampling, the pulse-transfer function, Z-transform analysis of sampled-data control systems, modified Z-transforms, general design principles, analysis of multi-rate, variable-rate and nonsynchronized sampled-data systems. Prereq: EE 421G or consent of instructor.

**\*EE 619 PROBLEMS SEMINAR IN OPERATIONS RESEARCH. (3)**

In this course the student is exposed to the art of applying the tools of operations research to real world problems. The seminar is generally conducted by a group of faculty members from the various disciplines to which operations research is applicable. Prereq: MA 617 and STA 525 or consent of instructor. (Same as STA 619 and MA 613.)

**EE 621 ELECTROMAGNETIC FIELDS. (3)**

Development of electromagnetic field theory from the basic postulates of Maxwell's equations in differential and integral forms, solution to static, quasistatic, and wave-propagation problems. Radiation from dipole antenna elements. Prereq: EE 468G.

**EE 622 ADVANCED ELECTRODYNAMICS. (3)**

Solution methods for applied electrodynamics problems; uniqueness, equivalence, duality, reciprocity; linear space methods; wave solutions in separable coordinate systems; classical problems in cartesian, cylindrical, and spherical coordinates. Prereq: EE 468G.

**EE 625 COMPUTATIONAL ELECTROMAGNETICS. (3)**

This advanced course in computational electromagnetics primarily covers moment method and finite element method solutions to scattering problems. Representative topics of the course include surface and volume equivalence principles, scattering by material cylinders, scattering by periodic structures and absorbing boundary condition models. Prereq: EE 525, EE 621, or consent of instructor.

**EE 627 MULTICONDUCTOR TRANSMISSION LINES. (3)**

Analysis of electromagnetic coupling in multiconductor transmission lines. Emphasis on modeling the line for the purposes of predicting crosstalk and incident field effects. Applications to interference prediction, power transmission line transients, and synthesis of microwave filters and circuits. Prereq: EE 468G or consent of instructor.

**EE 630 DIGITAL SIGNAL PROCESSING. (3)**

An introductory treatment of the basic concepts of signal processing via time and frequency domain (Z-transform) methods and a survey of procedures for designing, implementing and using digital signal processors. Prereq: EE 512 or consent of instructor.

**EE 635 IMAGE PROCESSING. (3)**

The course outlines applications of image processing and addresses basic operations involved. Topics covered include image perception, transforms, compression, enhancement, restoration, segmentation, and matching. Prereq: Graduate standing and consent of instructor. (Same as CS 635.)

**EE 639 ADVANCED TOPICS IN SIGNAL PROCESSING AND COMMUNICATIONS. (3)**

Advanced topics in signal processing and communications research and design topics of current interests, such as optical processing, pattern recognition, satellite systems, and digital communication networks. A review and extension of current literature and selected papers and reports. May be repeated to a maximum of nine credits. Prereq: Advanced graduate standing.

**EE 640 STOCHASTIC SYSTEMS. (3)**

Random variables, stochastic processes, stationary processes, correlation and power spectrum, mean-square estimation, filter design, decision theory, Markoff processes, simulation. Prereq: EE 421G.

**EE 642 DISCRETE EVENT SYSTEMS. (3)**

The objective of the course is to prepare students for research in the field of supervisory control of discrete event systems (DES's). Logical models, supervising control. Stability and optimal control of DES, complexity analysis and other related research areas will be covered. Prereq: Graduate standing or consent of instructor. (Same as CS 642.)

**EE 660 ELECTRONIC DEVICE DESIGN. (3)**

An integrated treatment of the theory and application of electronic devices with emphasis on methods of engineering analysis and design. Prereq: EE 560 and consent of instructor.

**EE 661 SOLID-STATE ELECTRONICS. (3)**

Bose and Fermi statistics; semiconductor theory; solid-state devices; electrical properties of insulators; theory and applications of magnetic materials, including ferrites. Prereq: EE 461G.

**EE 664 SAW DEVICE DESIGN, MODELING, AND APPLICATIONS. (3)**

Analysis of physical principles of Surface Acoustic Wave (SAW) devices on piezoelectric substrates and their application to the design of these devices. The use of these devices in a wide range of high-frequency signal processing applications will be covered, and computer aided design techniques for analysis and design will be surveyed. Prereq: EE 421G, 468G, and 560.

**EE 672 MOLECULAR PROPERTIES IN ELECTRONIC DEVICES. (3)**

The study of molecular properties and the application of these properties in electronic devices. Correlation of molecular energy states with infrared and Raman spectra; selection rules and intensities of transitions; instrumentation for molecular investigation; applications. Prereq: Consent of instructor.

**EE 684 INTRODUCTION TO COMPUTER AIDED DESIGN OF VLSI CIRCUITS. (3)**

Computer aided design of Very Large Scale Integration (VLSI) circuits. Topics include: VLSI technologies, CMOS circuit characteristics, computer aids in the design of VLSI circuits, use of various CAD tools for layout, circuit design, logic design, and functional design, and the use of VLSI circuits in the system design. A design project is required. Prereq: EE 581 and EE 461G or consent of instructor.

**EE 685 DIGITAL COMPUTER STRUCTURE. (3)**

Study of fundamental concepts in digital computer system structure and design. Topics include: computer system modeling based on instruction set processor (ISP) and processor-memory-switch (PMS) models, design and algorithms for ALU, processor, control unit and memory system. Special topics include floating-point arithmetic, cache design, pipeline design technologies, and parallel computer architectures. Prereq: EE 380 and EE 581 or consent of instructor.

**EE 686 ADVANCED COMPUTER ARCHITECTURE DESIGN. (3)**

A study of current diverse advanced architectures such as microprogrammed, parallel, array and vector, networked, and distributed architectures; applications and example systems employing these architectures; matching applications to architectures; consideration of architectures of the future. Prereq: EE 685.

**EE 688 NEURAL NETWORKS. (3)**

The purpose of this course is to introduce various aspects of the neural networks and neurocomputing. The course starts with an introduction to Learning Machines and analyzes various learning algorithms such as Hebbian, Grossberg's and Kohonen's learning algorithms. Some of the neural networks that will be studied in detail are: Backpropagation nets, Hopfield nets, Adaptive Resonance Theory, Adaline and Madalines, Kohonen's Self learning nets, BAMs, Neocognition, etc. Students will implement a minimum of three learning algorithms. Prereq: Graduate standing. (Same as CS 688.)

**EE 699 TOPICS IN ELECTRICAL ENGINEERING (Subtitle required). (3)**

A detailed study of a topic of current interest in electrical engineering. May be repeated to a maximum of six credits, but only three credits may be earned under the same subtitle. A particular topic may be offered at most twice under the EE 699 number. Prereq: Consent of instructor.

**EE 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**EE 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**EE 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**EE 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**EE 783 SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING. (1-3)**

Open to graduate students only. Individual work on an assignment approved by the chairperson of the department. May be repeated to a maximum of nine credits.

**EE 784 RESEARCH PROJECT IN ELECTRICAL ENGINEERING. (3)**

Individual study related to a special research project supervised by the student's advisor. A final written report on the project is required. This course is open only to and required by students pursuing the MSEE degree with a non-thesis option (Plan B). The course cannot satisfy part of the required 30 hours of course work for Plan B. Prereq: Approval of student's MSEE advisor.

**EGR Engineering****EGR 399 COOPERATIVE ENGINEERING EDUCATION. (1)**

A course designed for undergraduate students who, through the engineering cooperative education office, secure full-time, salaried, career-related positions under the supervision of a sponsoring employer. Enrollment in the course constitutes full-time status. Course may be taken on a pass-fail basis only and may be repeated on a rotational basis to a maximum of six credit hours. Prereq: Approval of Coordinator of Cooperative Engineering Education.

**#EGR 401 CAREER PLANNING/EMPLOYMENT SEMINAR. (1)**

This course will introduce students to the various elements involved in obtaining a position in their chosen field of engineering. Prereq: Engineering standing.

**EGR 537 NUMERICAL ANALYSIS. (3)**

Floating point arithmetic. Direct methods for the solution of systems of linear algebraic equations. Polynomial and piecewise polynomial approximation, orthogonal polynomials. Numerical integration: Newton-Cotes formulas and Gaussian quadrature. Basic methods for initial value problems for ordinary differential equations. The emphasis throughout is on the understanding and use of software packages for the solution of commonly occurring problems in science and engineering. Prereq: CS/MA 321 or equivalent, or graduate standing or consent of instructor. Knowledge of a procedural computer language is required. (Same as CS/MA 537.)

**EGR 599 TOPICS IN ENGINEERING (Subtitle required). (1-3)**

An experimental, interdisciplinary course devoted to a topic of interest to students in several departments of the college. May be repeated to a maximum of six credits, but only three credits may be earned under the same title. A particular topic may be offered at most twice under the EGR 599 number. Prereq: Variable, given when topic is identified.

**EGR 611 BOUNDARY ELEMENT METHODS IN ENGINEERING. (3)**

Introduction of boundary element methods for use in solving common engineering equations, such as the Laplace equation, the Poisson equation, the wave equation, and the diffusion equation. Both the theoretical and numerical aspects of the boundary element technique are presented. Application areas include heat conduction, potential flow problems, acoustic wave propagation, general diffusion, and stress analysis. Prereq: EGR 537 or consent of instructor. (Same as ME 611.)

**EGR 621 FINITE ELEMENT ANALYSIS IN ENGINEERING. (3)**

Theoretical and computational basics of the finite element method. Development of element relationships and calculations, assembly and efficient solution of the finite element equations. Weak formulations are presented for both steady and transient 1D, 2D, 3D problems. Prereq: MA 432G and EGR 537 or consent of instructor.

**EGR 622 ADVANCED FINITE ELEMENT ANALYSIS IN ENGINEERING. (3)**

Advanced topics in finite analysis including: weighted residual methods, variational principles, mixed and hybrid finite element formulations, advanced interpolation schemes and nonlinear formulations and analysis. Primary areas of emphasis are structural and solid mechanics. Prereq: EGR 621.

**EM Engineering Mechanics****EM 221 STATICS. (3)**

Study of forces on bodies at rest. Vector algebra; study of force systems; equivalent force systems; distributed forces; internal forces; principles of equilibrium; application to trusses, frames and beams; friction. Prereq or concur: MA 213.

**EM 230 MECHANICS FOR ELECTRICAL ENGINEERS. (3)**

Principles of statics. Principles of dynamics of a particle and a system of particles, with emphasis on applications in electromagnetics. Computer solutions included. Students may not receive credit for EM 221 and EM 230. Prereq or concur: MA 213 and PHY 232.

**EM 302 MECHANICS OF DEFORMABLE SOLIDS. (3)**

A study of stress and strain in deformable solids with application primarily to linear elastic materials: stress and strain transformations; simple tension and compression of axial members; torsion of shafts; bending of beams; combined loading of members; buckling of columns. Prereq: Registration in the College of Engineering or consent of chairperson, and EM 221; prereq or concur: MA 214.

**EM 313 DYNAMICS. (3)**

Study of the motion of bodies. Kinematics: cartesian and polar coordinate systems; normal and tangential components; translating and rotating reference frames. Kinetics of particles and rigid bodies: laws of motion; work and energy; impulse and momentum. Prereq: Registration in College of Engineering or consent of chairperson and EM 221, MA 214, and CS 221 or CS 222 or CS 223.

**EM 506 MECHANICS OF COMPOSITE MATERIALS. (3)**

A study of the structural advantages of composite materials over conventional materials, considering high strength-to-weight and stiffness-to-weight ratios. Fiber reinforced, laminated and particulate materials are analyzed. Response of composite structures to static and dynamic loads, thermal and environmental effects, and failure criteria are studied. Prereq: EM 302, engineering standing or consent of instructor. (Same as MSE 506.)

**EM 510 DYNAMICS AND DESIGN OF ROBOT MANIPULATORS. (3)**

Analysis of the design and operation of robotic systems. Emphasis on robot kinematics, dynamics, differential motion, manipulator Jacobian, motion trajectories, geometric modeling, force and vibration analyses. Various practical applications and real cases are investigated. Prereq: ME 340 or both EE 420G and EM 230. (Same as ME 510.)

**EM 513 MECHANICAL VIBRATIONS. (3)**

The analysis of vibrational motion of structural and mechanical systems. Single-degree-of-freedom systems; free vibrations; nonperiodic excitation; harmonic excitation. Modal analysis of multiple-degree-of-freedom systems. Vibration of continuous bodies, including strings and bars (axial, torsional and flexural modes). Energy methods. Prereq: EM 313 and EM 302, engineering standing or consent of instructor.



**EM 531 ADVANCED STRENGTH OF MATERIALS. (3)**

Unsymmetrical bending of beams, thin plates, stress analysis of thick-walled cylinders, and rotating discs. Theory of elastic energy, curved beams, stress concentration, and fatigue. Prereq: EM 302 and engineering standing.

**EM 533 AIRCRAFT AND MISSILE STRUCTURAL ANALYSIS. (3)**

Thin-walled structures used in aircraft, missile, and pressure vessel applications are studied. The response of thin-walled structures to flexure, torsion, pressure loads and temperature variations is analyzed by energy and approximate methods. Study of conventional and advanced composite materials, and the effects of creep and plasticity. Prereq: EM 302 or equivalent and engineering standing.

**EM 556 INTRODUCTION TO COMPOSITE MATERIALS. (4)**

Applications, materials selection and design of composite materials. Relation between properties of constituent materials and those of composite. Processing methods for materials and for some structures. Lab focuses on preparation and testing of composite materials and their constituents. Lecture, three hours; laboratory, three hours per week. Prereq: MA 214, CHE 236, PHY 232, MSE 201, or consent of instructor. (Same as MSE 556.)

**EM 585 FOURIER SERIES AND BOUNDARY VALUE PROBLEMS. (3)**

An introductory treatment of Fourier series and its application to the solution of boundary value problems in the partial differential equations of physics and engineering. Orthogonal sets of functions, Fourier series and integrals, solution of boundary value problems, theory and application of Bessel functions and Legendre polynomials. Prereq: MA 432G or equivalent. (Same as MA 485G.)

**EM 601 PRINCIPLES OF CONTINUUM MECHANICS. (3)**

Mathematical background including vector spaces, linear transformations, and vector analysis. Continuum balance principles of mass, momentum, angular momentum, and energy, and the entropy inequality. Modeling principles of material frame indifference and material symmetry. Constitutive equations for nonlinear thermoelastic materials with heat conduction and viscous dissipation. Linearization to classical linear elasticity and linear viscous fluids. Prereq: MA 432G or equivalent and EM 531 or ME 531 or equivalent.

**EM 603 MECHANICS OF PLASTIC SOLIDS I. (3)**

Permanent changes in shape of solid materials occur as plastic deformations in many engineering applications, such as extrusion, forging and rolling. This course examines the experimental basis and fundamental theoretical framework for plastic materials. The analysis of plastic deformations in simple bending, torsion, tension and compression, and some two dimensional problems are presented. Connection between mechanics parameters, design variables and metallurgical phenomena are discussed. Limit analysis is studied. Prereq: EM 503 or EM 651 or consent of instructor.

**EM 613 NONLINEAR OSCILLATIONS. (3)**

Many physical systems exhibit some nonlinear behavior. This course presents some methods of analyzing discrete, nonlinear, dynamical systems and applies the methods to typical mechanical systems. Various kinds of nonlinear behavior, including resonance phenomena such as harmonics, parametric excitation, and discontinuous jumps in amplitude are considered. Lyapunov stability criteria and Floquet and Routhian procedures for performing stability analyses of systems are introduced, and their physical interpretations for various systems are studied. Prereq: EM 513.

**EM 628 APPLIED MATHEMATICS IN THE NATURAL SCIENCES II. (3)**

Continuation of EM/MA 527 with emphasis on special topics and techniques applied to partial differential equations that occur in various physical field theories. Field equations of continuum mechanics of solids and fluids are reviewed. The method of characteristics, elliptic functions and integrals, Legendre polynomials, Mathieu functions, integral equations and transforms, and the methods of potential theory are examples of selected topics studied in introductory applications. Intended for students in applied mathematics, science and engineering. Prereq: EM/MA 527. (Same as MA 628.)

**EM 645 ADVANCED DYNAMICS I. (3)**

Many physical systems in engineering involve rigid bodies in translation and rotation. Such motions are studied in this course by the use of Euler's Laws. The kinematical description of the motions utilize the concept of reference frames. The inertia properties of rigid bodies, and the energy functions for rigid bodies are covered. Analytical and numerical solutions of dynamical systems of engineering interest are considered. Prereq: EM 313; prereq, or concur: MA 432G.

**EM 651 MECHANICS OF ELASTIC SOLIDS I. (3)**

Many engineering applications involve the use of materials that behave elastically when performing their designed function. This course concerns the general analysis of small deformations, stress, and stress-deformation relations for elastic bodies. The solution of typical problems frequently encountered in engineering applications, e.g., extension, bending, and torsion of elastic bars, stress concentrations and thermoelastic behavior, are studied. Some modern computational methods currently used in engineering practice are introduced. Prereq: MA 432G or consent of instructor.

**EM 652 MECHANICS OF ELASTIC SOLIDS II. (3)**

Continuation of EM 651 with more attention to the fundamental structure of and important historical and contemporary contributions to elastic theory. Extensive use of modern computational methods that were introduced in the first course will provide familiarity with the solution of larger scale, industrially important elasticity problems. Application of the boundary integral equation method (BIE) will be emphasized. Some use also will be made of the finite element method, primarily for comparison with BIE. Instruction will include "hands-on" experience with digital-computer program packages. Prereq: EM 651 or consent of instructor.

**EM 653 METHODS OF APPLIED DIFFERENTIAL EQUATIONS. (3)**

Integrals of nonlinear partial differential equations; similarity variables and other transformations; perturbation methods; weighted residual methods; numerical methods; selected topics. Prereq: MA 432G or consent of instructor.

**EM 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**EM 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**EM 760 RESEARCH PROJECT IN ENGINEERING MECHANICS. (0)**

Individual study related to a special research project supervised by the student's adviser. A final written report on the project is required. Prereq: Approval of director of graduate studies.

**EM 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**EM 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**EM 780 SPECIAL PROBLEMS IN ENGINEERING MECHANICS. (3)**

A mechanism for special and individualized study of a wide range of topics of interest to the advanced student of engineering mechanics. May be repeated to a maximum of nine credits. Prereq: Approval of director of graduate studies.

**END Endodontics****END 820 ENDODONTICS I. (2)**

This is a lecture-laboratory course introducing the student to the techniques of treating root canals of teeth. Emphasis is placed on the diagnosis and treatment of pulpal and periapical pathosis. Lecture, 15 hours; laboratory, 45 hours. Prereq: RSD 810, 812, and RSD 814, or consent of course director.

**END 821 CLINICAL ENDODONTICS I. (1)**

In this course, students will treat two clinical endodontic cases, one of which shall be a molar. Thirty hours clinic, total. Prereq: END 820.

**END 830 ENDODONTICS II. (1)**

This course concerns the diagnosis and treatment of endodontically related problems. Traumatic injuries, controversies in instrumentation and filling procedures, periodontic-endodontic consideration, surgical endodontics and other selected topics are discussed in depth. Lecture, 20 hours. Prereq: END 821.

**END 831 CLINICAL ENDODONTICS II. (1)**

In this course students will treat routine endodontic cases. Clinic, 54 hours. Prereq: END 821.

**END 841 CLINICAL ENDODONTICS III. (1)**

This course offers dental students further experience in providing endodontic treatment. Clinic, 40 hours. Prereq: END 831 or consent of instructor.

**END 850 ENDODONTICS ELECTIVE. (1-10)**

Elective courses offered by the Department of Endodontics provide opportunities for further study of or experience in various aspects of endodontics. Topics may include diagnosis, case selection, treatment planning, emergency treatment, intracanal medications, obturation materials, periapical surgery, root amputations, and endodontic-periodontic relationships. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of ten credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

**ENG English****ENG 098 ENGLISH FOR SPEAKERS OF OTHER LANGUAGES. (3)**

This course is a writing course designed to provide international undergraduate students with a firm basis in the rhetorical patterns of written English and in the grammatical structures and expressions associated with those patterns. It also serves as an introduction to the analysis and organization of information as found in English paragraphs and essays. Emphasis is placed upon writing beyond the sentence level. Students must attain at least a C in order to enter ENG 099. The course may be repeated up to six credits. Students cannot count this credit toward the Freshman Composition requirement or toward the graduation requirement. Lecture, five hours per week.

**ENG 101 WRITING I. (3)**

A course in writing emphasizing argument. Instruction and practice in reading critically, thinking logically, responding to texts, developing research skills, writing substantial essays through systematic revision, addressing specific audiences, expressing ideas in standard and correct English. Includes grammar and mechanics review. Notes: (a) Credit not available by special examination; (b) ENG 101 and ENG 102 may not be taken concurrently.

**ENG 102 WRITING II. (3)**

Argumentative writing. Emphasis on development of a fluent, precise, and versatile prose style. Continued instruction and practice in reading critically, thinking logically, responding to texts, developing research skills, writing substantial essays through systematic revision, addressing specific audiences, expressing ideas in standard and correct English. Prereq: ENG 101 or equivalent. Notes: (a) Credit not available by special examination; (b) ENG 101 and ENG 102 may not be taken concurrently.

**ENG 105 WRITING: AN ACCELERATED COURSE. (3)**

An intensive course in writing that combines the content of ENG 101 and ENG 102, emphasizing argumentation and library research. ENG 105 satisfies the University Writing Requirement for students who qualify for admission by ACT score and special examination. Note: Credit for this course and for fulfillment of the University Writing Requirement possible by CLEP examination.

**ENG 161 INTRODUCTION TO LITERATURE. (3)**

An analytical rather than historical approach to literature, intended to deepen the student's insight into the nature and purpose of literature and to develop literary taste and judgment. Designed especially for nonmajors, this course satisfies no requirements of the English major. (Offered in Community College System only.)

**ENG 203 BUSINESS WRITING. (3)**

Instruction and experience in writing for business, industry, and government. Emphasis on clarity, conciseness, and effectiveness in preparing letters, memos, and reports for specific audiences. Prereq: Completion of University Writing requirement.

**ENG 204 TECHNICAL WRITING. (3)**

Instruction and experience in writing for science and technology. Emphasis on clarity, conciseness, and effectiveness in preparing letters, memos, and reports for specific audiences. Prereq: Completion of University Writing requirement.

**ENG 205 INTERMEDIATE WRITING. (3)**

Instruction and experience in nonfictional writing. The emphasis is on clarity, conciseness, and effective form in abstracts, in case studies, and in literature reviews for special audiences. Assignments include research and oral presentations. Note: ENG 205 fulfills no requirements of the English major. Prereq: Completion of the University Writing requirement.

**ENG 207 BEGINNING WORKSHOP IN IMAGINATIVE WRITING (Subtitle required). (3)**

A beginning course in the craft of writing, teaching students how to read critically and how to revise work in progress. The students provide an audience for each other's work. Exercises involve practice in aspects of craft and promote experimentation with different forms, subjects, and approaches; outside reading provides models and inspiration. May be repeated under different subtitle to a maximum of six credits. Prereq: Consent of instructor.

**ENG 211 INTRODUCTION TO LINGUISTICS. (3)**

Introduction to the scientific study of human language. Emphasis on the fundamental principles of linguistic theory; applications of these principles in the investigation of grammatical structure, language change, regional and social dialect variation, and the acquisition of language by children. Credit will not be given to students who already have credit for either ANT 215 or ENG 414G. Prereq: Two college semesters or two high school years of a foreign language. (Same as LIN 211.)

**ENG 221 SURVEY OF ENGLISH LITERATURE I. (3)**

A survey of English literature from Beowulf through Milton. The emphasis is upon the more important writers, with attention to their cultural backgrounds.

**ENG 222 SURVEY OF ENGLISH LITERATURE II. (3)**

A survey of English literature from Dryden to the present. The emphasis is upon the more important writers, with attention to their cultural backgrounds.

**ENG 251 SURVEY OF AMERICAN LITERATURE I. (3)**

A survey of American literature from the Colonial Era to the Civil War. Emphasis upon the more important writers, with attention to their cultural backgrounds.

**ENG 252 SURVEY OF AMERICAN LITERATURE II. (3)**

A survey of American literature from the Civil War to the present. Emphasis upon the more important writers with attention to their cultural backgrounds.

**ENG 261 SURVEY OF WESTERN LITERATURE FROM THE GREEKS THROUGH THE RENAISSANCE. (3)**

A study of works by major Western authors from the Bible and ancient Greek literature through the Renaissance. Note: ENG 261 fulfills no requirement of the English major.

**ENG 262 SURVEY OF WESTERN LITERATURE FROM 1660 TO THE PRESENT. (3)**

A study of works by major Western authors from mid-17th century to the present. Note: ENG 262 fulfills no requirements of the English major.

**ENG 264 MAJOR BLACK WRITERS. (3)**

A cross-cultural and historical approach to written and oral works by major Black authors of Africa, the Caribbean and the United States. The course includes writers such as Chinua Achebe (Africa), Wilson Harris (Caribbean), and Toni Morrison (USA).

**ENG 270 THE OLD TESTAMENT AS LITERATURE. (3)**

A survey of the major types of Old Testament literature in English translation. While attention will be paid to historical backgrounds, the emphasis is on careful analysis of literary forms and techniques.

**ENG 271 THE NEW TESTAMENT AS LITERATURE. (3)**

A survey of the major types of New Testament literature in English translation. While attention will be paid to historical backgrounds, the emphasis is on careful analysis of literary forms and techniques.

**ENG 281 INTRODUCTION TO FILM. (3)**

An introduction to the study of the movies as a narrative art and a cultural document. Viewing of films outside of class is required. May not be taken concurrently with ENG 380.

**ENG 305 ADVANCED WRITING. (3)**

An intermediate-level course in the forms of nonfictional writing. Emphasis on the growth of a graceful, professional writing style. To enter course, students must demonstrate basic writing proficiency, an absence of problems requiring remedial instruction in writing. Prereq: Completion of freshman English requirement and consent of instructor. Final enrollment contingent on writing portfolio review (details available in OT 1227).

**ENG 320 INTRODUCTION TO LITERARY STUDY. (3)**

A practical introduction to the theory and practice of literary study. Emphases on literary terms, genre distinctions, practice in writing about literature. Readings in prose fiction, poetry, and drama. Required for English majors.

**ENG 356 STUDIES IN BLACK AMERICAN LITERATURE. (3)**

An analytical-historical approach to the development of black American literature from Douglass and DuBois to Ellison, Baldwin, and Cleaver.

**ENG 360 THE SHORT STORY. (3)**

Intensive study of the short story as a literary form. Readings will be drawn from a wide variety of stories and may include works by American, British, and, in translation, continental authors.

**ENG 361 LITERARY TYPES (Subtitle required). (3)**

Studies in one or more of the following literary types: comedy, tragedy, satire, romance. Specific topics announced the preceding semester. May be repeated to a maximum of six credits with consent of English Department Director of Advising. May not be repeated under the same subtitle.

**ENG 363 SPECIAL TOPICS IN LITERATURE (Subtitle required). (3)**

Study of special topics in literature, in areas such as fiction, poetry, drama, and the relation of literature and intellectual movements. Topics announced the preceding semester. May be repeated under different subtitles to a maximum of nine credits.

**ENG 364 STUDIES IN CONTEMPORARY LITERATURE (Subtitle required). (3)**

Selected topics in the fiction and poetry of the English-speaking world since World War II. Topics announced the preceding semester. May be repeated under different subtitles for a maximum of six credits.

**ENG 369 STUDIES IN SOUTHERN AMERICAN LITERATURE. (3)**

Studies in southern American literature with special attention to such major figures as the Southern Regionalists: Faulkner, Wolfe, Warren, O'Connor, Welty, and Dickey.

**ENG 374 AMERICAN FOLKLORE. (3)**

An introductory survey of folklore using American materials. The use of this material in other forms. Experience in actual collecting and in the cataloging of materials.

**ENG 375 THE WOMAN WRITER. (3)**

Survey of the themes and forms of female literary expression. Includes works by writers from a range of ethnic backgrounds and supplements the literature with biographical and social context.

**ENG 378 TOPICS IN POPULAR CULTURE (Subtitle required). (3)**

Variable in content and context, this course may focus on any of several aspects of popular culture—genre, theory, history, contemporary and past expressions in popular narrative forms. Specific content announced the preceding semester. May be repeated up to six hours with permission of English Department Director of Advising. May not be repeated under the same subtitle.

**ENG 380 FILM CRITICISM. (3)**

A course in film criticism as the art of seeing movies; attention is given to the process of descriptive analysis and evaluation. Viewing of the films outside of class is required. May not be taken concurrently with ENG 281.

**ENG 381 HISTORY OF FILM I. (3)**

The history of film as art and industry from the invention of the moving picture to World War II. Emphasis on the artistic development of the silent film in America and Europe, the rise of the American studio system, and the emergence of the sound film in the 1930's. Viewing of films outside of class is required.

**ENG 382 HISTORY OF FILM II. (3)**

A history of film from World War II to the present. Emphasis on the artistic development of both the American film and various national cinemas (e.g., Italy, Sweden, France, Germany, Japan) during this period, with special consideration of the emergence of color and widescreen processes. Viewing of films outside of class is required.

**ENG 383 JAPANESE FILM. (3)**

Study of Japanese films as an expression of Japanese culture. Viewing of films outside of class required.

**ENG 390 UNDERGRADUATE SEMINAR (Subtitle required). (3)**

Detailed investigation of a given topic, author, or theme with emphasis on both content and methods of research. Topics vary from section to section and are announced the preceding semester. Enrollment limited to 15 students. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**ENG 395 INDEPENDENT WORK. (1-3)**

For undergraduate majors in English with a high standing. Each pursues a course independently under the guidance of a staff member, writes a paper embodying the results of his study, and takes an examination. May be repeated to a maximum of six credits. Prereq: Major, standing of 3.0 in the department, and permission of the chairperson.

**ENG 401 SPECIAL TOPICS IN WRITING (Subtitle required). (3)**

Studies of special topics in writing, in areas such as technical writing, legal writing, cultural critique, and formal argument. Topics announced the preceding semester. May be repeated under different subtitles to a maximum of six credits. Prereq: Completion of the University Writing requirement and consent of instructor.

**ENG 405 EDITING ENGLISH PROSE. (3)**

For students with substantial training in writing. Instruction and practice in editing and revising skills; practice in evaluating, revising, and editing both the student's own writing and the prose works of others. Emphasis on developing critical intelligence and a sense of audience. Techniques of revision, verification of sources, preparation of manuscripts. Not for students with writing deficiencies. Prereq: ENG 305 or consent of instructor.

**ENG 407 INTERMEDIATE WORKSHOP IN IMAGINATIVE WRITING (Subtitle required). (3)**

Continued studies in the writer's craft, focusing on student work, but with increased emphasis on outside reading. May be repeated under a different subtitle to a maximum of six credits. Prereq: ENG 207 and consent of instructor.

**ENG 414G INTRODUCTION TO MODERN ENGLISH LINGUISTICS. (3)**

A study of phonemics, morphemics, and syntax. Special attention will be given in laboratory sessions to practical applications. Credit will not be given to students who already have credit for either ANT 215 or ENG/LIN 211. Prereq: Junior standing.

**ENG 418 HISTORY OF THE ENGLISH LANGUAGE. (3)**

A survey of the historical development of English from its Indo-European origins to the present. Includes an investigation of the principal changes which have affected English phonology, morphology, syntax, semantics, and vocabulary, and of the ways in which these changes are reflected in contemporary English usage; and an examination of the socio-historical factors that have shaped the evolution of the English language.

**ENG 420G STUDIES IN MEDIEVAL ENGLISH LITERATURE. (3)**

Studies in Old English and/or Middle English literature, such as Middle English lyric and romance, heroic poetry in Old and Middle English, Middle English alliterative poetry, religious poetry of the Middle Ages. Topics announced the preceding semester. Readings from some texts will be in Modern English translation.

**ENG 421G CHAUCER. (3)**

Extensive readings in the principal works of Chaucer, with particular attention to The Canterbury Tales.

**ENG 422G ENGLISH RENAISSANCE: 1500-1600. (3)**

Literature of the English Renaissance exclusive of the drama. Foreign sources of the English Renaissance. Major writers such as More, Ascham, Wyatt, Sidney, Spenser, Raleigh, and Marlowe.

**ENG 423G ENGLISH RENAISSANCE: 1600-1660. (3)**

Selected nondramatic works of such writers as Bacon, Donne, Ben Jonson, George Herbert, Izaak Walton, Herrick, Sir Thomas Browne, Vaughan, and Traherne.

**ENG 425G SHAKESPEARE SURVEY. (3)**

A study of ten to twelve of the major plays of Shakespeare, including comedies, tragedies, and histories and covering the important phases of his career.

**ENG 426G SHAKESPEARE STUDIES (Subtitle required). (3)**

Detailed study of a special topic in Shakespeare, such as Shakespeare's tragedies, early Shakespeare, Shakespeare's romantic comedies, Shakespeare and film. Topics announced the previous semester. May be repeated under different subtitles to a maximum of six credits.

**ENG 428G MILTON. (3)**

Extensive readings in Milton's poetry and prose.

**ENG 430G THE RESTORATION AND EARLY 18th CENTURY: 1660-1730. (3)**

A survey of the rise of Classicism with emphasis on the works of Dryden, Pope, Swift, Addison and Steele.

**ENG 431G THE LATER 18th CENTURY: 1730-1780. (3)**

A survey of the transition from Classicism to Romanticism with emphasis on the works of Boswell, Johnson, Gray, Goldsmith, and Cowper.

**ENG 435G THE ROMANTIC MOVEMENT: 1780-1815. (3)**

A study of the poetry and prose of the first half of the romantic movement. The emphasis is on the poetry of Blake, Wordsworth, and Coleridge.

**ENG 436G THE ROMANTIC MOVEMENT: 1815-1830. (3)**  
A study of the poetry and prose of the second half of the romantic movement. The emphasis is on the poetry of Keats, Shelley, and Byron.

**ENG 438G VICTORIAN PERIOD: 1830-1860. (3)**  
A survey of the major essayists and poets of the early Victorian period. Such authors as Mill, Carlyle, Browning, Tennyson, Arnold, and Newman will be considered both analytically and historically.

**ENG 439G VICTORIAN PERIOD: 1860-1900. (3)**  
Survey of the major figures and movements of the late Victorian period: Ruskin, Pater, Hopkins; the pre-Raphaelites, Darwinism, Imperialism, Aestheticism, and Decadence.

**ENG 440G THE 18th CENTURY ENGLISH NOVEL. (3)**  
A study of the English novel and its backgrounds from the beginnings through Jane Austen. Emphasis on the major figures of the 18th Century: Defoe, Richardson, Fielding, Smollett, and Sterne.

**ENG 441G THE 19th CENTURY ENGLISH NOVEL. (3)**  
A study of the English novel and its backgrounds from Scott and the early Victorians through Hardy and the Age of Transition. Such novelists as the Brontes, Dickens, Thackeray, Trollope, George Eliot, Meredith, and Collins will be studied.

**ENG 442G THE 20th CENTURY ENGLISH NOVEL. (3)**  
A study of the English novel and its backgrounds from 1900 to the present, with emphasis on the major figures of the pre-World War II era such as Conrad, Joyce, Lawrence, Forster, and Virginia Woolf.

**ENG 446G 20TH CENTURY BRITISH LITERATURE. (3)**  
British literature of the 20th century, with particular attention to the poetry, to literary movements, and to critical theory.

**ENG 448G ENGLISH DRAMA (Subtitle required). (3)**  
Studies in English drama, exclusive of Shakespeare, from the beginnings to the present. Organized historically, the course covers some major portion of the canon. Specific content announced the preceding semester. May be repeated up to six credits with consent of English Department Director of Advising. May not be repeated under same subtitle.

**ENG 451G STUDIES IN AMERICAN LITERATURE BEFORE 1860 (Subtitle required). (3)**  
Studies of selected American writers in one or more of the following contexts: Colonial America, the Age of Reason and Revolution, Romanticism. May be repeated to a maximum of six credits with consent of English Department Director of Advising. May not be repeated under the same subtitle.

**ENG 452G STUDIES IN AMERICAN LITERATURE: 1860-1920. (3)**  
Studies in American writing from the Civil War to 1920, with emphasis on major writers of fiction and poetry.

**ENG 453G STUDIES IN AMERICAN LITERATURE SINCE 1900. (3)**  
Studies in American writing from the beginning of the century to the present, with emphasis on major writers of fiction, poetry, and drama.

**ENG 454G AMERICAN NOVEL BEFORE 1900. (3)**  
An analytical and historical survey of the American novel from Charles Brockden Brown to the early Dreiser. Novelists such as Cooper, Hawthorne, Melville, Twain, Howells, James, and Crane will be studied.

**ENG 455G MODERN AMERICAN NOVEL. (3)**  
An analytical and historical survey of the American novel from Wharton to Mailer. Novelists such as Dreiser, Anderson, Lewis, Fitzgerald, Hemingway, Faulkner, Steinbeck, Updike, and Bellow will be studied.

**ENG 465G STUDIES IN AN AUTHOR (Subtitle required). (3)**  
Extensive readings in the work of an English language author, including biographical, historical, and critical contexts. May be repeated under different subtitle to a maximum of six credits.

**ENG 466G MODERN DRAMA. (3)**  
Continental, British, and American dramatic literature from Ibsen to the present. Authors such as the following are studied: Shaw, O'Neill, Brecht, and Beckett.

**ENG 472G SPECIAL TOPICS IN FOLKLORE (Subtitle required). (3)**  
Using various approaches— theoretical, thematic, comparative, historiographic, ethnographic, or structural—the course examines special topics in folklore not covered in survey or genre courses. Specific content announced the preceding semester. May be repeated up to six hours with permission of English Department Director of Advising. May not be repeated under the same subtitle.

**ENG 473G SURVEY OF WORLD FOLKLORE. (3)**  
A survey on a worldwide scope of types of folklore. Emphasis upon folklore as a cultural phenomenon in its own right and upon its relations to literary types. The development of the science of folklore.

**ENG 478G APPALACHIAN FOLKLORE. (3)**  
The course, by discussions and lectures, provides definitions of the various genres of folklore comprising the traditional humanistic threads of the Appalachian sociocultural fabric, with emphasis upon the place of folklore in Appalachians' lives.

**ENG 480G SPECIAL STUDIES IN FILM (Subtitle required). (3)**  
Study of special topics in film, such as directors, genres, film and literature, film theories, film movements. Viewing of films outside of class is required. Topics announced the preceding semester. May be repeated to a maximum of six credits with consent of instructor. Prereq: ENG 281 or 380 or consent of instructor.

**ENG 490G TOPICS OF GENDER IN LITERARY STUDIES (Subtitle required). (3)**  
Variable in content and context, this course focuses on any of several aspects of gender in literary studies, such as gender and genre, gender issues in a particular literary period, black women writers, feminist literary theory. May be repeated under different subtitles to a maximum of six hours.

**ENG 507 ADVANCED WORKSHOP IN IMAGINATIVE WRITING (Subtitle required). (3)**  
For the student who has shown marked talent and commitment, this course provides a more rigorous workshop among peers and includes additional attention to outside reading. Each student will produce a chapbook of poems or stories. May be repeated with the same subtitle to a maximum of six credits. Prereq: ENG 207 and ENG 407, or the equivalent, and consent of the instructor.

**ENG 509 COMPOSITION FOR TEACHERS. (3)**  
The basic studies helpful to teachers of composition. The teaching of grammar, punctuation, usage, etc., and of theme planning, correction, and revision. Students are required to do quite a bit of writing.

**ENG 510 AMERICAN ENGLISH. (3)**  
The varieties of modern American English: regional and social dialects, ethnic varieties, creoles, and argots. History and methods of American dialect study. Prereq: ENG/LIN 211 or ENG 414G or ANT 215 or the equivalent; or consent of instructor.

**ENG 512 MODERN ENGLISH GRAMMAR. (3)**  
Contemporary approaches to grammatical analysis; the interrelationships of phonology, morphology, and syntax. Prereq: ENG/LIN 211 or ENG 414G or ANT 215 or the equivalent; or consent of instructor.

**ENG 513 TEACHING ENGLISH AS A SECOND LANGUAGE. (3)**  
The course will examine the current theories and methods of teaching English as a second language. The course will include (1) language learning theory as it relates to other disciplines; (2) methods and techniques of contrastive analysis. Prereq: One course in linguistics or consent of instructor. (Same as EDC 513.)

**ENG 514 TESL MATERIALS AND METHODS. (3)**  
An extension of ENG/EDC 513, this course will include examination and evaluation of published materials designed for teaching English to speakers of other languages. Students will create individualized teaching materials and gain practical experience in applying the methods and using their own materials. Prereq: ENG/EDC 513 or consent of instructor. (Same as EDC 514.)

**ENG 515 PHONOLOGICAL ANALYSIS. (3)**  
An investigation of speech-sounds and systems of speech-sounds. Articulatory phonetics, analysis of phonological systems, phonological theories. Includes fieldwork on the phonology of a non-Indo-European language; within a given academic year, the same language serves as the basis for fieldwork in ANT/ENG/LIN 515 and ANT/ENG/LIN 516. Prereq: ENG/LIN 211 or equivalent. (Same as ANT/LIN 515.)

**ENG 516 GRAMMATICAL ANALYSIS. (3)**  
Emphasis on the systematic interrelationships of morphemes within words and sentences. Practical training in the writing of grammars and exposure to various theories of grammatical description. Includes fieldwork on the morphology and syntax of a non-Indo-European language; within a given academic year, the same language serves as the basis for fieldwork in ANT/ENG/LIN 515 and ANT/ENG/LIN 516. Prereq: ENG/LIN 211 or equivalent. (Same as ANT/LIN 516.)

**ENG 519 INTRODUCTION TO OLD ENGLISH. (3)**  
An introduction to Old English language and literature.

**ENG 562 COMPARATIVE LITERATURE: 17TH THROUGH 19TH CENTURY. (3)**  
A study in English of major works of continental European literature written in modern languages, especially French, German, Spanish, Italian, Russian, from mid-17th century to end of 19th century. (Same as CLT 562.)

**ENG 563 COMPARATIVE LITERATURE: 20TH CENTURY. (3)**  
Masterpieces and examples of 20th century Western World literature, in English translation, with emphasis on the emergence of new forms and techniques invented to express the complexity of modern life. The course will study novels, poems, and plays in their traditional development and in experimental and divergent forms. (Same as CLT 563.)

**ENG 569 HISTORY OF LITERARY CRITICISM II. (3)**  
The theory and practice of modern literary criticism such as New Criticism, Formalism, structuralism, reader response, Marxism, deconstruction, psychoanalysis, and feminist criticism.

**ENG 570 SELECTED TOPICS FOR ADVANCED STUDIES IN LITERATURE (Subtitle required). (3)**  
Study of special topics that cut across the normal divisions of genre or periods, such as the relations of literature to other disciplines; metaphor and symbolism; interpretative theory. May be repeated to a maximum of six credits. Prereq: Junior standing or consent of instructor.

**ENG 572 STUDIES IN ENGLISH FOR TEACHERS (Subtitle required). (3)**  
Specialized studies designed to increase the teacher's knowledge of subject matter and to enlarge his understanding of new developments and approaches to the teaching of English. May be repeated to a maximum of six credits.

**ENG 581 AESTHETICS OF FILM. (3)**  
An examination of theories of film. Emphasis on the establishment of criteria for the aesthetic response to film and the visual image. Viewing of films outside of class is required. Prereq: Another ENG film course or consent of instructor.

**PROSEMINARS:** The purpose of the proseminar courses (600 level) is to impart through lectures and discussion both the facts of literary history and the techniques of literary analysis. They are, therefore, designed to go beyond the mere information level to techniques of contemporary literary criticism and scholarship.

**ENG 600 BIBLIOGRAPHY AND METHODS OF RESEARCH. (3)**  
An introduction to descriptive and enumerative bibliography, textual criticism, and historical scholarship.

**ENG 609 COMPOSITION FOR TEACHERS. (3)**  
A course in the theory and practice of teaching English composition at the college level. Required of first-year teaching assistants in the Department of English, the course is structured to match the ordering of English 101 so that the practical work of college writing and the theoretical considerations of English 609 will be mutually reinforcing.

**ENG 610 STUDIES IN RHETORIC. (3)**  
This course introduces theories of rhetoric with readings drawn from major theoreticians and rhetoricians; applies theory to the practice of teaching college writing, with special emphasis on argumentation, the subject of English 102; and provides an opportunity for teaching assistants to get help from the teacher and from their peers in responding to and evaluating students' written work. This course, required of second semester teaching assistants in the Department of English, continues the work of English 609. Prereq: ENG 609 or equivalent.

**ENG 617 STUDIES IN LINGUISTICS (Subtitle required). (3)**  
A comprehensive investigation of some designated topic in general or applied linguistics. May be repeated to a maximum of nine credits under different subtitles. Prereq: An introductory course in linguistics (ANT 215, ENG/LIN 211, or ENG 414G) or permission of instructor. (Same as LIN 617).

**ENG 618 HISTORY OF THE ENGLISH LANGUAGE. (3)**  
An intensive study of the change of English from a synthetic to an analytic language, from its origin in Indo-European to its current stage of development. Emphasis is on changes in phonology, morphology, syntax, and semantics, from Old to Early-Modern English.

**ENG 619 BEOWULF. (3)**  
Translation and study of *Beowulf*. ENG 518 or ENG 519 recommended as background courses.

**ENG 620 STUDIES IN MIDDLE ENGLISH LITERATURE. (3)**  
A study in depth of selected writers and movements.

**ENG 621 STUDIES IN CHAUCER. (3)**  
A study in depth of selected works of Chaucer, especially *Troilus*, in relation to aspects of the medieval literary tradition.

**ENG 622 STUDIES IN ENGLISH LITERATURE: 1500-1600. (3)**  
Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole.

**ENG 623 STUDIES IN ENGLISH LITERATURE: 1600-1660. (3)**  
Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole.

**ENG 625 STUDIES IN RENAISSANCE DRAMA EXCLUSIVE OF SHAKESPEARE. (3)**  
A study in depth of selected writers.

**ENG 626 STUDIES IN SHAKESPEARE. (3)**  
A reading of Shakespeare's work and an intensive study of a selection representative of the full range of his dramatic and nondramatic writing. Extensive reading in Shakespeare scholarship and criticism. Prereq: One of the following – ENG 425G, 426G, 427G, or equivalent.

**ENG 628 STUDIES IN MILTON. (3)**  
A study of all of Milton's poetry and of his more important prose; readings from contemporary thinkers; studies in thought currents of the time and Milton's relation to them.

**ENG 630 STUDIES IN ENGLISH LITERATURE: 1660-1720. (3)**  
Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole.

**ENG 631 STUDIES IN ENGLISH LITERATURE: 1720-1780. (3)**  
Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole.

**ENG 635 STUDIES IN LITERATURE: 1780-1815. (3)**  
A study in depth of selected writers and movements.

**ENG 636 STUDIES IN LITERATURE: 1815-1830. (3)**  
A study in depth of selected writers and movements.

**ENG 638 STUDIES IN ENGLISH LITERATURE: 1830-1860. (3)**  
Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole.

**ENG 639 STUDIES IN ENGLISH LITERATURE: 1860-1900. (3)**  
Comprehensive study of broad topics, normally limited to an intensive survey of the literature and scholarship of the period as a whole.

**ENG 640 STUDIES IN THE 19th CENTURY BRITISH NOVEL. (3)**  
A study in depth of selected writers. Prereq: Graduate standing.

**ENG 642 STUDIES IN MODERN BRITISH LITERATURE. (3)**  
Selected writers, works, and movements in the modern period with concentration on the period from 1890 to 1945.

**ENG 643 STUDIES IN MODERN BRITISH AND AMERICAN POETRY. (3)**  
Selected poets from England and America, with a major concentration on the period 1890-1945.

**ENG 651 STUDIES IN AMERICAN LITERATURE BEFORE 1860. (3)**  
A study in depth of selected writers and movements.

**ENG 652 STUDIES IN AMERICAN LITERATURE: 1860-1900. (3)**  
A study in depth of selected writers and movements.

**ENG 653 STUDIES IN AMERICAN LITERATURE SINCE 1900. (3)**  
A study in depth of selected writers and movements.

**ENG 656 BLACK AMERICAN LITERATURE. (3)**  
An in-depth study of black American literature, with concentration on major texts by major black writers.

**ENG 660 MODERN CRITICAL THEORY. (3)**  
Detailed examination of one or another topic in contemporary theory of interpretation, such as literature and analytical philosophy, phenomenology and literature, structuralism, Marxism, psychoanalysis.

- ENG 673 STUDIES IN FOLKLORE.** (3)  
A study in depth of selected topics such as the development of literary genres out of oral folklore. Prereq: Eng 374 or consent of instructor.
- ENG 681 STUDIES IN FILM.** (3)  
Comprehensive study of the history, theory, and criticism of film, with concentration on a series of major American and foreign films. Viewing of films outside of class is required.
- ENG 682 STUDIES IN FICTION.** (3)  
A study in depth of selected types of fiction.
- ENG 683 STUDIES IN DRAMA.** (3)  
A study in depth of selected types of drama.
- ENG 684 STUDIES IN POETRY.** (3)  
A study in depth of selected types of poetry. May be repeated to a maximum of six credits.
- ENG 690 STUDIES IN LITERATURE AND GENDER (Subtitle required).** (3)  
This course focuses on gender as a primary category for literary analysis. Topics will vary, from a group of authors, an historical period or an aesthetic movement, to a genre, a theme, or an aspect of literary theory. May be repeated under different subtitles to a maximum of six credits.
- ENG 700 TUTORIAL FOR PH.D. CANDIDATES.** (3)  
In addition to its proseminar and seminar schedule of courses, the English Department offers its Ph.D. students the opportunity to investigate, by tutorial, topics that cannot be handled as well in a classroom setting. The purpose of the tutorial is to enable a student to work intensively with a specialist on the kind of topics that lead to professional research, including dissertations. Unlike independent study, the tutorial involves both instructor and students in a mutual investigation of little-studied topics. An ultimate aim is to present students with possibilities for dissertation topics. May be repeated to a maximum of six credits. Prereq: Admission to the Ph.D. program and instructor's consent.
- ENG 720 SEMINAR IN MEDIEVAL LITERATURE.** (3)  
Recent topics: medieval fiction; Chaucer and the Gothic mind. May be repeated to a maximum of six credits.
- ENG 722 SEMINAR IN 16th CENTURY LITERATURE.** (3)  
Recent topics: Spenser; Elizabethan drama. May be repeated to a maximum of six credits.
- ENG 723 SEMINAR IN 17th CENTURY LITERATURE.** (3)  
Recent topics: Donne; Herbert; Milton. May be repeated to a maximum of six credits.
- ENG 726 SEMINAR IN SHAKESPEARE.** (3)  
Seminar in Shakespeare. May be repeated to a maximum of six credits.
- ENG 730 SEMINAR IN 18th CENTURY LITERATURE.** (3)  
Recent topics: neoclassic satire. May be repeated to a maximum of six credits.
- ENG 735 SEMINAR IN ROMANTIC LITERATURE.** (3)  
Recent topics: Keats; Wordsworth. May be repeated to a maximum of six credits.
- ENG 738 SEMINAR IN VICTORIAN LITERATURE.** (3)  
Seminar in Victorian literature. May be repeated to a maximum of six credits.
- ENG 740 SEMINAR IN 20th CENTURY BRITISH LITERATURE.** (3)  
Seminar in 20th century British literature. May be repeated to a maximum of six credits.
- ENG 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.
- ENG 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.
- ENG 750 SEMINAR IN COLONIAL LITERATURE.** (3)  
Seminar in Colonial Literature; may be repeated to a maximum of six credits.
- ENG 751 SEMINAR IN AMERICAN LITERATURE: 1800-1860.** (3)  
Seminar in American literature 1800-1860. Recent topics: Emerson and Melville; Hawthorne. May be repeated to a maximum of six credits.
- ENG 752 SEMINAR IN AMERICAN LITERATURE: 1860-1900.** (3)  
Seminar in American literature 1860-1900. Recent topics: Whitman and Dickinson. May be repeated to a maximum of six credits.

- ENG 753 SEMINAR IN AMERICAN LITERATURE SINCE 1900.** (3)  
Seminar in American literature since 1900. Recent topics: Faulkner, Wolfe, and Warren. May be repeated to a maximum of six credits.
- ENG 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.
- ENG 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.
- ENG 771 SEMINAR IN SPECIAL TOPICS.** (3)  
Seminar in special topics; includes genres and subject matters such as symbolism which cover more than one period of literature. Recent topics: symbolism and allegory. May be repeated to a maximum of six credits.
- ENG 780 DIRECTED STUDIES.** (1-6)  
Independent work devoted to study and research on specific subjects and problems according to the interests and needs of individual students. May be repeated to a maximum of nine credits. Permission of chairperson required.
- ENG 781 SEMINAR IN FILM (Subtitle required).** (3)  
Seminar in special topics in film, such as directors, genres, historical periods, film and literature, film theories, and film movements. Viewing of films outside of class is required. May be repeated under different subtitle to a maximum of six credits. Prereq: ENG 681 or consent of instructor.

## ENS Environmental Studies

- ENS 200 INTRODUCTION TO ENVIRONMENTAL STUDIES.** (3)  
A broad-ranging multidisciplinary introduction to current environmental issues and problem solving presented through a series of case studies. Case studies incorporate contemporary environmental themes including industrialization, resource use, and pollution; changing land use patterns; global warming and deforestation; biodiversity; political regulation; economic resources; cultural attitudes toward nature. Each case study will present environmental issues as scientific problems with social, political, philosophical, and economic causes and consequences. Emphasis is placed on understanding and combining different approaches to environmental problems and on proposing public policy solutions.
- ENS 300 SPECIAL TOPICS (Subtitle required).** (1-4)  
Special topics in environmental studies. This course permits the offering of special topics in environmental studies in order to take advantage of faculty specialties. Course topic must be approved by the Environmental Studies Program Director. Prereq: Variable, when topic is identified.
- ENS 395 INDEPENDENT WORK.** (1-4)  
Under special conditions selected students may investigate specific environmental issues and problems. The instructor and the student will agree on a formal semester plan/learning contract, which will be filed with the Environmental Studies Program Director and will include weekly reports to the instructor. Prereq: Environmental Studies minor, 3.0 G.P.A., consent of instructor.
- ENS 400 SENIOR SEMINAR (Subtitle required).** (3)  
This course will draw on your interdisciplinary understanding of environmental issues and your problem-solving capacities developed while fulfilling Environmental Studies Minor requirements. It is a participatory capstone seminar designed to utilize and test your critical ability for independent thinking organized around specific environmental issues. Independent library work and writing assignments will be required in order to prepare for weekly, interactive topical seminar meetings. Group projects will culminate in individual term papers/projects on different aspects of the environmental issues under discussion. Specific topics will vary. Prereq: ENS 200 and 12 hours of course work from approved Environmental Studies courses (or instructor's consent).

## ENT Entomology

- ENT 110 INSECT BIOLOGY.** (3)  
Overview of the biology of insects. Emphasizes how this enormously abundant and important group of animals has resolved the basic challenges of survival and reproduction. Principles of physiology, behavior, ecology, and evolution are introduced using insects as examples. The roles of both beneficial and detrimental insects will be discussed.

- ENT 300 GENERAL ENTOMOLOGY. (3)**  
Fundamentals of insect biology and relationships among insects, plants, and other organisms; identification of commonly encountered insects. Beneficial and detrimental effects of insects are discussed. Lecture, two hours; laboratory, two hours per week. Prereq: One course in introductory biology. (Same as BIO 300.)
- ENT 310 INSECT PESTS OF FIELD CROPS. (3)**  
Identification, life histories and control of insects attacking field crops, especially those of importance in Kentucky. The damage that these insects cause, the reasons for their abundance, and alternatives in control practices will also be emphasized. Lecture, two hours per week; laboratory, two hours per week.
- ENT 320 HORTICULTURAL ENTOMOLOGY. (3)**  
A detailed coverage of the insects and mites attacking turf, ornamentals, greenhouse plantings, vegetables and fruits, with emphasis on field recognition of the pests and their damage. Lecture, two hours per week; laboratory, two hours per week.
- ENT 340 LIVESTOCK ENTOMOLOGY. (2)**  
Biology and behavior of insects and other pests attacking livestock, poultry, pets and wildlife. Current control methods are discussed. For students interested in livestock production, farm management, dairy science, poultry science, and preveterinary medicine, as well as general agriculture.
- ENT 360 GENETICS. (3)**  
The basic principles of heredity as currently understood from evidence accumulated in classical, cytogenetic, molecular, and quantitative genetic experiments. Emphasis is placed on a thorough understanding of genetic principles and the relationship of genetics to all biological disciplines. Prereq: Six credits in biological sciences and one course in general chemistry. (Same as AGR/ASC 360.)
- ENT 395 INDEPENDENT WORK. (2-3)**  
Special problems for individual students who are capable of pursuing independent investigations in the various areas of entomology. May be repeated to a maximum of six credits. Prereq: ENT 300.
- ENT 399 FIELD BASED/COMMUNITY BASED EDUCATION. (1-6)**  
Field-based or community-based experience in entomology under supervision of a faculty member. Pass/Fail only. Prereq: Permission of faculty member and department chairperson and completion of a departmental learning agreement before registration.
- ENT 402 FOREST ENTOMOLOGY. (3)**  
The principles of forest entomology, including the detection, collection, identification, appraisal of damage, and control of forest insect pests. Lecture, two hours; laboratory, two hours. Prereq: One year of biology or consent of instructor. (Same as FOR 402.)
- ENT 460 INTRODUCTION TO MOLECULAR GENETICS. (2)**  
Molecular genetics is the study of the biochemical basis of heredity and focuses on the structure and expression of DNA at the molecular and cellular level. The course will provide a detailed understanding of the biochemical events involved in replication, prokaryotic and eukaryotic transcription, and translation of DNA, as well as RNA processing, recombination, and the theoretical underpinnings of genetic engineering. Prereq: AGR 360 or BIO 404G or consent of instructor. (Same as AGR 460.)
- ENT 461 INTRODUCTION TO POPULATION GENETICS. (2)**  
This survey course examines the population dynamics and equilibria of genes in nuclei, chloroplasts and mitochondria. Emphasis will be on biological relevance (in plants, animals, and micro-organisms), but some theoretical derivations will also be introduced. Prereq: AGR 360 (or equivalent) and one course in probability/statistics. (Same as AGR/BIO/FOR 461.)
- ENT 530 INTEGRATED PEST MANAGEMENT. (3)**  
Principles of insect damage, populations and distributions. Various types of natural and applied control, including problems of insecticide toxicity, resistance and residues. Prereq: ENT 300.
- ENT 561 MEDICAL ENTOMOLOGY. (4)**  
Study of arthropod vectors of disease. Structure, collection, identification, control measures and life history studies. Given alternate years. Prereq: one year of biology. (Same as BIO 561.)
- ENT 563 PARASITOLOGY. (4)**  
Protozoan, helminth and arthropod parasites of man and domestic animals, emphasis on etiology, epidemiology, methods of diagnosis, control measures and life histories. Techniques for host examination and preparation of material for study. Prereq: BIO 150, 151, 152, 153 or consent of instructor. (Same as BIO 563.)
- ENT 564 INSECT TAXONOMY. (4)**  
A study of insect taxonomy including the collection, preparation, and identification of adult insect specimens. Prereq: Consent of instructor. (Same as BIO 564.)

- ENT 568 INSECT BEHAVIOR. (3)**  
The principles of animal behavior will be stressed using insects as examples. Physiology, mechanisms, behavioral ecology and evolution of insect behavior will be covered. Prereq: One year of biology. (Same as BIO 568.)
- ENT 605 EMPIRICAL METHODS IN ECOLOGY AND EVOLUTION. (2)**  
This course provides students with hands-on experience in a diverse array of modern research methods used by ecologists and evolutionary biologists, including techniques used in: molecular genetics, chemical ecology, behavioral studies, motion analyses, using high-speed video, image analyses for morphometrics and color, and field techniques in both aquatic and terrestrial systems. Lecture, one hour; laboratory, three hours per week. Prereq: BIO 451G or FOR 340 or ENT 665 or consent of instructor. (Same as BIO/FOR 605.)
- ENT 606 CONCEPTUAL METHODS IN ECOLOGY AND EVOLUTION. (2)**  
This course provides students with hands-on experience in a diverse array of conceptual research techniques used by ecologists and evolutionary biologists. The focus will be on optimization methods used for predicting animal and plant behaviors and life histories, and on methods for assessing population trends and dynamics. Mathematical techniques used will include graphical analyses, matrix algebra, calculus, and computer simulations. Prereq: One year of calculus and BIO 451G or FOR 340 or ENT 665, or consent of instructor. (Same as BIO/FOR 606.)
- ENT 607 ADVANCED EVOLUTION. (2)**  
This course covers advanced topics in evolution, concentrating on questions central to the understanding of general evolutionary processes. Phenomena occurring both within populations (e.g., selection, inheritance, population subdivision) and between populations (e.g., gene flow, competition) will be addressed. Special attention will be given to modern research approaches and techniques including quantitative genetics, measurement of selection, phylogenetic analyses of comparative data and molecular systematics. Prereq: One year of calculus, genetics (BIO 404G or BIO 461) and BIO 508 or consent of instructor. (Same as BIO/FOR 607.)
- ENT 608 BEHAVIORAL ECOLOGY AND LIFE HISTORIES. (2)**  
This course uses an evolutionary approach to examine behavior and life histories. Topics addressed include: the optimality approach, constraints on optimality, kin and group selection, predator and prey behaviors, social and mating behaviors, and life history evolution. Prereq: BIO 451G and one semester of calculus; or consent of instructor. (Same as BIO/FOR 608.)
- ENT 609 POPULATION AND COMMUNITY ECOLOGY. (2)**  
This course discusses the processes that determine population distributions and dynamics and community structure for both plants and animals. Topics addressed include: population regulation and population stability, community diversity and stability, ecological succession, population interactions (competition, predation, mutualism), coevolution, and the effects of spatial and temporal heterogeneity on population and community patterns. Prereq: BIO 451G or FOR 340 or consent of instructor. (Same as BIO/FOR 609.)
- ENT 625 INSECT-PLANT RELATIONSHIPS. (3)**  
This course examines the natural history, ecology, and evolution of insect/plant relationships. Topics include mechanisms and theory of plant defense, behavioral and physiological adaptations of herbivorous insects, pollination biology, multitrophic-level interactions, causes of insect outbreaks, and applications to managed ecosystems. Critical reading and discussion of current literature is emphasized. Prereq: Two years of college-level biology. (Same as BIO 625.)
- ENT 626 INSECT PATHOLOGY. (3)**  
Principles of insect pathology related to the etiology, pathogenesis, symptomatology, gross pathology, histopathology, and epizootiology of insect diseases with emphasis on infectious diseases caused by occluded viruses, bacteria, fungi, and protozoans. Lecture, two hours; laboratory, two hours. Prereq: Consent of instructor.
- ENT 635 INSECT PHYSIOLOGY AND INTERNAL MORPHOLOGY. (4)**  
Principles of insect physiology, function of organs, circulation, reproduction, respiration, neurophysiology, endocrinology and digestion. Internal morphology will be studied as it relates to function. Lecture, three hours; laboratory, two hours. Prereq: Consent of instructor. (Same as BIO 635.)
- ENT 660 IMMATURE INSECTS. (3)**  
Bionomics, structure and classification of immature stages of insects; practice in their identification. Lecture, one hour; laboratory, six hours. Prereq: BIO 570 or ENT 564, or consent of instructor.

**ENT 665 INSECT ECOLOGY. (3)**

The biotic and physical factors influencing the distribution and abundance of insects and insect populations. Prereq: Consent of instructor. (Same as BIO 665.)

**ENT 670 EXPERIMENTAL METHODS IN ENTOMOLOGY – FIELD. (2)**

The principles and techniques of field entomological research with emphasis on problem selection and the collection, evaluation, and presentation of data. Lecture, two hours; laboratory, four hours. Taught first half of the semester.

**ENT 671 EXPERIMENTAL METHODS IN ENTOMOLOGY – LABORATORY. (2)**

The principles and techniques of instrumentation in laboratory entomological research with evaluation and presentation of data. Two class hours; four laboratory hours. Taught second half of the semester.

**ENT 680 BIOLOGICAL CONTROL. (3)**

Principles related to the use of arthropods to suppress populations of arthropod pests and weeds. Includes historical perspective, ecological relationships, and contemporary issues related to the conservation and manipulation of arthropod predators, parasitoids, and herbivores. Prereq: ENT 300 or equivalent.

**ENT 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**ENT 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**ENT 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**ENT 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**ENT 770 ENTOMOLOGICAL SEMINAR. (1)**

Discussion of current research problems in entomology. May be repeated to a maximum of six hours.

**ENT 780 SPECIAL PROBLEMS IN ENTOMOLOGY AND ACAROLGY. (2-3)**

Investigations of chosen insect problems, including original work. Discussion and assignment of current insect subjects. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**ENT 790 RESEARCH IN ENTOMOLOGY AND ACAROLGY. (1-6)**

Independent research in entomology or acarology. May be repeated to a maximum of 12 hours. Prereq: Consent of instructor.

**EPE Education – Educational Policy Studies and Evaluation**

**EPE 301 EDUCATION IN AMERICAN CULTURE. (3)**

Critical examination of contending views, past and present, regarding the nature and role of educational institutions in American society as well as proposed purposes and policies for schools and other educational agencies.

**EPE 317 HISTORY OF EDUCATION. (3)**

A study of the historical foundations of American education.

**EPE 454 CULTURE, EDUCATION AND TEACHING ABROAD. (3)**

Introduction to the social, political, economic, and educational institutions of another country in preparation for student teaching in that country. The process and problems of adjusting to life in another culture will be included as well as instruction in the language of the host country as needed. Faculty from other departments in the University will be used as well as informants from the country involved. Lecture, three hours per week; laboratory, two hours per week for language practice. Prereq: Permission of instructor for students outside of the College of Education. (Same as EDC 454.)

**EPE 525 SPECIAL TOPICS SEMINAR IN EDUCATIONAL POLICY STUDIES AND EVALUATION (Subtitle required). (3)**

Examination of selected topics in educational policy studies and evaluation. May be repeated to a maximum of six credits but no more than three may be earned under the same subtitle. Prereq: Consent of instructor.

**EPE 555 COMPARATIVE EDUCATION. (3)**

Analytic and comparative study of contemporary education in selected countries, with emphasis on the historical development and total cultural context of educational programs in non-Western countries. Informal as well as formal agencies and programs will be studied with particular attention to recent reforms and innovations. Prereq: Junior, senior or graduate status, or consent of instructor.

**EPE 570 GATHERING, ANALYZING, AND USING EDUCATIONAL DATA. (3)**

An introductory course in the analysis of educational and evaluation data. An emphasis on exploratory data analysis and interpretation of results in the broad contexts of education and evaluation. Lecture, two hours; laboratory, two hours per week. Prereq: Undergraduates must have the consent of the instructor.

**EPE 601 PROSEMINAR. (1)**

Introductory survey of the bibliographic parameters and research approaches to educational policy studies and evaluation. Graduate faculty resources and typical research problems are introduced. Emphasis upon significance and importance of thesis writing and dissertation in graduate studies. Required, first semester of study, for all degree students in the department. Prereq: Graduate standing or consent of instructor.

**EPE 602 SOCIAL POLICY ISSUES AND EDUCATION. (3)**

Study of philosophical, historical, and sociological dimensions of contemporary educational policy issues. Topical policy controversies, such as equality of educational opportunity, tuition tax credits, and religious education, will be examined.

**EPE 603 EDUCATIONAL POLICY ANALYSIS: AN INTRODUCTION. (3)**

Examination of the basic aspects of educational policy analysis. Emphasis upon major issues endemic to the pursuit of rational policy formulation in democratic politics. Prereq: Graduate standing or consent of instructor.

**EPE 612 INTRODUCTION TO HIGHER EDUCATION. (3)**

This course is intended to give the student a broad overview of contemporary higher education. The course examines major trends, issues, and problems facing colleges and universities from a variety of perspectives, including historical, administrative, public policy, governance, and faculty. The primary objectives of the course are to assist the student in developing an understanding of 1) various components and operations of higher education and 2) the interaction of these components and operations.

**EPE 620 TOPICS AND METHODS OF EVALUATION. (3)**

An examination of a subset of evaluation methods, topics, and problems. An introductory course in the area with minimal emphasis on quantitative methods. The course is designed to: provide a perspective from which evaluation studies may be viewed; and, to provide experiences for those who will learn from or conduct evaluations. Prereq: Consent of instructor, and a basic course in statistics or research. (Same as ANT/EDP 620/SOC 622.)

**EPE 621 ADVANCED TOPICS AND METHODS OF EVALUATION. (3)**

An advanced course in evaluation methods and techniques with an emphasis on quantitative methodology. State of the art ideas and methods of conducting evaluation studies and analyzing data from those studies are presented. The course is designed primarily for those who are conducting or will conduct evaluation studies. Prereq: A basic course in statistics or its equivalent; EDP/EPE 620/SOC 622; and consent of instructor. (Same as ANT/EDP 621.)

**EPE 622 COLLEGE AND UNIVERSITY FACULTY. (3)**

This course considers college and university faculty in their roles as researchers, teachers, and community/institutional servants. The class considers from various theoretical perspective who faculty are, what they do, and how they relate to the environments and cultures in which they work. Prereq: EPE 612 or consent of instructor.

**EPE 628 ETHICS AND EDUCATIONAL DECISION MAKING. (3)**

Examination of ethical theories upon which educational evaluations are based and upon which they become the basis for educational policies. Theories considered include classical and rule utilitarianism, Rawlsian social justice, behavioristic, critical, and hermeneutic theories of value. Prereq: EPE 603 or consent of instructor.



**EPE 632 STUDENT SERVICES. (3)**

This course focuses on students services (broadly defined) and those who work with college and university students outside of the academic arena. The course not only surveys the history of student services but critically examines its theoretical bases and current practices with special attention paid to the relationship between students services and other segments of campus. Prereq: EPE 612 or consent of instructor.

**EPE 640 PHILOSOPHY OF EDUCATION. (3)**

The course is designed to enhance the professional educator's competence in analyzing and evaluating educational policies and programs. Theoretical frameworks, philosophical methods, and current educational debates are examined. May be repeated once to a maximum of six credits. Prereq: Twelve semester hours in education or permission of instructor.

**EPE 650 HISTORY OF WESTERN EDUCATION. (3)**

A study of the development of the "institution" of education in relation to social and political reality, ideas, and ideals of successive periods in Western culture.

**EPE 651 HISTORY OF EDUCATION IN THE UNITED STATES. (3)**

A history of the growth and development of education in the United States from earliest colonial times to the present, including recent movements and trends.

**EPE 652 HISTORY OF EDUCATIONAL THOUGHT. (3)**

Description and critical examination of the core ideas of leading educational theorists in the history of Western culture. Emphasis upon the societal and cultural conditions in which the ideas emerged, and the relevance of these ideas to contemporary educational policy concerns.

**EPE 653 HISTORY OF HIGHER EDUCATION. (3)**

Social and institutional history of higher education which will include selected topics in European culture and education and which will emphasize the development of the American college and university.

**EPE 661 SOCIOLOGY OF EDUCATION. (3)**

A study of schooling and education using basic analytic paradigms of sociology. Emphasis on schools as formal organizations and education in a changing, technologically oriented and stratified society. Prereq: SOC 101 or equivalent. (Same as SOC 661.)

**EPE 663 FIELD STUDIES IN EDUCATIONAL INSTITUTIONS. (3)**

Field research in an educational setting. Questions of theory, method, and application examined. Students plan and implement a study under faculty supervision. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**EPE 665 EDUCATION AND CULTURE. (3)**

An analysis of the cultural role and function of educational institutions and processes. Topics considered include schooling as cultural transmission, the community context of education, cross-national studies of schools, and implications of anthropological approaches for teacher training.

**EPE 667 EDUCATION AND GENDER. (3)**

The course examines the relationships between gender and education in U.S. society. The focus will be on the formation and enactment of gender within social and educational institutions. Using a variety of source materials and theories, we will address the following questions. How and what do educational institutions teach about gender? And how do females and males respond to these learning contexts? In what ways are social class, race and ethnicity important to engendering our lives? How does schooling contribute to the differential experiences of women and men in their transitions to adult work in the domestic and waged labor forces? How can education contribute to societal changes in sex equity?

**EPE 670 POLICY ISSUES IN HIGHER EDUCATION. (3)**

A survey of modern tendencies in higher education; scope and development, objectives, organization, administration, curricula, finance, faculty and student personnel. Designed primarily for prospective college administrators, teachers, and registrars.

**EPE 672 COLLEGE TEACHING AND LEARNING. (3)**

A study of all phases of instruction at the college level. The course will include methods and principles of teaching, utilization of materials in teaching, a consideration of the teaching-learning process as it relates to the individual student, and the evaluation of student progress. A comprehensive course for prospective college teachers.

**EPE 674 THEORIES OF STUDENT DEVELOPMENT. (3)**

A study of college student behavior, relationship of student personnel to total college program, organization and administration, evaluation, and research of college student personnel.

**EPE 676 ORGANIZATION AND ADMINISTRATION OF HIGHER EDUCATION. (3)**

Purposes and scope of higher education, organization, general administration, faculty administration, inter-institutional cooperation, allocation of financial resources, state systems of higher education.

**EPE 678 ECONOMICS OF HIGHER EDUCATION. (3)**

This course addresses issues of equity and efficiency by analyzing 1) how students, faculty and institutions are influenced by markets and incentives, 2) the economic impact of higher education on students and society, and 3) the financial management of institutions.

**EPE 679 MULTIPLE MEASURES IN EDUCATION AND EVALUATION. (3)**

Quantitative techniques for dealing with multiple measures of persons, programs, or products. Appropriate techniques for pretest-posttest designs, multiple outcome measures, reliability, time series and other situations where there are multiple measurements. Prereq: EPE 621 or its equivalent.

**EPE 681 HISTORY OF THE UNIVERSITY: GOVERNANCE AND ITS LEGAL CONTEXT. (3)**

Identification and analysis of the legal and governance issues in medieval, reformation and American colonial universities and their implications for contemporary issues of governance, autonomy and academic freedom.

**EPE 682 HIGHER EDUCATION AND THE LAW. (3)**

Case analysis regarding the university as a legal entity, private universities, the constitutionally autonomous university and other public universities, faculty rights, student rights, miscellaneous issues. Prereq: EPE 681 or consent of instructor.

**EPE 683 AFFIRMATIVE ACTION AND FEDERAL REGULATION OF HIGHER EDUCATION. (3)**

Affirmative Action as a legal concept; history and current application; sexual harassment; special codes; higher education desegregation cases and other miscellaneous issues including copyright, age discrimination, ADA and the Rehabilitation Acts. Prereq: EPE 682 or consent of instructor.

**EPE 690 THE COMMUNITY COLLEGE. (3)**

Comprehensive analysis of community colleges; history, current activity and future; demography, budget, administration. Prereq: EPE 612 or consent of instructor.

**EPE 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**EPE 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**EPE 763 ADVANCED FIELD STUDIES. (3)**

This course continues an exploration of qualitative research methods in the study of education. It focuses on advanced data collection techniques and particularly on methods of data analysis, representation and writing. The course revolves around an experiential core of individual student research products. May be repeated to a maximum of six credits. Prereq: EPE 663, other introductory qualitative research methods courses or instructor's permission.

**EPE 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**EPE 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**EPE 773 SEMINAR IN EDUCATIONAL POLICY STUDIES AND EVALUATION. (1-3)**

Examination of selected problems in educational policy studies and evaluation. May be repeated to nine credits but no more than three credits may be earned under the same title. Prereq: Consent of instructor.

**EPE 778 SEMINAR IN HISTORY OF EDUCATION IN KENTUCKY. (3)**

Emphasis upon implications of major trends in national historiography for needed research in education in Kentucky. Prereq: A graduate-level course in the history of education or consent of instructor.

**EPE 785 INDEPENDENT STUDIES  
IN EDUCATIONAL POLICY STUDIES AND EVALUATION. (3)**

Independent study experience for advanced graduate students to investigate special problems and conduct research in educational policy studies and evaluation. Prereq: Permission of department chairperson required.

**EPE 790 INTERNSHIP IN EDUCATIONAL  
POLICY STUDIES AND EVALUATION. (6)**

Formal assignment to an evaluation and/or policy analysis project in an appropriate educational setting. Student's work directed and evaluated by both departmental faculty and on-site supervisor. Laboratory, 20 hours per week. May be repeated to a maximum of 12 credits. Prereq: 12 hours of graduate course work in the department and permission of the director of graduate studies.

**EPE 798 SEMINAR IN HIGHER EDUCATION. (3)**

A critical study of selected problems in higher education. May be repeated to a maximum of nine credits but no more than three credits may be earned under the same subtitle. Prereq: Consent of instructor.

**ER Emergency Medicine**

**ER 815 FIRST-YEAR ELECTIVE, EMERGENCY MEDICINE. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Emergency Medicine. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**ER 825 SECOND-YEAR ELECTIVE,  
EMERGENCY MEDICINE. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Emergency Medicine. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**ER 850-899 FOURTH-YEAR ELECTIVE  
FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:**

**ER 850 FOURTH-YEAR ELECTIVE EMERGENCY MEDICINE**

**ER 853 RESEARCH IN EMERGENCY MEDICINE**

**ER 890 EMERGENCY MEDICINE OFFSITE**

**ES Environmental Systems**

**ES 600 ENVIRONMENTAL SYSTEMS SEMINAR. (1)**

A series of presentations by experts in the field on environmental systems topics including topics from the fields of law, economics, social sciences, medicine, biology, engineering and physical sciences. May be repeated to a maximum of two credits.

**ES 610 ENGINEERING AND PHYSICAL SCIENCES  
IN ENVIRONMENTAL SYSTEMS. (3)**

Earth systems: environmental impacts of natural and human processes; the role of water systems on the earth including surface water systems, groundwater systems, and water quality and contamination systems; the role of atmospheric systems on earth including the nature and source of air pollutants, meteorological principles, radiation balance, climatology and air pollution, and air pollution control methodology; and processes and principles involved in waste producing organizations. Prereq: Freshman chemistry.

**ES 620 NATURAL, BIOLOGICAL  
AND MEDICAL SCIENCES IN ENVIRONMENTAL SYSTEMS. (3)**

A survey course for students outside the biological and medical sciences. Concepts in environmental systems, toxicology, ecology and the environment, ecotoxicology and environmental health. Prereq: A background in physical sciences or introductory biology and chemistry.

**ES 630 LEGAL, SOCIAL AND ECONOMIC  
SCIENCES IN ENVIRONMENTAL SYSTEMS. (3)**

Jurisprudential history, ethics and rule of law, environmental economics, history of science, governmental structures, process for development and enforcement of standards, social/political implications of environmental systems, regulatory schemes for environmental control.

**EXP Experiential Education**

**EXP 396 EXPERIENTIAL EDUCATION. (1-12)**

A community-based or field-based learning experience under the supervision of a faculty member. May be repeated to a maximum of 30 credits. Pass/fail with departmental permission required for letter grade. Prereq: Completion of departmental learning agreement and filing of the agreement in OEE. Consent of major department chairperson and instructor required.

## FA Fine Arts

†FA 301 PRINCIPLES AND PRACTICES OF ARTS ADMINISTRATION.

†FA 401 SEMINAR IN ARTS ADMINISTRATION.

## FAM Family Studies

**FAM 250 CONSUMER ISSUES. (3)**

A study of consumer issues, rights and responsibilities. Examination of how individual and societal decisions affect quality of life.

**FAM 251 PERSONAL AND FAMILY FINANCE. (3)**

Management of personal and family financial resources throughout the lifespan. A study of individual and family finances as related to planning, credit, savings, investment, insurance, taxes, housing costs, transportation costs, retirement and estate planning.

**FAM 252 THE INDIVIDUAL, MARRIAGE AND FAMILY. (3)**

Consideration of the dynamics of intimate relationships with emphasis on the individual's personal development and expectations regarding intimacy, marriage, and family.

**FAM 253 HUMAN SEXUALITY: DEVELOPMENT, BEHAVIOR AND ATTITUDES. (3)**

Study of human sexuality, including the process of gender differentiation, sexual response patterns, sexual behavior and attitudes. Prereq: Three hours in social or behavioral science.

**FAM 254 DEVELOPMENTAL PSYCHOLOGY. (3)**

An introduction to the principles of developmental psychology as seen in human growth over the entire lifespan, with the primary focus on infancy through adolescence. Emphasis is placed on theory and data relating to the developmental aspects of cognition, language and personality. Prereq: PSY 100. (Same as PSY 223.)

**\*FAM 255 CHILD DEVELOPMENT. (3)**

An overview of the various aspects of development (physical, social, emotional, intellectual) in the social context for children prenatally through adolescence. Course will emphasize techniques of directed observation. Lecture, three hours, laboratory, one hour per week.

**\*FAM 256 GUIDANCE STRATEGIES FOR WORKING WITH YOUNG CHILDREN. (3)**

Examination of effective guidance strategies for use with young children in an early childhood setting; modifications of experiences for age level, ability, group and individual needs. Application and evaluation of guidance skills in laboratory experience. Lecture, two hours; laboratory, two hours per week. Prereq: PSY 223 (or FAM 254) or FAM 255.

**FAM 257 INTRODUCTION TO FAMILY INTERVENTION: WORKING WITH FAMILIES AND INDIVIDUALS. (3)**

Survey course to introduce students to the various skills and strategies used by family scientists in helping relationships. The emphasis will be on learning the skills required to provide support for families and individuals. Prereq: IFDE, FRMC and HEED majors only, and FAM 251, 252, or 255.

**FAM 258 CHILD DEVELOPMENT AND FAMILY LIFE IN JAPAN AND CHINA. (3)**

Consideration of structure and function of the family, marriage and kinship patterns, socialization of children and personality development, attitudes and values relating to children, economic practices within the family, and how these family values and patterns in Japan, Mainland China, and Taiwan relate to the historical and philosophical bases of Eastern cultures.

**FAM 304 PERSONAL AND FAMILY RISK MANAGEMENT. (3)**

An in-depth study of the topic of risk management with an emphasis on applications for individuals and families. Various methods of managing risk will be addressed with the principal focus on insurance as a means for reducing risk associated with property, liability, income, health, and disability protections. Prereq: FAM 251.

**\*FAM 350 CURRICULUM PLANNING IN EARLY CHILDHOOD EDUCATION. (4)**

Theories, research and strategies for planning, implementing and evaluating learning experiences for young children (birth - five years). Application in practicum in an early childhood setting. Lecture, two hours; field work, four hours per week. Prereq: Admission to the TEP programs in ECEU or AECH.

**FAM 354 THE FAMILY IN CROSS-CULTURAL PERSPECTIVE. (3)**

This course approaches the study of the family from a comparative perspective, emphasizing cross-cultural variability in the structure and function of family. Kinship, household formation, sex roles, and socialization are examined in the context of the family, as well as patterns of interaction, personality formation, and family pathology. Prereq: Introductory social science course. (Same as ANT/SOC SW 354.)

**FAM 356 MIDDLE CHILDHOOD. (3)**

Examination of the various aspects of development including physical, social, emotional and cognitive for children ages 9-12 years. Emphasis is on the current research and theories most relevant to the age group. Prereq: FAM 255 or equivalent.

**FAM 357 CONTEMPORARY ADOLESCENCE. (3)**

A survey of contemporary adolescent development and behavior with special emphasis on the multiple forces which affect this stage of development. Prereq: Six hours in social or behavioral science or consent of instructor.

**FAM 390 INTRODUCTION TO RESEARCH IN FAMILY STUDIES. (3)**

An introduction to research design, methodology, instrumentation, and data analysis with emphasis on a student's ability to understand and critique research in human development and family relations. Prereq: One course in FAM and STA 200 or consent of instructor.

**FAM 402 FAMILY ECONOMICS AND MANAGEMENT ISSUES. (3)**

Examination of family economics and management issues and analysis of their impact on the economic well-being of families. Prereq: FAM 251 or consent of instructor.

**\*FAM 407 ASSESSMENT OF YOUNG CHILDREN. (2)**

An introduction to the assessment and measurement of skills in children from birth to primary. Training in the development and use of commercially available and teacher-made assessment devices and techniques suitable for teachers to administer. Includes observations, standardized tests, portfolio development, and transdisciplinary assessment, used by teachers of young children. Includes laboratory experience in assessment of children birth to age five. Lecture, one and one half hours; laboratory, one hour per week. Prereq: FAM 255.

**FAM 410 PRACTICUM IN APPLIED CHILD DEVELOPMENT. (4-6)**

Supervised practicum in a community agency. Emphasis on observing children and/or adolescents and developing competencies in providing services to these ages on either an individual, small, or large group basis. Biweekly discussion will provide analysis of problems related to these competencies. Lecture, one hour biweekly; laboratory, 8 to 12 hours per week. Pass/fail only. Prereq: FAM 255; senior standing or consent of instructor.

**\*FAM 411 STUDENT TEACHING IN EARLY CHILDHOOD EDUCATION. (6)**

Course designed to give students experience with supervised teaching at the pre-primary level. Emphasis will be placed on observation and teaching individual, small and large group methods). One afternoon per week will be devoted to a discussion and analysis of problems in student teaching. Discussion, two hours; laboratory 22 hours per week. To be offered pass-fail only. Prereq: Completion of professional sequence and formal admission to student teaching; admission to the Teacher Education Program or permission of instructor.

**FAM 463 CONCEPTS OF PERSONAL AND FAMILY MANAGEMENT. (3)**

Concepts of management related to individuals and families throughout the life cycle. Emphasis is given to decision-making for achieving goals through the use of family resources. Experiences in applying management concepts will be required. Prereq: Three hours of Family Studies and junior or senior class standing.

**\*FAM 474 SPECIAL TOPICS IN FAMILY RESOURCE MANAGEMENT (Subtitle required). (1-3)**

Course will focus on selected topics drawn from various areas of family resource management taught by faculty members with special interests and competence. May be repeated to a maximum of six credits under different subtitles. Prereq: Consent of instructor.

**\*FAM 475 SPECIAL TOPICS IN INDIVIDUAL AND FAMILY DEVELOPMENT (Subtitle required). (1-3)**

Course will focus on selected topics drawn from various areas of individual and family development taught by faculty members with special interests and competence. May be repeated to a maximum of six credits under different subtitles. Prereq: Consent of instructor.

**FAM 486 FIELD EXPERIENCES IN FAMILY RESOURCE MANAGEMENT. (3)**  
Field training in community setting. Opportunities for developing competencies in planning and conducting individual and small group experiences related to family resource management. Lecture, one hour; laboratory, seven hours per week. May be repeated to a maximum of six credits. Prereq: Senior standing and consent of instructor.

**\*FAM 494 INDEPENDENT WORK IN FAMILY RESOURCE MANAGEMENT. (1-3)**  
Intensive independent work on specific phases or problems in the field. May be repeated to a maximum of six credits. Prereq: Junior or senior standing.

**\*FAM 495 INDEPENDENT WORK IN INDIVIDUAL AND FAMILY DEVELOPMENT. (1-3)**  
Intensive independent work on specific phases or problems in the field. May be repeated to a maximum of six credits. Prereq: Junior or senior standing.

**FAM 499 FIELD EXPERIENCES IN INDIVIDUAL AND FAMILY STUDIES. (3)**  
Field training in a community setting. Opportunities for developing competencies in planning and conducting individual and small group experiences related to human development and family relations. Lecture, one hour; laboratory, seven hours. May be repeated to a maximum of six credits. Prereq: Senior standing and consent of instructor.

**FAM 501 SYSTEMIC FAMILY DEVELOPMENT. (3)**  
An exploration of normal family functioning from family systems theory and family development/life cycle perspectives. Emphasis will be placed on recent theory development and research pertaining to the study of the family and a critique of this work. Prereq: FAM 252 and FAM 255 or equivalents.

**FAM 509 THE U.S. FAMILY IN HISTORICAL PERSPECTIVE. (3)**  
A study of American family experience and values from its pre-industrial Anglo-European roots to the present. Using an interdisciplinary focus, the course will examine the shifting boundary between family and community and the interaction between domestic life and demographic, religious, and economic influences in American history. Prereq: FAM 353 or SOC 409 or equivalent, or consent of instructor. (Same as HIS 596, SOC 509.)

**FAM 544 CULTURAL DIVERSITY IN AMERICAN CHILDREN AND FAMILIES. (3)**  
Study of cultural and linguistic diversity in American children and families, with special emphasis on Kentucky children and families. Consideration of implications for working with young children and families in educational settings. Study of the variations in beliefs, traditions, values and cultural practices within American society, and their effects on the relationships between child, family, and school. Prereq: An advanced undergraduate course in family or child development or consent of instructor.

**FAM 550 CHILDREN AND FAMILY IN APPALACHIA. (3)**  
Exploration of family life and the socialization of children in the Appalachian Southern Highlands from both an historical and a contemporary comparative perspective. Prereq: Six hours of social sciences or consent of the instructor. (Same as ANT 527.)

**FAM 551 WOMAN IN CONTEMPORARY SOCIETY. (3)**  
An examination of the development of modern American women through the life span. The course emphasizes how female biology and socialization, as well as demographic, political and economic forces, help to create important differences in female development from that of males. Consideration is given to uniquely female events such as menstruation, pregnancy, childbirth, motherhood, and menopause. Modern social problems that particularly affect women, including poverty, provision of child care, psychological depression, role overload, being a displaced homemaker, and widowhood are also discussed. Prereq: Six hours of social sciences or consent of instructor.

**FAM 552 ADMINISTRATION AND SUPERVISION IN EARLY CHILDHOOD EDUCATION PROGRAMS. (3)**  
A course designed for students preparing to become administrators and supervisors in Early Childhood Education Programs. Consideration is given to program evaluation, personnel training and supervision, appropriate curriculum materials, parent involvement and education, program management and funding. Prereq: FAM 350 or consent of instructor.

**FAM 553 THE CHILD IN HIS/HER FAMILY. (3)**  
Preparation and presentation of research reports of studies of family influences on the personality and development of children. Prereq: FAM 252, and six credits in sociology and/or psychology.

**FAM 554 WORKING WITH PARENTS. (3)**  
Principles, techniques, and resources relevant to working with parents as individuals, couples, and families. Survey of related literature on parent effectiveness and parent education is included with relevant field experiences. Lecture, two hours; laboratory, two hours. Prereq: FAM 350 and six hours of 300 level or above in social and behavioral sciences or consent of instructor.

**FAM 555 FOSTERING COGNITIVE DEVELOPMENT IN CHILDREN. (3)**  
Study of the child's development of reasoning and concept formation, perception of reality, and language. Consideration of relevant research and theory and their applications to the education of pre-school children. Examination of the methods and techniques for teaching pre-school children in the areas of math, science, social studies, and language arts. Prereq: FAM 255 or equivalent.

**FAM 557 INFANT DEVELOPMENT. (3)**  
The development of the young child during the prenatal period, infancy and toddlerhood. Care and guidance of the child during the first two years of life. Lecture, two hours; laboratory, two hours per week. Prereq: Six hours of child development, psychology or equivalent.

**FAM 563 FAMILIES, LEGISLATION, AND PUBLIC POLICY. (3)**  
A study of the impact of legislation and public policies on the well being of the family. Emphasis on the involvement of individuals and families with policies and legal resources as a means for realizing satisfying life styles. Prereq: FAM 252.

**FAM 573 FAMILY LIFE EDUCATION. (3)**  
Historical development, current programs, and emerging trends in family life education with particular emphasis on programs and techniques for teaching sex education, marital relations, parenting and human development. Prereq: FAM 252 or consent of instructor.

**FAM 585 AGING AND ENVIRONMENT. (3)**  
Explores the elderly person's changing experience of environment. Physiological, psychological and social changes are related to adjustment within urban and rural community environments, special housing for the elderly, and long-term care environments. Prereq: Graduate or advanced undergraduate standing and consent of instructor. (Same as GEO 585.)

**FAM 602 CONSUMER ECONOMICS. (3)**  
A study of consumer economics with emphasis upon application of the theories and principles toward solution of problems of the individual and family unit as a part of the total economy. Prereq: ECO 201 or equivalent; FAM 250, FAM 251, or consent of instructor.

**FAM 603 THEORY AND RESEARCH IN FAMILY ECONOMICS AND MANAGEMENT. (3)**  
Research and theories in family economics and management with special emphasis given to current issues. Conceptual frameworks developed by leaders in family economics and management are studied. Prereq: FAM 463 and undergraduate work in statistics and research methods or consent of instructor.

**FAM 624 PERSPECTIVES ON HUMAN SEXUALITY. (3)**  
An examination and study of historical and current perspectives of sexuality as it relates to behavioral patterns, cultural attitudes, social policy and practice. Prereq: Knowledge of human behavior and personality theory highly recommended. (Same as SW 624.)

**FAM 652 READINGS IN FAMILY THEORY AND RESEARCH. (3)**  
Entry level course for graduate work in the study of the family with a focus on family theory and research. Conceptual frameworks and theoretical approaches to the study of the family together with extensive reading of relevant supporting research are covered. Critical evaluation of macro theories and micro theories of the middle range and historical perspective on the development and evolution of family theory are emphasized. Prereq: Six hours in family-related social or behavioral sciences or consent of instructor.

**FAM 654 LIFE SPAN HUMAN DEVELOPMENT AND BEHAVIOR. (3)**  
A survey of human development across the life span of the individual from conception to death. Content includes changes in motor skills, biological growth and decline, learning behavior, language, social, emotional, moral, and intellectual development as well as the roles of the family, the school, peers, and work in relation to individual development. Critical evaluation of current theories which describe human development. (Same as EDP 600.)

**FAM 655 THEORY AND DYNAMICS OF HUMAN DEVELOPMENT. (3)**  
Advanced study of theory and research relating to the processes and outcomes of human development throughout the life cycle. Prereq: An advanced undergraduate course in child or human development or consent of instructor.

**FAM 656 ADULT DEVELOPMENT IN THE FAMILY. (3)**

Individual development during young adulthood and middle age, but not including aging or the aged. Particular emphasis is placed on the impact of marital, familial, and parenting careers on individual development in other areas. Theories relating to role negotiations, identity, and the family life cycle are also considered. Prereq: Graduate standing or consent of instructor.

**FAM 657 FAMILY SYSTEMS THEORY. (3)**

An investigation into the evolution and development of family systems theory, beginning with general systems theory and extending into the current applications to family studies. Emphasis is upon evaluation of the theory and its derivatives together with relevant research pertaining to the theory. Prereq: Six hours in family-related social or behavioral sciences or consent of instructor.

**FAM 658 ADOLESCENT DEVELOPMENT. (3)**

A survey of theory and research in adolescent development with particular emphasis on the role of families and implications for working with adolescents. Prereq: Six hours in social or behavioral science.

**FAM 659 ADVANCED CHILD DEVELOPMENT. (3)**

Advanced survey of theoretically and professionally important topics in child development. Particular attention to current theory and research in social, affective, cognitive and language domains; familial/cultural influences; the interdisciplinary nature of the knowledge base; and issues concerning the application of child development knowledge to professional work with children. Prereq: Six hours in social or behavioral sciences or family studies, including one course in child or human development, or consent of the instructor.

**FAM 660 AGING AND FAMILY VALUES. (3)**

The study of dynamics of family interactions and issues when some family members are elderly. Emphasis is placed on perspectives from multiple generations and across various kin categories.

**FAM 662 SOCIAL AND ECONOMIC DECISION MAKING IN THE FAMILY. (3)**

Special study of social and economic decisions affecting family resource management. Prereq: FAM 463 or consent of instructor.

**FAM 668 ALLOCATION OF FAMILY RESOURCES. (3)**

Study of the contributors to and the recipients of family resources. Emphasis upon the recognition and analysis of patterns of resource utilization and the effect of definite factors such as standard of living on those patterns. Prereq: FAM 251 and 463 or consent of instructor.

**FAM 685 PROFESSIONAL ISSUES IN MARRIAGE AND FAMILY INTERVENTION. (3)**

Exploration and definition of the legal, ethical, and professional issues in the practice of marriage and family intervention. Emphasis will be on developing professional skills, attitudes, and identity for marriage and family intervention. Prereq: FAM 657 and 686 or consent of instructor.

**†FAM 686 THEORY AND METHODS IN MARRIAGE AND FAMILY THERAPY.****FAM 687 TREATMENT MODALITIES IN MARRIAGE AND FAMILY THERAPY. (3)**

The primary systemic modalities in marriage and family therapy are presented both in theory and in case study analysis. The presenting problem, history of the problem, family history, identification of dysfunctional dynamics, goals, plan of treatment, and outcome/evaluation are emphasized in each modality. Procedures of assessment, diagnosis, and intervention specifically applicable to each modality are emphasized together with techniques common to both systemic and nonsystemic modalities. Research relevant to outcome/evaluation of each modality is also emphasized. Students are expected to observe marriage and family therapy and to serve as beginning level co-therapists with more advanced students under faculty supervision. Prereq: FAM 657, 686 and admission to the graduate program in Family Studies.

**FAM 688 FAMILY STRESS AND THERAPEUTIC INTERVENTION. (3)**

An examination of the normative and nonnormative stressor events experienced by families. Family crisis theory and the research strategies used to explore family adaptation to stress and crisis will be explored. Emphasis will be on the impact these stressor events have on family life, methods of coping, and principles and techniques of therapeutic intervention. Prereq: FAM 652 or consent of instructor.

**FAM 689 PERSPECTIVES ON DIVORCE AND REMARRIAGE. (3)**

Examination of research, theory and intervention strategies for family experiences: divorce, single-parenting, and remarriage. Focus on family dynamics and child outcomes during these normative family changes. Prereq: Six graduate credits in human development, family relations or equivalent; consent of instructor.

**FAM 690 FAMILIAL AND DEVELOPMENTAL RESEARCH METHODS. (3)**

The study of research techniques and methodological problems involved in home economics research on the family. Emphasis is placed on research concerning interrelations between the family and its environment, development within the family, and family dynamics. Prereq: Consent of instructor.

**FAM 693 FAMILY SYSTEMS APPROACH TO SEXUAL PROBLEMS IN MARRIAGE AND FAMILY THERAPY. (3)**

Study of sexual problems in the context of marriage and family therapy. A family systems perspective will be used to understand and work with couples and families who present with sexual problems in marriage and family therapy. Prereq: FAM 686.

**FAM 699 FIELD EXPERIENCES IN FAMILY STUDIES. (1-3)**

Field training in a community setting related to family science for graduate students. Opportunities for developing competencies in planning and conducting programming in human development, family relations, early childhood education, and family resource management. Student will work under the supervision of a faculty and a training site supervisor. May be repeated to a maximum of six credits. Laboratory, three to nine hours per week. Open to HEIE, HEFD, HEFE, and HEEC majors only with prior consent of instructor.

**FAM 710 CURRENT TRENDS IN EARLY CHILDHOOD EDUCATION AND CARE. (3)**

A study of major trends and issues in early childhood education and care. Several contemporary early childhood trends will be examined and analyzed in terms of appropriateness for specific populations. Prereq: FAM 659 or consent of instructor.

**FAM 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**FAM 752 SEMINAR IN FAMILY THEORY CONSTRUCTION. (3)**

An advanced seminar focusing on the definition, evaluation and construction of family theory. Inductive and deductive theory construction strategies are surveyed, evaluated and applied. Prereq: FAM 652. (Same as SOC 752.)

**FAM 759 SPECIAL ADVANCED TOPICS IN FAMILY STUDIES. (1-3)**

Intensive study of advanced topics and problems from family studies or subfields: marriage and family counseling, individual development within the family, early childhood education, and family economics and management. Consideration of current issues and theories, research literature, and research methods. May be repeated under different subtitles to a maximum of six credits. Prereq: Consent of instructor.

**FAM 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**FAM 773 SEMINAR IN FAMILY ECONOMICS AND MANAGEMENT. (3)**

Preparation and presentation of reports of current investigations in family economics and management. May be repeated to a maximum of six credits. Prereq: Graduate standing and consent of instructor.

**FAM 775 SEMINAR IN HUMAN DEVELOPMENT AND FAMILY STUDIES. (1-3)**

Preparation and presentation of reports of current investigations in human development and family relations. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**\*FAM 776 PROSEMINAR IN MARRIAGE AND FAMILY THERAPY: (SUBTITLE REQUIRED). (1-3)**

Intensive study of skills, issues, or treatment procedures in marriage and family therapy. May be repeated under different subtitles to a maximum of six credits. Prereq: Permit will be required.

**FAM 785 ADVANCED PROBLEMS IN INDIVIDUAL AND FAMILY DEVELOPMENT. (1-3)**

Independent advanced work. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**FAM 786 ADVANCED PROBLEMS IN FAMILY ECONOMICS AND MANAGEMENT. (1-3)**  
Independent advanced work in family economics and management. May be repeated to a maximum of six credits. Prereq: Graduate standing and consent of department chairperson.

**FAM 787 SUPERVISED EXPERIENCE IN THE PRACTICE OF MARRIAGE AND FAMILY THERAPY. (1-6)**  
Supervised experience in the practice of marriage and family therapy. Students are required to spend one hour per week in lecture and one hour per week in individual supervision and three hours per week in group discussion of professional issues in conjunction with case management and administration. A minimum of eight hours of client contact per week is expected. May be repeated to a maximum of 18 credits. Prereq: Consent of supervising faculty committee required.

## FIN Finance

**FIN 300 CORPORATION FINANCE. (3)**  
An introduction to the basic principles, concepts, and analytical tools in finance. Includes an examination of the sources and uses of funds, budgeting, present value concepts and their role in the investment financing and dividend decision of the corporate enterprise. Prereq: ECO 202, ACC 202.

**FIN 350 FUNDAMENTALS OF INVESTING. (3)**  
Investigation of various investment opportunities. Primary emphasis on financial assets such as stock, bonds, options, and futures contracts. Also considers real estate, insurance, and similar alternatives. Operation of financial markets; security analysis and valuation models, forecasting. Efficient markets: random walk vs. technical analysis. Description of portfolio management.

**FIN 360 PRINCIPLES OF REAL ESTATE. (3)**  
An overview of the basic concepts and principles of real estate in the private and public sectors. The course provides an introduction to real estate issues and a foundation for further study in the various specialized areas of real estate and urban development. Prereq: A grade of C or better in FIN 300 or consent of instructor.

**FIN 395 INDIVIDUAL WORK IN FINANCE. (1-6)**  
Students confer individually with the instructor. Written paper usually expected and filed in chairperson's office. May be repeated to a maximum of six credits. Prereq: GPA of 3.0 in major, approval of instructor and chairperson.

**FIN 410 ANALYSIS OF FINANCIAL INFORMATION. (3)**  
Begins with a review of the informational inputs to financial decision-making, including financial statements and other economic data. Some emphasis placed on the interpretation of "noncomparable" data across firms, and the application of popular analytic techniques. Studies evaluating the usefulness of financial data will also be reviewed. Prereq: ECO 391, ACC 301 and a grade of C or better in FIN 300.

**FIN 423 INTERNATIONAL FINANCE. (3)**  
The course provides an overview of world trade, international monetary and trade theory, and the theory of exchange rate determination. Focus is on the management of short- and long-term international assets, with particular attention given to the direct investment decision and on financing international operations. Prereq: A grade of C or better in FIN 300.

**FIN 445 CAPITAL INVESTMENT AND FINANCING DECISIONS. (3)**  
Primary emphasis on the application of financial concepts and tools of analysis. Case analysis is used to simulate "real world" environment. Topics include capital budgeting, financing decisions, cost of capital, leasing, dividend policy, and mergers and acquisitions. Prereq: A grade of C or better in FIN 300.

**FIN 447 WORKING CAPITAL MANAGEMENT. (3)**  
Primary emphasis is placed on the study of short-term financial management policies. Course topics include cash management, marketable security investment, credit and inventory policies, as well as alternative sources of short-term funding. Some casework is involved. Prereq: A grade of C or better in FIN 300.

**FIN 450 INVESTMENT ANALYSIS. (3)**  
Analysis of corporation statements for investment purposes; the security market; market influences on security prices; effect of interest changes on security prices; and the development of investment programs. Prereq: ACC 301 or FIN 410; ECO 391; and grades of C or better in FIN 300 and 350.

**FIN 452 OPTIONS AND FUTURES. (3)**  
A study of the options and futures markets including institutional aspects, pricing, and regulation. Primary emphasis will be on the uses and applications of options and financial futures. Prereq: FIN 300 (grade of C or better), ECO 391, ECO 485G, and a course in investment; or consent of instructor.

**FIN 464 REAL ESTATE FINANCE. (3)**  
The course surveys the sources and uses of real estate funds. The institutions which provide funds and the various types of financial instruments are described and compared. Likewise, various forms of real estate investment are analyzed and methods of determining value are critiqued. Prereq: A grade of C or better in FIN 300.

**FIN 480 MONEY AND CAPITAL MARKETS. (3)**  
A study of the institutional structure and theory of the money and capital markets, including the types of financial claims traded in such markets, the major buyers and sellers, the regulatory environment, capital market theory, and the forces of supply and demand affecting the level and structure of interest rates. Prereq: ECO 485G, a grade of C or better in FIN 300 or consent of instructor.

**FIN 585 BANK MANAGEMENT. (3)**  
A study of the principles and cases in commercial banking practice. Bank management practices are studied within the economic, monetary, fiscal and legal framework of the American economy. Prereq: ECO 485G, a grade of C or better in FIN 300, or consent of instructor.

**FIN 600 CORPORATE FINANCIAL POLICY. (3)**  
A study of financial management from the viewpoint of the corporate financial officer. Areas studied include capital budgeting, capital structure, financing decisions, working capital management, dividend policy, and mergers and acquisitions. Prereq: Graduate standing: ECO 610, ACC 628, MGT 650.

**FIN 623 INTERNATIONAL FINANCIAL MANAGEMENT. (3)**  
This course provides an overview of financial management at the international level. Topics covered include: The nature and uses of international financial markets, the financial behavior of multinational corporations, exchange rates, and hedging in international business. Prereq: FIN 600 and consent of the instructor.

**FIN 637 HEALTH FINANCE. (3)**  
This course applies general principles of finance to the financial management of health care institutions. The major financial incentives which dictate how health care is delivered are studied and proposals to change these incentives are explored. Prereq: MHA/MPA program status and HA 601, HA 621, PA 623, HA 635. (Same as HA/PA 637.)

**FIN 645 CORPORATE INVESTMENT AND FINANCING POLICY. (3)**  
Emphasizing both theory and practice, this course is an in-depth study of long-term corporate investment and financing decisions. Topics include valuation, capital budgeting, cost of capital, leasing, dividend policy, capital structure, and mergers and acquisitions. Prereq: FIN 600.

**FIN 647 WORKING CAPITAL POLICY. (3)**  
A study of short-term financial policies primarily from the corporate financial officer's viewpoint. Areas studied include working capital management, liquidity policy, banking relations, investment in money market instruments and financial statement forecasting. Prereq: FIN 600.

**FIN 650 INVESTMENTS. (3)**  
Analysis and valuation of securities and the effects on investment decisions. Prereq: Appropriate undergraduate courses in accounting and finance.

**FIN 656 PORTFOLIO MANAGEMENT. (3)**  
A study of the advanced analytical processes involved in portfolio selection and management. Topics include alternative models for allocating resources among risky alternatives and evaluation of performance. Prereq: FIN 600 and FIN 650 or consent of the instructor.

**FIN 664 REAL ESTATE FINANCE. (3)**  
A basic orientation in commonly used instruments, institutional structures, and real estate financing policies. Emphasis will be placed on mortgage instruments, mortgage types, effective cost of borrowing, construction lending, financial institutions, loan underwriting, and the secondary mortgage market. Analysis is primarily from the debt investor's perspective. Prereq: FIN 600 and consent of instructor.

**FIN 680 MONEY, INTEREST AND CAPITAL. (3)**  
A study of the theory of money, interest and financial intermediation. In addition to the theory, the major financial markets, financial institutions and financial instruments will be examined. Finally, the governmental agencies which regulate the industry will be discussed as will the overlapping nature of the regulatory process. Prereq: Completion of the first year MBA core or consent of instructor.

**FIN 691 ADVANCED TOPICS IN FINANCE**

**(Subtitle required). (1-3)**  
The study of selected topics in finance for graduate students. Special title required. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

**FIN 695 INDIVIDUAL WORK IN FINANCE. (1-6)**

Students confer individually with the instructor. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**FIN 700 SEMINAR IN FINANCIAL THEORY. (3)**

Primary emphasis on the theory of financial asset valuation. Topics include utility theory, investor reaction to uncertainty, cost of capital theory, dividend theory, portfolio theory, and asset pricing in equilibrium. Prereq: FIN 600 and FIN 650.

**FIN 701 SEMINAR IN FINANCIAL THEORY II. (3)**

A continuation of FIN 700. Topics covered include state-preference theory, arbitrage pricing theory, agency theory, and the pricing of contingent claims. Prereq: FIN 700 and consent of instructor.

**FIN 745 SEMINAR IN MANAGERIAL FINANCE. (3)**

Primary emphasis on the implementation of financial theory for the management of the assets of a business firm. Topics include capital budgeting, working capital planning, financing the firm, cost of capital and the financial structure of the firm, and mergers and acquisitions. Prereq: FIN 700.

**FIN 750 SEMINAR IN INVESTMENT THEORY. (3)**

Primary emphasis on the implementation of financial theory for the evaluation and management of financial assets in an efficient capital market. Topics include mean-variance efficiency, development and testing of the capital asset pricing model, stochastic dominance, and option pricing theory as well as other topics in modern capital market theory. Prereq: FIN 700 or equivalent, or consent of instructor.

**FIN 763 RESEARCH, DESIGN AND ANALYSIS. (3)**

This course deals with the design and analysis of business research. Emphasizes the practical application of analysis of variance and correlational techniques to problems in business research. Focus will be on design, implementation, and interpretation of research. Prereq: MGT/MKT/FIN 762. (Same as MGT/MKT 763.)

**FIN 780 SEMINAR IN FINANCIAL INSTITUTIONS. (3)**

An examination of the role of financial institutions in the financial system and in the economy, with special emphasis on commercial banks. Topics covered include: theories of financial intermediation, asset-liability management, regulation and deposit insurance, structure of the financial institutions industry, and empirical models of banking. Prereq: FIN 700.

**\*FIN 791 SEMINAR IN FINANCE (Subtitle required). (1-3)**

An intensive study of current theory and research in a topic in finance as discussed in scholarly journals. Examples of possible topics include: Capital structure, agency theory, market efficiency, contingent claims. May be repeated with a different subtitle for a maximum of 12 credits. Prereq: Consent of the instructor.

**FIN 795 INDEPENDENT WORK IN FINANCE. (1-6)**

Designed for advanced students who undertake research problems to be conducted in regular consultation with the instructor. May be repeated to a total of six credit hours. Prereq: Consent of instructor.

**FOR Forestry****FOR 100 INTRODUCTION TO FORESTRY. (3)**

A brief coverage of the general fields of forestry; development and importance; tree growth; principal forest regions and important timber species; forest management practices; utilization and products; state and federal forestry programs.

**FOR 101 INTRODUCTION TO WILDLIFE CONSERVATION. (3)**

An introduction to the history, concepts, and principles of wildlife biology and management. The role of wildlife in ecological systems and human-altered environments will be discussed. Lecture, two hours; laboratory, two hours per week.

**FOR 200 MAP READING AND PHOTOGRAMMETRY. (2)**

Use of topographic maps and aerial photos to determine distances, heights, directions, and areas. Location of ground features on maps and photos and of map and photo features on the ground. Laboratory, four hours per week. Prereq MA 109 and MA 112 or high school equivalents.

**FOR 205 FOREST AND WILDLAND SOILS AND LANDSCAPES. (4)**

A study of soil-plant-landscape relationships as related to forestry and the management of natural ecosystems. Emphasis will be on properties and processes of wildland soils, and on interrelationships between soils; composition and productivity of plant communities; and the structure, form, and functioning of landscapes. Lecture, three hours; laboratory, three hours per week. Prereq: At least three credits of biology and three credits of chemistry.

**FOR 219 SILVICS AND TREE IDENTIFICATION. (3)**

Silvics, taxonomy, and preparation of woody plants native to the U.S. Lecture, two hours per week; laboratory, three hours per week, with field trips to local forests. Prereq: One semester of botany.

**FOR 221 WINTER DENDROLOGY. (1)**

Identification of 100 species of trees, shrubs, and lianas based upon bark, form, twig, and bud characteristics. Laboratory; four hours per week for one-half semester. Prereq: FOR 219.

**FOR 300 FOREST MEASUREMENTS. (4)**

Basic forest surveying; units of measure and their application in determining volume in forest stands and products; statistical techniques and photogrammetry in volume estimate; site classification and growth determinations; continuous forest inventory and data processing techniques. Lecture, three hours; laboratory, two hours. Prereq: MA 123 and STA 291.

**FOR 315 CONSERVATION BIOLOGY. (3)**

This course is a multidisciplinary science designed to deal with the global crisis confronting natural biological systems. This course will review the scientific evidence demonstrating loss of biological diversity across all taxonomic groups. Various strategies for conserving biological diversity will be presented, including single-species, ecosystem, and landscape level approaches. Emphasis will be placed on strategies for managing small populations. Additional topics to be addressed include habitat fragmentation, restoration ecology, and sustainable development. Prereq: BIO 150 and 152 or consent of the instructor.

**FOR 340 FOREST ECOLOGY. (3)**

The study of the forest as a biological community with emphasis on the interrelationships between trees and other organisms comprising the community, and the interrelationships between these organisms and the physical environment. Lecture, two hours; laboratory, three hours per week. Prereq: FOR 205 and FOR 219, or consent of instructor.

**FOR 350 SILVICULTURE. (4)**

Principles and techniques of intermediate cutting, natural and artificial regeneration, systems of reproduction, application of genetics and tree improvement to intensive forest management, and silviculture of some of the major forest types of the United States. Lecture, three hours; laboratory, two hours with occasional extended field trips. Prereq: FOR 205, FOR 219, FOR 340, or consent of instructor.

**FOR 360 WOOD TECHNOLOGY AND UTILIZATION. (4)**

General anatomy of wood and study of its properties. Identification of major species based on microscopic and macroscopic features. Sources, processing, and utilization of wood products. Lecture, three hours; laboratory, two hours per week. Prereq: BIO 106 and 107, PHY 151, or consent of instructor.

**FOR 375 TAXONOMY OF FOREST VEGETATION. (1)**

Field study of the identification and silvics of forest vegetation. One week summer field course. Prereq: FOR 205, FOR 219, and FOR 340; grade of C or better required in FOR 205 and FOR 219.

**FOR 376 SILVICULTURAL PRACTICES. (2)**

Field study of the relationship between specific site characteristics and yield of forest stands and the application of cultural practices to forest stands. Two week summer field course. Prereq: FOR 205, FOR 219, FOR 340, and FOR 350; grade of C or better required in FOR 205 and FOR 219.

**FOR 377 FOREST SURVEYING. (1)**

The application of surveying principles and techniques to forest land areas. One week summer field course. Prereq: FOR 200 and FOR 300; grade of C or better required in FOR 200.

**FOR 378 FOREST MENSURATION. (2)**

The application of mensurational principles and techniques in determining tree and stand volumes and growth; timber cruising; development of volume and stand tables. Two week summer field course. Prereq: FOR 200 and FOR 300; grade of C or better required in FOR 200.

**FOR 379 HARVEST AND UTILIZATION OF WOOD. (2)**

Study and use of harvesting and milling equipment in the harvest and manufacture of wood and wood products. Two week summer field course. Prereq: FOR 360.

**FOR 399 FIELD-BASED EDUCATION IN FORESTRY. (1-6)**

The use of field experience as an educational complement to classroom work. May be repeated to a maximum of 12 credits which are to be used as electives. Prereq: Permission of instructor and department chairperson. A departmental learning agreement must be completed prior to registration.

**FOR 402 FOREST ENTOMOLOGY. (3)**

The principles of forest entomology, including the detection, collection, identification, appraisal of damage, and control of forest insect pests. Lecture, two hours; laboratory, two hours. Prereq: One year of biology or consent of instructor. (Same as ENT 402.)

**FOR 405 MECHANICS AND PHYSICS OF WOOD. (3)**

Elastic behavior and mechanical properties of wood. Liquid movement, thermal, electrical, acoustical, and viscoelastic properties of wood. Timber structural design. Two class hours, two laboratory hours per week. Prereq: FOR 360.

**FOR 410 FOREST PATHOLOGY. (3)**

Symptomatology, epidemiology, host-pathogen relations and control of selected diseases of forest trees. Lecture, two hours; laboratory, two hours. Prereq: BIO 106 and 107 or BIO 351 or one equivalent semester of botany. (Same as PPA 410.)

**FOR 425 TIMBER MANAGEMENT. (4)**

The principles of sustained yield timber management, organization of the forest area, management objectives, timber valuation, regulation of the cut, and timber management plans. Lecture, three hours; laboratory, two hours. Prereq: MA 162, FOR 201, and Summer Camp (FOR 375, 376, 377, 378, and 379), or consent of instructor. (Same as AEC 425.)

**\*FOR 430 FOREST WILDLIFE MANAGEMENT. (3)**

The principles and practices of wildlife ecology and management with emphasis on the forest environment. Lecture, two hours; laboratory, two hours with occasional extended field trips. Prereq: Summer Camp (FOR 375, 376, 377, 378, and 379) or consent of instructor.

**FOR 440 FOREST RESOURCES FOR RECREATION. (3)**

Study of resource-oriented recreation in the forest. The recreational development of forest lands and waters and basic forest land management policies and principles related thereto. Lecture, two hours; laboratory, two hours with occasional extended field trips. Prereq: Summer Camp (FOR 375, 376, 377, 378, and 379) or consent of instructor.

**FOR 460G FOREST WATERSHED MANAGEMENT. (3)**

Principles and techniques involved in forest watershed management as related to the water resource. The influence of forestry practices on water movement into and through the watershed; water storage; water loss, vegetation and water yields; water quality. All-day field trip required. Prereq: Summer Camp (FOR 375, 376, 377, 378, and 379); or consent of instructor.

**FOR 461 INTRODUCTION TO POPULATION GENETICS. (2)**

This survey course examines the population dynamics and equilibria of genes in nuclei, chloroplasts and mitochondria. Emphasis will be on biological relevance (in plants, animals, and micro-organisms), but some theoretical derivations will also be introduced. Prereq: AGR 360 (or equivalent) and one course in probability/statistics. (Same as AGR/BIO/ENT 461.)

**FOR 480 INTEGRATED FOREST RESOURCE MANAGEMENT. (5)**

This is the capstone course in the forestry curriculum. Students will be presented with a real life management scenario in a forested location in Kentucky. They will be required to collect data, determine management objectives, and develop action plans for managing the forest according to the desires of the owner and subject to realistic legal, economic, and social constraints. Students will be required to present their management plans at the end of the semester to the faculty of the Department of Forestry. Lecture, three hours; laboratory, four hours per week. Prereq: FOR 425, FOR 430, FOR 440, and FOR 460G.

**FOR 530 APPLICATIONS OF GIS IN NATURAL RESOURCES. (4)**

An introduction to geographic information systems (GIS) and their application to natural resource management problems. Students will learn the basic functions and uses of GIS, and will use a GIS to model spatial relationships to solve problems in wildlife, timber, recreation, and watershed management. Prereq: STA 291 and junior standing or above in Forestry or graduate student or permission of instructor.

**FOR 564 FOREST SOILS. (3)**

The physical, chemical and biological properties of soils as they relate to forest tree growth and the forest community. A study of the genesis, morphology, classification and utilization of soils for forestry. Lecture, two hours; laboratory, two hours with occasional extended field trips. Prereq: PLS 366 and AGR 367 and consent of instructor. (Same as AGR 564.)

**FOR 599 INDEPENDENT WORK IN FORESTRY. (1-3)**

Study and independent work on selected problems related to allocation and utilization of natural resources. May be repeated to a maximum of six credits. Any combination of FOR 599 and FOR 781 cannot exceed six credits. Prereq: Senior or graduate standing and consent of instructor.

**FOR 605 EMPIRICAL METHODS IN ECOLOGY AND EVOLUTION. (2)**

This course provides students with hands-on experience in a diverse array of modern research methods used by ecologists and evolutionary biologists, including techniques used in: molecular genetics, chemical ecology, behavioral studies, motion analyses, using high-speed video, image analyses for morphometrics and color, and field techniques in both aquatic and terrestrial systems. Lecture, one hour; laboratory, three hours per week. Prereq: BIO 451G or FOR 340 or ENT 665 or consent of instructor. (Same as BIO/ENT 605.)

**FOR 606 CONCEPTUAL METHODS IN ECOLOGY AND EVOLUTION. (2)**

This course provides students with hands-on experience in a diverse array of conceptual research techniques used by ecologists and evolutionary biologists. The focus will be on optimization methods used for predicting animal and plant behaviors and life histories, and on methods for assessing population trends and dynamics. Mathematical techniques used will include graphical analyses, matrix algebra, calculus, and computer simulations. Prereq: One year of calculus and BIO 451G or FOR 340 or ENT 665, or consent of instructor. (Same as BIO/ENT 606.)

**FOR 607 ADVANCED EVOLUTION. (2)**

This course covers advanced topics in evolution, concentrating on questions central to the understanding of general evolutionary processes. Phenomena occurring both within populations (e.g., selection, inheritance, population subdivision) and between populations (e.g., gene flow, competition) will be addressed. Special attention will be given to modern research approaches and techniques including quantitative genetics, measurement of selection, phylogenetic analyses of comparative data and molecular systematics. Prereq: One year of calculus, genetics (BIO 404G or BIO 461) and BIO 508 or consent of instructor. (Same as BIO/ENT 607.)

**FOR 608 BEHAVIORAL ECOLOGY AND LIFE HISTORIES. (2)**

This course uses an evolutionary approach to examine behavior and life histories. Topics addressed include: the optimality approach, constraints on optimality, kin and group selection, predator and prey behaviors, social and mating behaviors, and life history evolution. Prereq: BIO 451G and one semester of calculus; or consent of instructor. (Same as BIO/ENT 608.)

**FOR 609 POPULATION AND COMMUNITY ECOLOGY. (2)**

This course discusses the processes that determine population distributions and dynamics and community structure for both plants and animals. Topics addressed include: population regulation and population stability, community diversity and stability, ecological succession, population interactions (competition, predation, mutualism), coevolution, and the effects of spatial and temporal heterogeneity on population and community patterns. Prereq: BIO 451G or FOR 340 or consent of instructor. (Same as BIO/ENT 609.)

**FOR 612 FOREST ECOSYSTEM ANALYSIS. (3)**

The study of ecosystem structure and function with emphasis upon eastern deciduous forest ecosystems. Topics discussed will include energy flow, mineral cycling, the influence of disturbance upon ecosystem properties and dynamic processes in the development of ecosystems. Prereq: FOR 340 or BIO 451G and consent of instructor.

**FOR 620 SPECIAL TOPICS IN FORESTRY (Subtitle required). (1-3)**

Special topical or experimental courses in forestry for advanced graduate students. Special title required and must be approved by the chairperson of the Department of Forestry. May be repeated to a maximum of nine credits. Students may not repeat under the same subtitle. Prereq: Consent of instructor.

**FOR 622 PHYSIOLOGY OF PLANTS I. (3)**

A physiological/biochemical treatment of central topics in modern plant physiology. Topics will include: plant-cell biology, ion transport, water and translocation, respiration and photosynthesis. Prereq: BIO 430G or equivalent or consent of coordinator. Prereq or concur: BCH 501. (Same as AGR/BIO/HOR 622.)



**FOR 623 PHYSIOLOGY OF PLANTS II. (3)**

A physiological/biochemical treatment of central topics in modern plant physiology. Topics will include: plant hormones, an introduction to plant biotechnology, senescence and abscission, stress physiology, phytochrome-photomorphogenesis-phototropism nitrogen and sulfur metabolism. Prereq: BIO 430G or equivalent, and BCH 501 or consent of coordinator. (Same as AGR/BIO/HOR 623.)

**FOR 630 WILDLIFE HABITAT ANALYSIS. (3)**

The components and structure of wildlife habitats and associated wildlife communities. Univariate and multivariate statistical methods of habitat analysis will be described and applied to data collected during laboratory periods to identify important habitat characteristics for selected wildlife species. The importance of habitat complexity will be demonstrated in laboratory and field situations. Lecture, three hours; laboratory, two hours. Prereq: FOR 430 and basic courses in statistics and ecology.

**FOR 662 QUANTITATIVE METHODS IN RENEWABLE RESOURCE MANAGEMENT. (3)**

Design and analysis of optimization models in renewable resource management. Includes survey of applications in mathematical programming, CPM-PERT, Markov processes and Game theory. Case examples are used to demonstrate applicability and problem formulation in management of industrial and public forests. Prereq: MA 113 and MA 162 or equivalent, and AEC 445G or equivalent. (Same as AEC 662.)

**FOR 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**FOR 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours. Prereq: Consent of adviser and chairperson of the department.

**FOR 770 FORESTRY SEMINAR. (1)**

Reports and discussions of problems and investigations of problems in forestry and related fields. May be repeated to a maximum of three credits.

**FOR 781 SPECIAL PROBLEMS IN FORESTRY. (1-3)**

Advanced study of selected problem areas in forestry. May be repeated for a total of six credits; any combination of FOR 781 and FOR 791 cannot exceed six credits. Prereq: Consent of graduate adviser.

**FOR 791 RESEARCH IN FORESTRY. (1-3)**

Involves original research in selected areas of interest in forestry. May be repeated for a total of six credits; any combination of FOR 781 and FOR 791 cannot exceed six credits. Prereq: Consent of graduate adviser.

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**FP Family Practice**


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**FP 815 FIRST-YEAR ELECTIVE, FAMILY PRACTICE. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Family Practice. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**FP 825 SECOND-YEAR ELECTIVE, FAMILY PRACTICE. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Family Practice. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**FP 841 FAMILY PRACTICE OFF-SITE PRECEPTORSHIP. (1-6)**

A senior selective in remote sites designed to acquaint the student with the functions, techniques, and experiences associated with a family physician. Students will function in an office-based practice of family physicians, will live in the community and practice primary health care delivery. One credit per week, not to exceed six weeks. Prereq: Admission to the fourth year, College of Medicine.

**FP 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:****FP 850 ACTING INTERNSHIP IN FAMILY PRACTICE****FP 852 ELECTIVE IN FAMILY PRACTICE**


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**FR French Language and Literature**


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**\*FR 011 FRENCH FOR READING KNOWLEDGE. (3)**

This course is designed to meet the needs of upper division and graduate students who are preparing for the graduate reading examination.

**FR 101 ELEMENTARY FRENCH. (4)**

The study of basic French through grammar, reading and oral practice.

**FR 102 ELEMENTARY FRENCH. (4)**

A continuation of FR 101. The study of basic French through grammar, reading and oral practice. Prereq: FR 101.

**FR 106 ELEMENTARY FRENCH REVIEW. (5)**

A course equivalent in level to FR 102 designed to prepare students with two or three units of high school French for French 201 who, on the basis of the placement test, appear to lack sufficient skill in French for that course. Prereq: Two years of high school French and the placement test.

**FR 200 ORAL PRACTICE IN FRENCH III. (1)**

This course is designed for intermediate students who wish to strengthen speaking skills through practice in a supervised laboratory. Concur: FR 201.

**FR 201 INTERMEDIATE FRENCH. (3)**

Reading, conversation and oral comprehension are the basic aims of this course, which is structured around contemporary texts. Prereq: FR 102 or two years of high school French and placement test.

**FR 202 INTERMEDIATE FRENCH. (3)**

A continuation of FR 201. Prereq: FR 201 or three years of high school French and placement test.

**FR 203 ELEMENTARY FRENCH CONVERSATION AND COMPOSITION. (3)**

This course will develop conversational skill and introduce writing. Premajor requirement for the French major. Prereq or concur: FR 202.

**FR 204 FRENCH CULTURE: READINGS AND CONVERSATION. (3)**

To enhance reading proficiency and comprehension through exposure to a variety of cultural texts and to apply reading skills to expression in conversation and writing. Premajor requirement for the French major. Prereq: FR 202.

**\*FR 261 MASTERPIECES OF FRENCH LITERATURE IN TRANSLATION. (3)**

A study of major literary texts (in English translation) from the seventeenth century to the present day. Special emphasis is given to the role of literature as an expression of French and Francophone culture. No knowledge of French is required.

**#FR 263 AFRICAN AND CARIBBEAN LITERATURE AND CULTURE OF FRENCH EXPRESSION IN TRANSLATION (Subtitle required). (3)**

This course treats major cultural questions concerning the exchange between Africa and the Caribbean in terms of historical, sociological, political, and literary events. No knowledge of French is required.

**FR 300 ORAL PRACTICE IN FRENCH (Subtitle required). (1)**

Oral-aural practice in the spoken language. Emphasis in the expansion of conversational vocabulary. Designed to increase oral fluency in French. May be repeated to a maximum of three credits. May not be repeated under the same subtitle. Not open to students who are taking or who have taken FR 312 or FR 412. Prereq: FR 202 and FR 203 or equivalent.

**FR 304 INTRODUCTION TO FRENCH LITERATURE I. (3)**

A study of literary texts from the period before 1800 with emphasis on literary analysis and critical approaches. Lecture, discussion, reports. Prereq: FR 202 and FR 203 or equivalent.

**FR 305 INTRODUCTION TO FRENCH LITERATURE II. (3)**

A study of literary texts from the 19th and 20th centuries with emphasis on literary analysis and critical approaches. Lecture, discussion, reports. Prereq: FR 202 and FR 203 or equivalent.

**FR 306 INTERMEDIATE FRENCH COMPOSITION. (3)**

Intermediate grammar review and theme writing. Vocabulary expansion and practice in writing stylistically appropriate French. Prereq: FR 203 or equivalent.

**FR 307 FRENCH FOR BUSINESS AND ECONOMICS. (3)**

Development of specialized conversational and written proficiency necessary to import-export business activities, banking, insurance, business regulation, etc., in the French-speaking world. Prereq: FR 306.

**FR 310 FRENCH PHONETICS. (3)**

Phonetics and phonemics, theory and practice. Advanced corrective pronunciation drill on an individual basis. Prereq: FR 203.

**\*FR 312 FRENCH CONVERSATION I. (3)**

Intensive practice in oral French, emphasizing idiomatic speech. Designed to maintain oral fluency in French. Prereq: FR 204 or equivalent.

**#FR 350 CULTURAL PROFILES OF FRANCE. (3)**

This course explores significant figures, movements, trends, and issues in the cultural history of France in relation to the major political, economic, educational, and cultural institutions of France such as the monarchy, the Republics, the Church, the university, religious and secular schooling, architecture, music, and the plastic arts. Taught in French. Prereq: FR 204.

**FR 375 STUDY IN FRANCE OR QUEBEC. (4)**

A study of the heritage and culture of France or French Canada, with special attention to the development of French conversational skills. Emphasizes contemporary culture and the history of French literature and civilization. May include escorted visits to appropriate sites, reinforced by formal lectures and directed study. May be repeated to a maximum of eight credits with a different topic and departmental approval. Prereq: FR 201 and consent of instructor.

**FR 395 INDEPENDENT WORK IN FRENCH. (3)**

Directed study in French literature and linguistics. May be repeated once. Prereq: Major, senior standing, 3.0 grade-point average in the department, consent of instructor, and approval of the Director of Undergraduate Studies.

**FR 406 ADVANCED FRENCH GRAMMAR AND COMPOSITION. (3)**

The course aims to present vocabulary and grammatical structures necessary in writing long, logically developed compositions in correct formal French. Compositions will be discussed and analyzed in class. Prereq: FR 306.

**\*FR 412 FRENCH CONVERSATION II. (3)**

Practice of language skills at an advanced level. Emphasis on fluency and command of contemporary French speech. Preparation of oral presentations. Prereq: FR 312.

**#FR 450G TOPICS IN FRENCH CULTURE (Subtitle required). (3)**

This course explores in depth a particular movement, trend, or issue in the cultural history of France. Taught in French. May be repeated to a maximum of nine credits under a different subtitle. Prereq: FR 350.

**#FR 465G TOPICS IN FRENCH LITERATURE AND CULTURE IN TRANSLATION (Subtitle required). (3)**

This course explores a significant author, literary genre, movement, trend, or issue in history of French cultural institutions with special emphasis on literature as an expression of culture. No knowledge of French is required. May be repeated to a maximum of nine credits under a different subtitle.

**FR 470G STUDIES IN FRENCH LITERATURE (Subtitle required). (3)**

Study of an author, literary form, topic, or problem. Taught in French. Course may be repeated to a maximum of nine credits under different subtitle. Prereq: FR 304 and FR 305.

**FR 501 FRENCH LITERATURE AND THE ARTS: THE MIDDLE AGES. (3)**

A study of the interrelationship of French narrative, dramatic and poetic literature with the other arts—music and the plastic arts—in the period 1050-1500. Readings in French: Course conducted in English.

**FR 502 FRENCH LITERATURE AND THE ARTS: LA BELLE EPOQUE. (3)**

A study of the literature of the late 19th and early 20th century and its extension into the arts. Readings in French, class conducted in English.

**FR 504 TOPICS IN FRENCH LITERATURE AND CULTURE (Subtitle required). (3)**

Intensive study of an author, genre, period or movement of French literature or an aspect of French culture. May be repeated to a maximum of nine credits under a different subtitle.

**FR 507 INTERPRETATION AND STYLE. (3)**

Study of French style with attention to written and oral expression. Introduction to stylistic theory and methodology. Prereq: FR 406 or graduate standing.

**FR 516 INTRODUCTION TO EARLY FRENCH. (3)**

An introduction to the study of Old and Middle French. Emphasis will be on understanding the language through an examination of its phonology and grammar, and through practice in reading from selected texts, chiefly literary. Prereq: FR 304 and 305.

**FR 550 FRANCE TODAY. (3)**

A contrast between contemporary France in today's Europe and the historical image of France. The impact of the "New Quiet French Revolution" and of the new institutions on French Society. Conducted in French. Prereq: FR 306 and consent of instructor.

**FR 553 TEACHING OF FRENCH. (3)**

The course is designed for teachers and prospective teachers of modern foreign languages, with emphasis on French. Modern methodology, theory and practice of language pedagogy.

**FR 570 SEMINAR IN FRENCH LANGUAGE PEDAGOGY. (1)**

A general seminar in a broad range of subjects in the area of French language pedagogy. May be repeated to a maximum of two credits. Prereq: Graduate student standing in French or consent of instructor.

**FR 601 POETIC VISION (Subtitle required). (3)**

Examination of the major trends in French poetics; attention will focus on aesthetic problems, generic concerns, and various approaches to the nature of poetry. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**FR 602 NARRATIVE TRADITION (Subtitle required). (3)**

A study of narrative structure and techniques as exemplified in selected masterpieces of French literature. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**FR 604 THE TRAGIC MODE (Subtitle required). (3)**

A study of the concept of the tragic mode and its embodiment in French literature and critical theory. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**FR 605 COMIC FICTION (Subtitle required). (3)**

Studies in the development and theory of comic fiction in France. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**FR 606 LITERATURE OF THE MIDDLE AGES (Subtitle required). (3)**

Special topics in French literature from the period 1050-1500. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**FR 607 STUDIES IN RENAISSANCE LITERATURE (Subtitle required). (3)**

Comprehensive study of selected writers. May be repeated under a different subtitle to a maximum of six credits. Prereq: Consent of instructor.

**FR 609 SEVENTEENTH-CENTURY STUDIES (Subtitle required). (3)**

Study of selected French writers, literary, intellectual and cultural practices of the time. May be repeated to a maximum of six credits under different subtitle. Prereq: Consent of instructor.

**FR 617 EIGHTEENTH-CENTURY STUDIES (Subtitle required). (3)**

Literary, intellectual and social practices and theories of the French Enlightenment. May be repeated to a maximum of six credits under different subtitle. Prereq: Consent of instructor.

**FR 619 NINETEENTH-CENTURY STUDIES (Subtitle required). (3)**

Study of the intellectual, literary and social practices and theories of the major movements of the century, including Romanticism, Realism, and Symbolism. May be repeated to a maximum of six credits under different subtitle. Prereq: Consent of instructor.

**FR 621 TWENTIETH-CENTURY STUDIES (Subtitle required). (3)**

Study of the practices and theories of the major intellectual, literary and social movements of the century, such as modernism, existentialism, the new novel, post structural and postmodern writing. May be repeated to a maximum of six credits under different subtitle. Prereq: Consent of instructor.

**FR 630 FRENCH LANGUAGE, LITERATURE AND CULTURE OUTSIDE FRANCE (Subtitle required). (3)**

Study of Francophone writing, currents of thought, and cross-cultural movements in Africa, the Caribbean, Quebec and elsewhere. May be repeated to a maximum of six credits under different subtitle. Prereq: Consent of instructor.

**FR 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**FR 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**FR 780 SPECIAL STUDIES IN FRENCH. (3)**

Selected studies and investigations in the French language and literature, permitting the student to work in areas of special interest, and providing opportunity for original endeavor. May be repeated to a maximum of six hours. Prereq: Consent of instructor.

**FSC Food Science****FSC 107 INTRODUCTION TO FOOD SCIENCE. (3)**

A general basic food science course that deals with world food needs and available food supplies, types of food and nutritive values and use, food processing technology and distribution methods.

**FSC 304 ANIMAL DERIVED FOODS. (5)**

Principles of red meat, poultry, fish and dairy processing; physical and chemical composition and nutritive values of meat, dairy and egg products; structure and identification of muscle; inspection, grading, formulation, processing and preservation methods; organoleptic properties and consumer acceptance of processed meat, dairy and egg products. Lecture, three hours; laboratory, four hours per week. Prereq: GEN 106 or GEN 107.

**FSC 306 INTRODUCTION TO FOOD PROCESSING. (4)**

Commercial processing of foods including theory and use of heat exchangers, separators, freezers, air and vacuum dryers, evaporators, membrane separation, electrodialysis, emulsion formers, extruders, and irradiators. Physico-chemical changes in osmotic pressure, vapor pressure, pH surface tension, viscosity, emulsification and colloidal dispersions in processed foods will be discussed. Processing of waste streams will also be discussed. Prereq: CHE 105, CHE 107, CHE 236.

**FSC 395 SPECIAL PROBLEM IN ANIMAL SCIENCE/FOOD SCIENCE. (2)**

Course designed for students interested in pursuing independently some specific problem. May be repeated for maximum of four credits. Prereq: Consent of instructor. (Same as ASC 395.)

**FSC 399 EXPERIENTIAL LEARNING IN ANIMAL SCIENCES/FOOD SCIENCE. (1-6)**

A field-based learning experience in animal sciences and food science under the supervision of a faculty member. May be repeated for a maximum of six credits as an elective on a pass/fail basis. Prereq: Consent of instructor and department chairperson and completion of a departmental learning contract before registration. (Same as ASC 399.)

**FSC 434G FOOD CHEMISTRY. (4)**

Chemical and physical properties of proteins, lipids, carbohydrates, pigments and food additives as they relate to food processing and food preservation. Lecture, three hours; laboratory, two hours. Prereq: BCH 401G or consent of instructor.

**FSC 530 FOOD MICROBIOLOGY. (5)**

Study of procedures for the enumeration and identification of foodborne microorganisms important in the food industry. Principles for controlling contamination and growth of microorganisms during production, processing, handling and distribution of food products. Lecture, three hours; laboratory, four hours. Prereq: BIO 108 and BIO 109 or equivalent.

**FSC 535 FOOD ANALYSIS. (4)**

Techniques and instrumentation used to determine the chemical composition of foods. Emphasis is placed on the principles of chemical analysis as it relates to foods and food processing. Lecture, two hours; laboratory, four hours per week. Prereq: FSC 434G.

**FSC 536 ADVANCED FOOD TECHNOLOGY. (4)**

Concepts of developing/improving new food products or food processing including: consumer awareness, marketing, ingredient specifications, product formulation, stabilization of product, packaging to meet shelf life goals, shelf testing of products, challenge testing, establishment of HACCP system, consumers testing, market testing, and introduction to the market. A capstone course, where all concepts of food science are used to extend or create new food products for the market place. Lecture, three hours; laboratory, two hours. Prereq: AEN 340, FSC 306, and FSC 335; or consent of instructor.

**FSC 538 FOOD FERMENTATION AND THERMAL PROCESSING. (4)**

Thermal processing of foods. The use of microorganisms in the preservation of raw foods and the manufacture of new foods. Manipulation and improvement of cultures to ensure production of desirable end products. Lecture, three hours; laboratory, two hours. Prereq: BIO 108, BIO 109, BIO 476G, FSC 530 or consent of instructor.

**FSC 540 FOOD SANITATION. (3)**

A study of sanitation principles and techniques for ensuring the safety and wholesomeness of our food supply. Prereq: FSC 530 or equivalent.

**FSC 630 ADVANCED MEAT SCIENCE. (4)**

Advanced meat science with special reference to the histological, chemical, physical and microbiological properties as they relate to meat quality, organoleptic acceptability and processing procedures. Lecture, three hours; laboratory, two hours. Prereq: ASC 304, ASC/FSC 306 or equivalent; one course in histology or biochemistry or consent of instructor. (Same as ASC 630.)

**FSC 632 FOODBORNE DISEASE AGENTS. (3)**

Discussion of microorganisms, toxins and chemicals involved in foodborne illnesses as well as procedures for controlling and investigating foodborne disease outbreaks. Prereq: FSC 530.

**FSC 636 FOOD PACKAGING. (2)**

Detailed description of food packaging materials, composition and resistance to chemical and physical damage and their use in food systems as well as criteria for selection of packaging systems for specific food processing techniques will be presented. Methods of production, e.g.: blow mold, casting and extrusion; layering; lamination and co-extrusion; processing; and printing and sealing will be discussed. Prereq: FSC 536, FSC 538 or equivalent or consent of instructor.

**FSC 638 FOOD PROTEINS. (3)**

This course deals with chemical, biochemical, and enzymatic significance of proteins in food systems; physicochemical and functional properties of animal and plant proteins, their interactions with lipids, carbohydrates, flavors, minerals and other food components during processing and storage, and resulting modifications of food quality. Prereq: FSC 434G or consent of instructor.

**#FSC 640 FOOD LIPIDS. (3)**

An advanced study of the physical, chemical, and biochemical significance of lipids in foods. Topics include the structure and function of lipids in post-harvest physiology, interaction with other food components, and the effect of lipids on the physical properties of foods during processing and storage. Prereq: One course in Food Chemistry or Biochemistry.

**FSC 780 SPECIAL PROBLEMS IN ANIMAL DERIVED FOODS. (1-4)**

May be repeated for a maximum of nine credits. Prereq: Consent of graduate adviser. (Same as ASC 780.)

**FSC 790 RESEARCH IN ANIMAL DERIVED FOODS. (1-6)**

Problems involving original investigation. May be repeated for maximum of nine credits. Prereq: Consent of graduate adviser. (Same as ASC 790.)

**GEN Agriculture – General****GEN 100 ISSUES IN AGRICULTURE: THE DEVELOPMENT OF MODERN AGRICULTURE. (3)**

An introductory course requiring critical analysis of the major social, economic, political and scientific issues in agriculture and related disciplines. The historical development of agriculture will be surveyed, followed by discussions of major issues in modern agriculture. Development of skills in information gathering, critical analysis of issues, and written and oral communication will be emphasized. Prereq: Freshman enrolled in College of Agriculture.

**GEN 101 THE ECONOMICS OF FOOD AND AGRICULTURE. (3)**

An introduction to the field of agricultural economics and some of the basic tools and concepts of decision making. Concepts are illustrated in terms of selected current social and economic issues including the role of agriculture in both a national and international dimension.

**GEN 102 THE DYNAMICS OF RURAL SOCIAL LIFE. (3)**

Introduces major concepts of sociology by exploring social, political and cultural issues confronting rural society and American agriculture, such as: population change, industrialization, energy developments, agricultural change. Student may not receive credit for both this course and SOC 101.

**†GEN 103 AGRICULTURE PEST AND DISEASE MANAGEMENT.****GEN 105 ENGINEERING APPLICATIONS IN AGRICULTURE. (3)**

This course is a comprehensive overview of basic engineering principles and technology which have applications in agricultural production and resource management. It is designed for freshman and sophomore students in the College of Agriculture.

**GEN 200 ISSUES IN AGRICULTURE: CONTEMPORARY PROBLEMS IN AGRICULTURE AND NATURAL RESOURCES. (3)**

An intermediate course which extends the critical analysis of selected issues in agriculture and related disciplines begun in GEN 100. Continues the development of skills in information gathering, critical analysis, and written and oral communication. Students will be required to investigate scientific literature germane to the issues covered and develop reviews, reports and position papers. Prereq: Sophomore enrolled in College of Agriculture.

**GEN 300 SPECIAL COURSE. (1-3)**

Interdisciplinary, topical or experimental courses to be approved by the Dean of the College of Agriculture. A particular course may be offered at most twice under the GEN 300 number, and no GEN 300 course may be given for more than three credits per semester. Open to all University students, subject to such limits or prerequisites as set by the instructor. Hours are variable with each special course. Prereq: As specified by the instructor.

**GEN 301 AN INTRODUCTION TO CHINESE CULTURE THROUGH AGRICULTURE. (3)**

This course is designed to introduce students to basic culture in China. Students will learn about Chinese agriculture, languages, customs, history, the political and educational system, geography and the economy. The culmination of the course is a three-week trip to China. Only students committed to go on trip to China will be enrolled in the course. First priority for the trip is given to College of Agriculture students.

**GEO Geography****\*GEO 130 EARTH'S PHYSICAL ENVIRONMENT. (3)**

A course exploring the fundamental characteristics of earth's physical environment. Emphasis is placed on identifying interrelationships between atmospheric processes involving energy, pressure, and moisture, weather and climate, and terrestrial processes of vegetative biomes, soils, and landscape formation and change. Fulfills elementary certification requirements in education, and USP cross-disciplinary requirement.

**\*GEO 152 REGIONAL GEOGRAPHY OF THE WORLD. (3)**

A geographical study of the world by regions with a focus on the world's physical and human landscapes. Emphasis on how regions are connected to each other. Also how each region is affected by, and affects, global issues such as economic restructuring, food production, and environmental change, will be examined. Fulfills elementary certification requirement for Education and USP disciplinary social science requirement.

**\*GEO 160 LANDS AND PEOPLES OF THE NON-WESTERN WORLD. (3)**

The geographic study of the conceptual and historical definition of regions of the world as "Non-Western." Global patterns of social, cultural, economic, and political difference between the West and Non-West as well as the processes key to the making of the Non-Western world (such as colonialism and imperialism) are discussed. In addition, selected current issues of significance to peoples in the Non-Western world, such as sustainable development, environment, human rights, and gender relations, are considered. Fulfills USP Cross-Cultural requirement.

**GEO 172 HUMAN GEOGRAPHY. (3)**

A study of the spatial distributions of significant elements of human occupation of the earth's surface, including basic concepts of diffusion, population, migration, settlement forms, land utilization, impact of technology on human occupation of the earth. (Fulfills elementary certification requirement for Education and University Studies requirement.)

**\*GEO 210 POLLUTION, HAZARDS, AND ENVIRONMENTAL MANAGEMENT. (3)**

An introduction to environmental systems such as weather and climate, vegetation, land forms and soils, and how the quality of these systems is modified by human use. Resource issues discussed include: atmospheric pollution and global warming; groundwater, flooding, and flood plain management; volcanic activity and earthquakes; and biospheric processes associated with deforestation and lake eutrophication. Case studies based upon important environmental problems illustrate how human activity and environmental systems interrelate. Fulfills USP Cross-Disciplinary requirement.

**\*GEO 222 CITIES OF THE WORLD. (3)**

Focuses on the historical development, contemporary character, and alternative futures of cities in both developing and developed regions. The spatial, social, economic, and political processes of major world cities are studied and contemporary urban problems are discussed. Fulfills USP disciplinary social science requirement.

**#GEO 240 GEOGRAPHY AND GENDER. (3)**

Adopts a geographic approach to the study of gender relations. The role of space and place in shaping the diversity of gender relations throughout the world will be considered. Through case studies the importance of gender relations in understanding a variety of issues will be stressed. Such issues include: the design and use of urban and rural environments; "Third World" development; regional economic restructuring; changing political geographies; and migration.

**\*GEO 251 WEATHER AND CLIMATE. (3)**

A survey of the atmospheric controls associated with local, regional, and global weather and climate variability. Includes fundamental coverage of the physics and chemistry of energy, gasses, pressure and moisture, with a goal of promoting understanding of general weather analysis and forecasting, severe storms, atmospheric pollution, descriptive climatology, and global climate change. Prereq: GEO 130 or consent of instructor.

**\*GEO 256 BEHAVIOR IN SPACE AND TIME. (3)**

An examination of how space and time are organized and how space and time influence human behavior. Included will be notions of territoriality, life-space and the meaning of space at the personal and social level. The course will explore implications of these concepts for understanding individual and group behavior in everyday life as well as important social issues.

**GEO 260 THIRD WORLD DEVELOPMENT. (3)**

The course focuses on characteristics of developing countries as well as solution strategies to development problems and conditions. Cultural distinctions, traditions, and institutions are recognized as keys to development condition and progress. Selected theories show how cultural variations in language and religion may be used to explain development. Numerous case studies are discussed, including Indonesia, China, India, Brazil, Kenya, and Zimbabwe. Prereq: One of the following: ECO 202, GEO 152, GEO 160, GEO 172, or GEO 222.

**GEO 285 INTRODUCTION TO PLANNING. (3)**

An introduction to the history, purpose, and objectives of planning with emphasis on urban and regional planning, planning processes, techniques, and legislation.

**\*GEO 300 GEOGRAPHIC RESEARCH. (3)**

Introduces students to past and contemporary geographic concepts and methods through a survey of different paradigms or schools of thought. Includes the historical development of geographic thought, as well as examples of research carried out within these paradigms. Focuses on the relationship between different research methods and the paradigmatic and disciplinary structures that influence them. Prereq: GEO 130, 152, 160, or 172.

**GEO 305 ELEMENTS OF CARTOGRAPHY. (3)**

Fundamental training in map drafting, compilation, symbolization, scales, projections, and map reproduction, including emphasis on the conceptual planning and designing of maps and graphs as a medium for communication.

**GEO 310 QUANTITATIVE TECHNIQUES IN GEOGRAPHY. (3)**

The application of spatial techniques geographers use to collect, sample, map, and analyze data in human and physical geography. Students will be introduced to automated data processing. Prereq: STA 200.

**\*GEO 320 GEOGRAPHY OF THE UNITED STATES AND CANADA. (3)**

A systematic review of the physical context, economic, historic, and cultural diversity that distinguish U.S. and Canadian regions. Topical emphasis on the geographic aspects of regional problems. Prereq: GEO 130 or 152 or 172, or consent of instructor.

**\*GEO 321 LAND, PEOPLE, AND DEVELOPMENT IN APPALACHIA. (3)**

Major themes revolve around regional diversity and regional development. Major topics examined include physical environmental context, historical development, and economic and population geography. The study region includes the upland areas between southern New York State and central Alabama. Prereq: GEO 130, 152 or 172, or consent of instructor.

**\*GEO 322 GEOGRAPHY OF KENTUCKY. (3)**

An examination of the cultural, economic, political, and environmental diversity of Kentucky. In addition to studying the state's historical evolution, emphasis will be placed on contemporary problems facing the state. Kentucky's regional, national, and international contexts are discussed. Prereq: GEO 130, 152, 160, or 172.

**\*GEO 324 GEOGRAPHY OF CENTRAL AND SOUTH AMERICA AND THE CARIBBEAN. (3)**

A study of the diversity of physical environments and human societies. The various historical geographies (pre-Columbian and after) of the region are presented as essential to an understanding of contemporary geographical patterns and processes in transport, agricultural, industry and mining, urbanization, and population. Throughout the course case-studies are presented and students are guided as they develop their own case studies. Prereq: GEO 152 or 160 or 172.

**\*GEO 326 GEOGRAPHY OF EUROPE. (3)**

This course explores the physical, cultural, and political geography of the European continent. Diversity of populations and physical landscapes is stressed. The geographic context for current events that are changing the face of Europe are presented. Prereq: GEO 152 or 172.

**\*GEO 328 GEOGRAPHY OF THE MIDDLE EAST AND NORTH AFRICA. (3)**

A comprehensive regional overview, emphasizing cultural adaptation to desert environments. The interrelationships among religions, cultures, and the physical environment will be examined, along with the region's position and influence in the global system. Prereq: GEO 152, GEO 160, GEO 172, or consent of instructor.

**\*GEO 329 GEOGRAPHY OF THE FORMER SOVIET UNION. (3)**

A study of this region's diverse physical and human landscapes, emphasizing the historical and contemporary interlinkages between the various states. Contemporary problems of the post-Soviet era (such as environmental degradation, economic and regional restructuring, or the international position of the region) will be studied from a geographical perspective. Prereq: GEO 152, 160, or 172.

**GEO 330 GEOGRAPHY OF SOUTH ASIA. (3)**

A study of the human, economic, and environmental aspects of India, Pakistan, Bangladesh, Himalayan Nepal and Bhutan, and Sri Lanka. Topics include basic physical and cultural regionalisms, land use and population problems, and patterns of economic development involving urbanization, resources, and industrialization. Prereq: GEO 152 or 160 or 172.

**GEO 332 GEOGRAPHY OF SOUTHEAST ASIA. (3)**

A study of the cultural, economic, and political patterns and processes in mainland and insular Southeast Asia. Major themes examined are how the region's diverse physical geography, uneven natural resource base, cultural diversity, and colonial heritage provide a background to understanding contemporary development. Prereq: GEO 152 or 160 or 172.

**\*GEO 333 GEOGRAPHY OF EAST ASIA. (3)**

Provides an understanding of the life and landscapes in East Asian nations, with special focus on China and Japan. Emphasis is placed on contemporary issues of sustainable development, environmental management, minority groups, human rights and gender relations. Prereq: GEO 152, GEO 160, GEO 172 or consent of instructor.

**#GEO 334 ENVIRONMENT, SOCIETY AND ECONOMY OF JAPAN. (3)**

This course examines some of the major aspects of the society, culture, and economy of Japan. It discusses Japan's human and natural environments; natural hazards and disasters; cultural history and geography; economic and technological developments, their prospects and potentials; challenges to the management of environment and its resources; and Japan's role in global economy. (Same as JPN 334.)

**\*GEO 336 GEOGRAPHY OF SUB-SAHARAN AFRICA. (3)**

This course focuses on the cultural and environmental geographies of the subcontinent, rural landscapes and cultures and environmental problems, the historical geography of precolonial and colonial Africa, and the social geography of contemporary economic development. Prereq: GEO 130 and 152, 160, or 172.

**#GEO 365 SPECIAL TOPICS IN REGIONAL GEOGRAPHY (Subtitle required). (3)**

Offers coverage of world regions not usually covered in other geography courses, or in-depth examinations of specific subregions. Topics covered include: elements of climate and physical landscapes; political and economic systems and their historical development and dynamics; social and cultural processes and landscapes. May be repeated to a maximum of six credit hours under different subtitles. Prereq: Any 100-level geography course or consent of instructor.

**GEO 405G CARTOGRAPHIC PRODUCTION AND DESIGN. (3)**

A course involving the modern techniques of designing, drafting and reproducing commercial quality, multi-color cartographics and graphics. Scribing, photocomposition, color-proofing and planning are the principal topics of study. Lecture, one hour per week; laboratory, four hours per week. Prereq: GEO 305.

**GEO 409G INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS. (3)**

An introductory investigation of the phenomenon of Geographic Information Systems (GIS), including theory and applications areas. A major portion of the course will be based on use of a current widely used GIS computer software system. Considered will be aspects of geographic data entry and editing, spatial analysis, and map development and display. Relationship of GIS to the Global Positioning System (GPS) and satellite generated data will be addressed. Prereq: Junior standing or permission of instructor.

**\*GEO 415 MAP INTERPRETATION. (3)**

An introduction to reading and interpreting maps. Special attention given to the study of physical and cultural geography as portrayed on large scale topographic maps. Emphasis on the relationship between the environmental setting and human activities, surveys and boundaries, transportation, urban and rural settlement and land use, and place names. Prereq: GEO 130 or 172 or consent of instructor.

**GEO 420G URBAN AND REGIONAL PLANNING. (3)**

An analysis of urban and regional planning with emphasis on the contemporary urban and regional planning activities. Prereq: GEO 285 or consent of instructor.

**GEO 430G PHYSICAL GEOGRAPHY FOR TEACHERS. (3)**

The basic content of this course is quite similar to GEO 130 Physical Geography, with emphasis on atmospheric processes of weather and climate, and terrestrial processes of landscape formation and alteration. The human element, in terms of impacts on the environment and the converse impact through pollution and natural hazards, presents a common theme throughout the class. The primary focus in this course, however, is in developing effective teaching techniques for levels K-12 by fostering an understanding of material, a knowledge of resource materials, and experience in applying physical geography to situations outside the classroom. Open to senior education majors and practicing instructors. Lecture, ten hours per week for four weeks.

**GEO 452G WORLD GEOGRAPHY FOR TEACHERS. (3)**

Approaches to teaching geographic themes and concepts within the context of the world's major regions and countries in grade levels K-12. Addresses those issues and problems that affect world regions in the context of the following broad themes: location, place, movement, regions, and human-environment interactions. Among those topics discussed are the use and importance of maps and related resource materials in instruction, presentation of themes at different grade levels, and identification and utilization of a broad range of reference materials for student and teacher use. Lecture, ten hours per week for four weeks.

**\*GEO 455 ECONOMIC GEOGRAPHY. (3)**

An examination of the geography of the capitalist global economy as it has developed unevenly. Emphasis will be placed on contemporary issues (such as industrial restructuring), and specific regions (such as Kentucky). Competing theories (classical, neoclassical, and marxian) aimed at explaining these patterns and processes are discussed and applied. Prereq: GEO 152, 160, or 172.

**\*GEO 460 URBAN GEOGRAPHY. (3)**  
Examines the relationship between urbanization and the larger social and economic contexts within which city growth occurs. Surveys a range of theoretical perspectives on the internal socio-economic structure and built environment of cities, including the contributions by Chicago School, neoclassical, marxist, and postmodern theorists. Emphasis also placed on relevant environmental, social, and political problems of cities. Primary focus is on North American cities, but includes cross-cultural comparisons. Prereq: GEO 152, 160, 172, or 222, or consent of instructor.

**#GEO 465 SPECIAL TOPICS IN HUMAN GEOGRAPHY (Subtitle required). (3)**  
Offers coverage of issues and themes not covered in other geography courses, or in-depth examinations of specific issues and themes. Topics covered will commonly address emerging national and global issues of both general and scholarly interest. May be repeated for a maximum of six credit hours (under different subtitles). Prereq: Any 100-level geography course or consent of instructor.

**\*GEO 475G MEDICAL GEOGRAPHY. (3)**  
An examination of the basic principles of the two major traditions of medical geography: disease ecology and medical care. Examined are the etiology, diffusion, and distribution of selected major diseases. Issues pertaining to the spatial-temporal distribution, accessibility and utilization of medical care resources are presented. Prereq: GEO 172 or consent of instructor.

**\*GEO 480 INTERNSHIP IN GEOGRAPHY. (3)**  
Provides supervised professional experience in public and private sector positions, and is intended to introduce students to the skills and working environments of careers in geography. Students should consult with a geography faculty member in advance of registering for this class. Prereq: Junior or senior standing in the major.

**\*GEO 490G AMERICAN LANDSCAPES. (3)**  
A review and analysis of America's vernacular landscapes. Topics include: the history of settlement by Europeans, Africans, and others; evolving political allegiances; and the expansion of agricultural and industrial technologies in the context of diverse physical environments. The role of political philosophy in landscape development and historic preservation will be highlighted. Prereq: GEO 172 or consent of instructor. (Same as ARC 589.)

**GEO 495 INTERNSHIP IN CARTOGRAPHY. (6 or 9)**  
Professional commercial cartography laboratory experience. Awarded competitively. Student assumes an entry level position involving research, production, or pre-press experience under the direction of a corporate operations supervisor. Applicants should request a faculty or University Cartography Laboratory advisor to direct and record the student's experience for academic credit, and with the advisor's assistance, file a signed learning agreement with the department chair prior to the start of the internship. Available fall, spring, and summer sessions. Credit: six hours fall and spring; nine hours summer session. Pass-fail only. Students should apply to the Director of Undergraduate Studies at least sixty days before the beginning of each semester. Prereq: Major in geography, GEO 405G and 415. The following courses are also recommended: GEO 505, 506, 507 or 508.

**GEO 505 PRACTICUM IN CARTOGRAPHY. (3)**  
Experience credit in which a small number of advanced students work under the direct supervision of the faculty or staff cartographer and in conjunction with other faculty members on departmental and contracted projects. May be repeated to a maximum of six hours. Prereq: GEO 305 and GEO 405; or GEO 506.

**\*GEO 506 INTRODUCTION TO COMPUTER CARTOGRAPHY. (3)**  
A basic introduction to computer-assisted cartography. Emphasis on basic computer graphics literacy and automated techniques for spatial data acquisition, storage, processing, and output. Introduction to current mainframe, workstation, and desktop mapping programs. Prereq: GEO 305 or permission of instructor.

**GEO 508 GEOGRAPHIC INTERPRETATION OF AERIAL PHOTOGRAPHY. (3)**  
Aerial photography is commonly used as a means of collecting information and enhancing the analysis of the earth's landscapes. This course provides the technical background necessary to use aerial photography in a research setting and includes the application of the techniques in specialized fields, including agriculture, forestry, geology, and urban studies. Prereq: GEO 305 or equivalent, or consent of instructor.

**\*GEO 509 APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS. (3)**  
An extension of GEO 409G, this course covers GISs in greater detail. Material common to GISs will be covered in lecture, and students choose between becoming familiar with several GISs or making intensive use of one or two systems. Actual data will be used and actual spatial issues or problems will be addressed. The student will be responsible for data procurement and input, analysis design, and output production, including maps. Prereq: An introductory GIS course (e.g. GEO 409G) or permission of instructor.

**\*GEO 542 POLITICAL GEOGRAPHY. (3)**  
This course examines how space and political activities are related. Major topics will include: history of political geographic thought; geopolitics; nationalism and identity; the territorial state; regionalism; conflicts; borders and frontiers, and electoral geography, at a range of scales.

**\*GEO 544 HUMAN POPULATION DYNAMICS. (3)**  
The study of human population distributions, densities, and growth patterns through analyses of the processes of fertility, mortality and mobility. Topical coverage includes the environmental, social, political, economic, and behavioral impacts on personal action and population change. Emphasis is placed on historic and contemporary meanings and influences of population diversity, with special attention given to issues of gender, race, and class.

**\*GEO 545 TRANSPORTATION GEOGRAPHY. (3)**  
This course addresses concepts critical to understanding transport systems. Economic, social and political as well as spatial perspectives to transport matters are emphasized. Problems, issues and trends facing the sector in both the developed and developing world along with appropriate responses are paramount. Topics include the bases and impact of transport, communications, mass transit, Third World cities, regional development, shipping, railway policies, and the dynamics of airline survival. Prereq: GEO 455 or consent of instructor.

**GEO 547 GEOGRAPHY OF INFORMATION AND COMMUNICATIONS. (3)**  
The increasing role of information, communications, and telecommunications in the economic and social transformations in rural and urban areas. Topics include geographic influences on the growth of information industries, the diffusion of innovations and patterns in newspaper, radio and television systems on economic development, and impacts of satellites and computers on information availability. Prereq: GEO 172 or consent of instructor.

**\*GEO 550 SUSTAINABLE RESOURCE DEVELOPMENT AND ENVIRONMENTAL MANAGEMENT. (3)**  
A study of the theories and strategies for environmental management and sustainable development of resources. Topics covered include contemporary environmental degradation and resource use problems, political economy of resource use and environmental change, design and management of sustainable resource development, impact of sustainable development on gender issues and poverty, and environmental accounting. Prereq: GEO 130 or GEO 210 or consent of instructor.

**\*GEO 560 INDEPENDENT WORK IN GEOGRAPHY. (3)**  
Individualized study and/or research intended to provide opportunities for students to explore topics in more depth than is offered in existing courses, or to address topics not covered in existing courses. Students work with a faculty supervisor in defining a specific area of study, appropriate learning objectives, and suitable evaluation criteria. Course format may range from critical reading of selected literatures to innovative research projects. Students should identify and consult with faculty supervisor well in advance of registration for this course. Prereq: Restricted to Geography majors with GPA of 3.0 or above in the department.

**GEO 565 TOPICS IN GEOGRAPHY. (3)**  
Discussion, readings, and papers focusing on relevant topics in geography directed by a staff member having specific competence for the topics under study. Current research developments in particular geographic subfields will be stressed. May be repeated under different subtitles to a maximum of six credits. Prereq: Consent of instructor.

**GEO 585 AGING AND ENVIRONMENT. (3)**  
Explores the elderly person's changing experience of environment. Physiological, psychological and social changes are related to adjustment within urban and rural community environments, special housing for the elderly, and long-term care environments. Prereq: Graduate or advanced undergraduate standing and consent of instructor. (Same as FAM 585.)

**GEO 600 ANALYTICAL METHODS IN GEOGRAPHY. (3)**  
An introduction to the application of analytical methods to geographic problem solving. Topics cover sampling theory, probability theory and both parametric and nonparametric statistical techniques. Prereq: STA 570 or equivalent or consent of instructor.

- GEO 643 URBAN TRANSPORTATION PLANNING. (3)**  
A detailed review of the transportation planning process; inventory methodologies; trip generation, distribution and assignment with associated mathematical models and theories; prediction of future travel; land use models; modal split; developing and testing proposed systems; simulation. Prereq: CE 543 or equivalent and STA 381 or 681 or equivalent statistics course. (Same as CE 631.)
- GEO 655 SPECIAL STUDY OF SYSTEMATIC GEOGRAPHY. (3)**  
The application of the methods of systematic geography to particular special studies in topical areas, such as conservation, urban areas, climatology, cartography, or others. May be repeated to a maximum of six hours. Prereq: Appropriate 500-level course work in systematic or topical geography (e.g., conservation, urban, climatology, cartography).
- GEO 700 ADVANCED ANALYTICAL METHODS IN GEOGRAPHY. (3)**  
A survey of the application of multivariate statistical techniques to geographic problem solving. Prereq: GEO 600 or consent of instructor.
- GEO 702 CONCEPTS IN GEOGRAPHY. (3)**  
Contemporary geographic concepts and theories are examined with emphasis on concepts within human geography, especially with reference to the economic, urban, cultural, and population subfields within the discipline. Prereq: Graduate student status.
- GEO 707 SEMINAR IN DEVELOPMENT OF GEOGRAPHIC THOUGHT. (3)**  
An analytical review of the evolution of geographic thought, in terms of concepts, methodologies and scholars, emphasizing the basic literature through a series of topics. Prereq: Geography major or consent of instructor.
- GEO 710 RESEARCH METHODS AND METHODOLOGY IN GEOGRAPHY. (3)**  
A comprehensive review of the problems involved in designing geographical research, planning field work, analysis of data, and in writing geographic reports. Prereq: GEO 560 or equivalent.
- GEO 716 TOPICAL SEMINAR IN CULTURAL GEOGRAPHY (Subtitle required). (3)**  
Study of selected topics on historic preservation, landscape evolution, regionalism, ethnicity, religion, architecture, and settlement. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.
- GEO 717 TOPICAL SEMINAR IN ECONOMIC AND URBAN GEOGRAPHY (Subtitle required). (3)**  
Examination of selected topics on location-allocation models, transportation development and impacts, industrial location, financial geography, urban growth, and postindustrial economies. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.
- GEO 718 TOPICAL SEMINAR IN GEOGRAPHY OF ENVIRONMENT AND RESOURCES (Subtitle required). (3)**  
Study of selected topics on agriculture resource allocation, resource conflict, public land policy, natural hazards, environmental management, energy and biogeography. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.
- GEO 722 TOPICAL SEMINAR IN SOCIAL AND POLITICAL GEOGRAPHY (Subtitle required). (3)**  
Examination of selected topics on diffusion of diseases, health care delivery, the elderly, geopolitics, the nation-state, elections, squatters, suburbs, and impacts of technological hazards. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.
- GEO 723 TOPICAL SEMINAR IN GEOGRAPHY OF THE THIRD WORLD (Subtitle required). (3)**  
Study of selected topics on the cultural, economic, social, urban, political and environmental geography of Latin America, Middle East, Africa, South Asia, and Southeast Asia. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.
- GEO 740 INTERNSHIP IN APPLIED GEOGRAPHY. (3)**  
Academically and professionally supervised field experience in specific areas of planning and applied geography, for example, in private industry and government. May be repeated to a maximum of nine credits. Prereq: Consent of instructor.
- GEO 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

- GEO 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.
- GEO 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.
- GEO 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.
- GEO 772 SPECIAL RESEARCH PROBLEMS IN GEOGRAPHY. (1-6)**  
Open to doctoral candidates who have the necessary training and ability to conduct research on a selected problem. May be repeated to a maximum of 12 credits. Prereq: Approval of the director of graduate studies.

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## GER Germanic Languages and Literatures

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- GER 011 GERMAN FOR READING KNOWLEDGE. (0)**  
This course is designed to meet the needs of upper division and graduate students who are preparing for the graduate reading examination, who need a reading knowledge of German in their minor, or who require a review of German grammar.
- GER 101 BASIC GERMAN. (4)**  
Fundamentals of German with development of the four basic skills: reading, writing, listening, and speaking.
- GER 102 BASIC GERMAN. (4)**  
Continuation of GER 101. Prereq: GER 101, or one year of high school German, or equivalent.
- GER 111 ELEMENTARY GERMAN. (3)**  
The essentials of grammar with practice in reading and writing German (correspondence course).
- GER 112 ELEMENTARY GERMAN. (3)**  
Continuation of GER 111 (correspondence course). Prereq: GER 111 or one year of high school German.
- GER 201 INTERMEDIATE GERMAN. (3)**  
Systematic review of grammar and furthering of reading, writing, listening, and speaking skills based upon cultural and literary materials. Prereq: GER 102, or two years of high school German, or equivalent.
- GER 202 INTERMEDIATE GERMAN. (3)**  
Continuation of GER 201. Prereq: GER 201 or three years of high school German, or equivalent.
- GER 205 READING AND WRITING PRACTICE. (2)**  
This course concentrates on the development of reading and writing skills. Students learn to build vocabulary systematically and develop strategies for reading texts of varying kinds and levels of difficulty. Writing assignments ranging from brief descriptions and reports to translations and original compositions enable students to develop and sharpen writing skills. Prerequisite for upper division courses. Prereq or concur: GER 202 or equivalent.
- GER 206 ORAL PRACTICE. (2)**  
This course concentrates on the development of speaking and listening skills. Students learn to negotiate everyday communication situations by acquiring verbal strategies and idiomatic expressions needed for meaningful interaction in a German-speaking environment. Prereq or concur: GER 202 or equivalent.
- GER 211 GERMAN FOR READING KNOWLEDGE I. (3)**  
This is the first of a two-course sequence in German that will enable students to read any German texts they wish, from daily newspapers and magazines, to literary works, to scholarly prose in any discipline.

**GER 212 GERMAN FOR READING KNOWLEDGE II. (3)**

The course will confront students with a variety of texts of ever increasing difficulty. Students will be provided with the foundation necessary both for understanding the evolution of German literature, history, and culture, and with the reading skills necessary for them to use the language in their course work. Completion of the two-semester sequence will enable undergraduates to pursue a course of study leading to the proposed certificate in German studies. Prereq: GER 211, or GER 201 and permission of instructor or GER 202.

**GER 261 MASTERPIECES OF GERMAN LITERATURE IN TRANSLATION. (3)**

Focusing on major authors, the course traces the development of German literature along thematic lines. Representative works are read and discussed against the backdrop of German society, culture and intellectual history.

**GER 263 THE GERMAN CULTURAL TRADITION I. (3)**

An introduction to the social, intellectual and aesthetic traditions of German-speaking cultures from the Germanic past to the Enlightenment. Texts in English translation. Films with English subtitles to be viewed outside of regular class time.

**GER 264 THE GERMAN CULTURAL TRADITION II. (3)**

An introduction to the social, intellectual and aesthetic tradition of German-speaking cultures from the Enlightenment to the present. Texts in English translation. Films with English subtitles to be viewed outside of regular class time.

**GER 307 INTERMEDIATE GERMAN COMPOSITION AND CONVERSATION I. (3)**

This course develops listening, speaking and writing skills in German with emphasis on practical communicative needs. It includes a review of grammar, special oral and written projects, class discussion, and practice in a variety of written forms. Prereq: GER 205 or 206 or equivalent.

**GER 308 INTERMEDIATE GERMAN COMPOSITION AND CONVERSATION II. (3)**

Continuation of GER 307. Prereq: GER 307, or equivalent.

**GER 310 GERMAN FOR INTERNATIONAL BUSINESS AND PROFESSIONS. (3)**

This course will develop written and conversational skills based on communicative needs of international business and professions in German-speaking countries, using materials from banking, computer science, export-import, journalism, government and the public sphere. Prereq: GER 307 or permission of the instructor.

**GER 311 INTRODUCTION TO GERMAN LITERATURE: THEMES (Subtitle required). (3)**

An introductory course that explores such themes in German literature as Fathers and Daughters, Fathers and Sons, Trials, Judgments and Justice, and Conceptions of the Self. Readings will be drawn from various periods and major genres. Themes vary and will be announced. May be repeated once for a total of six credits by nonmajors if theme changes. Prereq: GER 205 or GER 206 or equivalent.

**GER 312 INTRODUCTION TO GERMAN LITERATURE: POPULAR FORMS. (3)**

An introductory course that focuses on social, political, anthropological and aesthetic aspects of popular forms of German literature. Readings include fairy tales, folk songs and legends, children's literature, detective stories, comics and other popular literary forms. Prereq: GER 205 or 206 or equivalent.

**GER 316 MASTERPIECES OF GERMAN LITERATURE II. (3)**

Continuation of GER 315. Taught in German. Prereq: GER 311 or 312 or equivalent.

**GER 317 HISTORY OF GERMAN CULTURE. (3)**

An introduction to German culture with emphasis on the epochs important to the development of modern German-speaking countries. Readings in German from philosophy, the sciences, the arts, history, politics and literature. Visual materials documenting high culture and everyday life. Taught in German. Prereq: GER 205 or 206 or equivalent.

**GER 319 CONTEMPORARY GERMAN LITERATURE AND CULTURE. (3)**

Selected works of post-war German literature by Austrian, East and West German, and Swiss authors are read relative to the economic, social, political, artistic and ideological developments in the four countries of the German-speaking world. Taught in German. Prereq: GER 205 or 206 or equivalent.

**GER 361 GERMAN CINEMA. (3)**

A history of the cinema in the German-speaking world from its beginnings to the present, emphasizing the evolution of the production, distribution and reception of film in relation to changing political, social, economic, ideological and literary/artistic contexts. Some consideration of film theory and criticism in conjunction with class discussion of individual films. Viewing of films (silent or German dialogue with English subtitles) outside of class is required. Class taught in English.

**GER 395 INDEPENDENT WORK IN GERMAN. (3)**

This course is designed for students who wish to do advanced work in German on any subject. May be repeated once. Prereq: Major and a standing of 3.0 in the department.

**GER 415G MAJOR GERMAN AUTHORS (Subtitle required). (3)**

The study of a single author or combination of authors in the social, political and cultural context of their day. Special concerns include the interrelationship between literary production and biography, and author's relation to literary tradition, and his or her historical as well as current relevance. May be repeated once to a maximum of six credits with a new author or complex of authors. Taught in German. Prereq: GER 311 or 312 or equivalent.

**GER 416G GENRES OF GERMAN LITERATURE. (3)**

The study of a particular genre in German literature with readings of representative examples and with inquiry into concepts of genre in general. May be repeated once to a maximum of six credits with emphasis on a different genre. Taught in German. Prereq: GER 311 or 312 or equivalent.

**GER 420G SPECIAL STUDIES IN GERMAN LITERARY AND CULTURAL HISTORY. (3)**

Intensive study of selected topics in German literary and cultural history, such as Fascism, War and Literature, Expressionism in Art and Literature, and German Women Authors: Behond Kinder, Küche, Kirche. Students are encouraged to propose topics. May be repeated once, if topic changes, for a maximum of six credits. Taught in German. Prereq: Senior standing or consent of instructor.

**GER 507 ADVANCED GERMAN COMPOSITION AND CONVERSATION. (3)**

Further development of conversational skill and practice in writing stylistically appropriate German. Study of finer points of grammar. Discussion of special topics and theme writing. Prereq: GER 308 or equivalent.

**GER 520 SPECIAL TOPICS SEMINAR. (3)**

Investigation of a topic pertinent to the advanced study of German language, literature and culture. May be repeated once with new topic. Prereq: GER 415G, 416G, 420G or equivalent.

**GER 532 HISTORY OF THE GERMAN LANGUAGE. (3)**

A survey tracing the development of German from its earliest stages to the present, with introduction to basic concepts of historical linguistics. Prereq: GER 308 or equivalent.

**GER 553 THE TEACHING OF GERMAN. (3)**

The course is designed for teachers and prospective teachers of modern foreign languages, with emphasis on German. Modern methodology, theory and practice of language pedagogy.

**GER 615 STUDIES IN MAJOR AUTHORS. (3)**

Explorations into one or several major figures of German literature. Reading of primary texts and pertinent scholarship together with an investigation of the authors' literary, social, or political significance during contemporary or later periods. May be repeated to a maximum of 12 credits.

**GER 616 STUDIES IN GENRE. (3)**

One major genre or a group of related genres. Readings in genre theory and in the key texts from various periods; study of the development of forms, techniques, and ideas. May be repeated to a maximum of nine credits.

**Note:** The series of courses GER 620-630 provides a general framework for the systematic study of German literature in its cultural setting and delimits various issues to be investigated further in corresponding 700-level courses. Readings and discussions focus on documents central to the literary life of a given period and to the understanding of its institutional and biographical basis as well as its regional, sociopolitical, motivational, poetological, and ideological diversity. Each course also emphasizes critical methodology and tools of scholarship and identifies new directions for basic research.

**GER 620 STUDIES IN THE MIDDLE AGES. (3)**

From Carolingian times to the late Middle Ages.

**GER 624 STUDIES IN THE 17TH CENTURY. (3)**

The Age of Baroque.



- GER 625 STUDIES IN THE 18TH CENTURY.** (3)  
Enlightenment to Classicism.
- GER 629 STUDIES IN THE 19TH CENTURY.** (3)  
Romanticism to Naturalism.
- GER 630 STUDIES IN THE 20TH CENTURY.** (3)  
Turn-of-the-century Modernism to the present.
- GER 653 RESEARCH AND ISSUES IN TEACHING GERMAN.** (1)  
This course builds on GER 553, Methods of Teaching German. The course will address a range of educational issues beyond the teaching of foreign language skills as well as acquaint students with research methods in both a theoretical and practical manner. May be repeated to a maximum of four semesters. Coreq: GER 553.
- Note:** The course series 720-730 offers the opportunity for the more specialized and greater in-depth investigation of various topics encountered in the corresponding, but more broadly conceived, period courses of the 620-630 series. With changes in topic, each course number of the 720-730 series can be repeated a total of three times—thus enabling the student at the more advanced level to specialize within a particular period or periods.
- GER 729 SPECIAL TOPICS IN THE 19TH CENTURY.** (3)  
May be repeated to a maximum of nine credits with different topics. Prereq: Permission of Director of Graduate Studies.
- GER 730 SPECIAL TOPICS IN THE 20TH CENTURY.** (3)  
May be repeated to a maximum of nine credits with different topics. Prereq: Permission of Director of Graduate Studies.
- GER 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.
- GER 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.
- GER 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.
- GER 781 SPECIAL STUDIES IN GERMAN.** (3)  
Selected studies and investigations in the German language and literature, permitting the student to work in areas of special interest, and providing opportunity for original endeavor. May be repeated to a maximum of 12 credits.

### SCANDINAVIAN

(Offered as required)

- GER 141 SWEDISH I.** (3)  
Introduction to Swedish with emphasis on grammar, pronunciation, reading and writing. Basic information on Swedish customs, history, geography, folklore. Students planning to fulfill part of a language requirement should be aware that the scheduling of Swedish III and IV will be subject to student demand and the availability of a qualified instructor.
- GER 142 SWEDISH II.** (3)  
Continuation of Swedish I with additional emphasis on conversation. Prereq: GER 141 or equivalent.
- GER 610 OLD ICELANDIC.** (3)  
Rapid coverage of morphology, phonology and syntax of Old Icelandic, with some attention to linguistic affinities within the Indo-European and Germanic groups of languages. Prereq: Reading knowledge of German; consent of instructor.

## GLY Geological Sciences

- GLY 101 PHYSICAL GEOLOGY.** (3)  
A first course in the principles of physical geology, including study of minerals and rocks, volcanoes and earthquakes, plate tectonics and the landforms of Earth's surface. Concur: GLY 111.

- GLY 102 HISTORICAL GEOLOGY.** (3)  
The history of Earth: its origin as part of the solar system, and the subsequent evolution of its atmosphere, continents, seas, and life as interpreted from the rock record. In addition to lecture illustrations, examples are presented by a three-hour field trip and several out-of-class exercises. Attention is given to the development of the basic principles used in interpretation. Prereq: GLY 101 and 111.

- GLY 111 LABORATORY FOR PHYSICAL GEOLOGY.** (1)  
Identification of minerals and rocks in hand specimens, interpretation of landscape features as shown on topographic maps, and an introduction to geologic maps. Laboratory, two hours per week. Concur: GLY 101.

- GLY 112 LABORATORY FOR HISTORICAL GEOLOGY.** (1)  
Interpretation of geological maps and cross-sections, and elementary study of important invertebrate fossil groups. One three-hour field trip required. Laboratory, two hours per week. Prereq or concur: GLY 102.

- GLY 140 GENERAL PHYSICAL GEOLOGY.** (4)  
A first course in the principles of physical geology, including topics from mineralogy, geochemistry, and geophysics. High school chemistry recommended. Lecture, three hours; laboratory, two hours. (Offered in Community College System only.)

- GLY 142 GENERAL HISTORICAL GEOLOGY.** (4)  
A first course in historical geology, including a study of the development of earth's fundamental features and a review of the history of life. Lecture, three hours; laboratory, two hours per week. Prereq: GLY 140 or 144. (Offered in Community College System only.)

- GLY 160 GEOLOGY FOR ELEMENTARY TEACHERS.** (3)  
The basic principles of geologic processes, materials and history with primary emphasis on inquiry-based laboratory and field activities. The course is designed in conjunction with PHY 160 to provide basic concepts of earth science, astronomy and physics appropriate for elementary school teachers. Lecture, one hour; laboratory, five hours per week. Credit may not be received for both GLY 101 and GLY 160.

- GLY 202 DINOSAURS AND DISASTERS.** (3)  
More than 65 million years ago, dinosaurs and their kin dominated the earth and relegated our mammalian ancestors to positions of unimportance for nearly 155 million years. This course traces the history of dinosaurs from early vertebrate ancestors to their final extinction and surveys the evolutionary, paleogeographic, environmental, and possible extraterrestrial causes for the rise to dominance and sudden fall. Along the way, dinosaur interactions with other organisms, various groups, and the new revolutionary view of dynamic, hot-blooded dinosaurs will be examined. Prereq: GLY 101/111.

- GLY 210 THE FINITE EARTH: AN INTRODUCTION TO ECONOMIC GEOLOGY.** (3)  
An introduction to the geology of earth resources (economic geology) including metals, industrial minerals, building materials, nuclear fuels, and fossil fuels: their origin, occurrence, distribution, methods of exploration and production, and global consumption. Prereq: GLY 101/111.

- GLY 225 FIELD METHODS IN GEOLOGY.** (3)  
An introduction to methods of observation, measurement, and mapping of rocks and structures in the field, including geologic map interpretation, hand specimen examination, and reporting skills in geology. Laboratory or field work, nine hours per week. Prereq or concur: GLY 101 and 111, GLY 102 and 112.

- GLY 240 ELEMENTARY GEOLOGY FOR ENGINEERS.** (3)  
An introduction to geologic materials and processes with emphasis on their application to engineering practice. Lecture, two hours; laboratory, three hours; one field trip required. Prereq or concur: CE 106.

- GLY 242 ENDANGERED PLANET: AN INTRODUCTION TO ENVIRONMENTAL GEOLOGY.** (3)  
Introduction to the study of the environment from a geological standpoint. An emphasis is placed on how man lives with hazards such as earthquakes, volcanoes, and floods and attempts to predict such events. Environmental problems that arise from the utilization of resources are examined, as are ways in which pollution problems could be minimized. Course material is presented in a way that allows the student to apply basic geologic concepts to current environmental issues. Prereq: GLY 101/111.

- GLY 260 MINERALOGY.** (4)  
The introductory study of minerals including classification, crystallography, physical and chemical properties, occurrence, association, and identification. Laboratory work includes study of hand specimens and optical methods of identification. Lecture, three hours; laboratory, three hours per week. Prereq: GLY 101 and 111, CHE 105.

- GLY 395 SPECIAL PROBLEMS IN GEOLOGY.** (1-3)  
Individual work on a special problem in geology. Report required. May be repeated to a maximum of six credits. Prereq: Consent of instructor.
- GLY 399 WORK EXPERIENCE IN GEOLOGICAL SCIENCES.** (1-6)  
Professional-level, pre-planned learning experience in geological sciences in the work place under the supervision of a faculty member. The student will complete work of the type done by professional geoscientists in the same setting. May be repeated to a maximum of six credits. Pass/fail only. Prereq: Approval of learning contract by faculty supervisor, director of undergraduate studies, and department chair.
- GLY 401G INVERTEBRATE PALEONTOLOGY AND EVOLUTION.** (3)  
Basic ecologic and evolutionary framework of common fossil invertebrate taxa. Major principles of paleontology, ecology, systematics, and evolution; and the use of fossils in paleoecology and biostratigraphy. Laboratory work in classification of common fossils. Lecture, two hours; laboratory, three hours per week. Prereq: GLY 102/112.
- GLY 420G STRUCTURAL GEOLOGY.** (4)  
An introduction to earth structures. Advanced geologic map interpretation. Prereq: GLY 225 or GLY 240, and PHY 201 or PHY 211 or PHY 231, or consent of instructor.
- GLY 423 FIELD WORK IN REGIONAL GEOLOGY.** (6)  
Geologic mapping in the field for a six-week period. Description, measurement, and mapping of a wide variety of rocks and structures, and analysis of geologic events in mountainous regions of the Rockies or Appalachians. Includes practice in writing geologic field reports. Offered only during the summer session. At least 40 hours of field-related work per week. Special fee. Prereq: GLY 225, GLY 420G and GLY 450G or consent of instructor.
- GLY 450G STRATIGRAPHY AND SEDIMENTATION.** (3)  
Basic principles and concepts of stratigraphy and sedimentation. Lithologic correlation and the interpretation of geologic history and paleogeography. Field and laboratory analysis of sedimentary rocks including megascopic and microscopic methods. Lecture, two hours; laboratory, two hours. Prereq: GLY 102 or equivalent course in historical geology.
- GLY 461 IGNEOUS AND METAMORPHIC PETROLOGY.** (4)  
Classification and origins of the common igneous and metamorphic rocks. Lecture material will emphasize the mineralogical, chemical, and physical equilibria within the earth. Laboratory topics will stress hand-specimen and microscopic petrography. Lecture, three hours; laboratory, three hours per week. Prereq: GLY 260.
- GLY 470 SENIOR SEMINAR (Subtitle required).** (1)  
A required seminar course for majors in the geological sciences. Each semester's seminar will be organized around a central theme chosen from research topics of wide interest in the geological sciences at the time. Presentations will be judged on the basis of oral skills and content. May be repeated to a maximum of two credits. Prereq: Senior standing in a Geological Sciences curriculum.
- GLY 511 PETROLEUM GEOLOGY.** (3)  
The origin and accumulation of petroleum and natural gas. A study of geological methods used in exploratory work. Geology of principal producing fields. Prereq: GLY 450G.
- GLY 513 REMOTE SENSING AND AERIAL PHOTOGRAPHY.** (3)  
Geological applications of remote sensing methods including aerial photography and satellite imagery in the visible and infrared wavelengths to geologic structure, mapping, mineral exploration and mine reclamation. Principles of aerial photography, structural and false color enhancement systems, side looking radar, the production of photo mosaics and photo maps and the planning of exploration programs using remote sensing. Lecture, two hours; laboratory, two hours per week. Prereq: GLY 144, GLY 420G, or consent of instructor.
- GLY 530 LOW TEMPERATURE GEOCHEMISTRY.** (3)  
An introduction to sedimentary and environmental geochemistry, including carbonate equilibria, coal and petroleum geochemistry, and the geochemistry of aqueous contaminants. Prereq: GLY 260 and MA 114 or consent of instructor.
- GLY 552 SEDIMENTARY PETROLOGY.** (3)  
Detailed description of sedimentary rock types, their origin and classification. Megascopic and microscopic examination of textures and structures of sediments. Mineralogy of sediments and the significance of sedimentary environments. Lecture, two hours; laboratory, two hours. Prereq: GLY 260 and STA 291 or STA 370.
- GLY 555 STRATIGRAPHY.** (3)  
Principles of stratigraphy, depositional systems, sequence stratigraphy, and tectonic framework of sedimentation. Prereq: GLY 552.

- GLY 570 SEMINAR IN GEOLOGICAL SCIENCES (Subtitle required).** (1)  
A general seminar in a broad range of topics in the geological sciences. May be repeated to a maximum of six credits under different subtitles. Prereq: GLY 470 or graduate standing in Geological Sciences.
- GLY 571 APPLICATION OF POTENTIAL METHODS IN APPLIED GEOPHYSICS.** (3)  
A review of electrical, gravity, and magnetic field methods used in exploration geophysics. Course includes an assigned field problem involving geophysical techniques. Lecture, two hours; laboratory, two hours. Lectures are presented more frequently when field trips are not scheduled. Prereq: MA 114 and PHY 231.
- GLY 572 EXPLORATION SEISMOLOGY.** (3)  
An introduction to exploration seismology with emphasis on the fundamentals of gathering, processing and interpretation of seismic data. The course includes the application of ray theory, Fourier and Z-transforms, and spatial filtering techniques as used in seismic exploration. Prereq: MA 114 and PHY 231.
- GLY 575 GEODYNAMICS.** (3)  
A quantitative review of deformation and heat transfer processes encountered in the study of the earth's crust and upper mantle. Prereq: PHY 211 or 201, MA 114 and GLY 420G.
- GLY 579 GROUNDWATER GEOPHYSICS.** (3)  
Application of geophysical methods to groundwater exploration, emphasis is placed on the use of potential fields in the analysis of groundwater aquifers. Lecture, two hours; laboratory, three hours per week. Prereq: GLY 365 or consent of instructor.
- GLY 585 HYDROGEOLOGY.** (3)  
A study of the physical aspects of groundwater, including regional flow, well hydraulics, and computer simulation. Prereq: GLY 101 and MA 114.
- GLY 617 ORGANIC PETROLOGY.** (3)  
The geochemical and paleobotanical origin of coal macerals and kerogen. Topics will include: petrology of coal and peat; organic metamorphism; petrology of dispersed organics, including oil shales; inorganic constituents in coal and organic-rich shales; and applications to industrial and geologic problems. Prereq: GLY 515 or consent of instructor.
- GLY 620 TECTONICS.** (3)  
A study of the structural features of the earth's crust with an analysis of the mechanics involved. Prereq: PHY 211, 213; GLY 420G.
- GLY 624 MESOSCOPIC STRUCTURES.** (3)  
The analysis of structures of mesoscopic and microscopic scales in deformed rocks and their extrapolation to large scale structures. Emphasis is placed on mechanisms, kinematics, and processes. Topics include: strain analysis in shear zones; microstructural evolution of mylonites; rock rheology; deformation mechanisms in the continental crust. One four-day field trip required. Prereq: GLY 420G.
- GLY 628 BASIN ANALYSIS SEMINAR.** (3)  
Methods of analysis of large sedimentary volumes from the point of view of mineral exploration. Prereq: Consent of instructor.
- GLY 654 PETROLOGY OF CARBONATE ROCKS.** (3)  
The composition, classification, and interpretation of environments of deposition and diagenesis of carbonate rocks and modern carbonate sediments. Lecture, two hours; laboratory, three hours. Prereq: GLY 450G.
- GLY 670 SELECTED TOPICS IN GEOPHYSICS.** (3)  
Study of topics of current interest in geophysics. Subject matter will vary from term to term. May be repeated to a maximum of 12 credits. Lecture, two hours; laboratory, two hours. Prereq: GLY 571 or 572.
- GLY 671 EARTHQUAKE SEISMOLOGY.** (3)  
A study of wave propagation and earthquake phenomena stressing both theory and delineation of earth structure. Lecture, two hours; laboratory, two hours. Prereq: GLY 572.
- GLY 703 PALEOECOLOGY/PALEONTOLOGY SEMINAR (Subtitle required).** (1-3)  
Discussion and study of advanced topics in paleoecology or paleontology and related fields. One or more field trips required. May be repeated to a maximum of six credits. Prereq: GLY 602 or equivalent or consent of instructor.
- GLY 715 COAL GEOLOGY SEMINAR.** (2)  
Seminar discussion and presentation of current work in coal geology from current literature or ongoing research. May be repeated to a maximum of eight credits. Prereq: GLY 515 or 617 or consent of instructor.

- GLY 720 GRADUATE TECTONICS SEMINAR.** (3)  
Discussion and study of advanced topics in tectonics. May be repeated to a maximum of 12 hours. Prereq: GLY 620 or consent of instructor.
- GLY 741 CLAY MINERALOGY.** (3)  
A comprehensive study of the crystal structures of clay minerals commonly found in soils and sediments. Lecture and discussion, three hours. Prereq: GLY 260 or consent of instructor. (Same as AGR 741.)
- GLY 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.
- GLY 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.
- GLY 750 SEDIMENTOLOGY/STRATIGRAPHY SEMINAR (Subtitle required).** (1-3)  
Discussion and study of advanced topics in sedimentology or stratigraphy emphasizing current problems or topics pertinent to the sedimentology or stratigraphy of Kentucky and adjacent areas. One or more field trips required. May be repeated to a maximum of six credits. Prereq: GLY 450G, 552, or consent of instructor.
- GLY 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.
- GLY 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.
- GLY 780 MODELING IN HYDROGEOLOGY.** (3)  
Seminar in modeling and computational algorithm hydrogeology. Two or three computer modeling programs are applied to hydrogeological programs. May be repeated to a maximum of six credits. Prereq: GLY 685.
- GLY 782 INDIVIDUAL WORK IN GEOLOGY.** (1-3)  
Problems involving independent laboratory and/or library study conforming to the student's special interest under the direction of an appropriate staff member having proficiency in the area selected. May be repeated to a maximum of nine credits. Prereq: Geology major with graduate standing.
- GLY 787 RESEARCH IN HYDROGEOLOGY AND LOW-TEMPERATURE GEOCHEMISTRY.** (3)  
Laboratory and/or field research, literature study, discussion, and/or reports in one or both of these fields selected on the basis of the student's needs. May be repeated to a maximum of nine credits. Prereq: GLY 530, GLY 655, and consent of instructor.
- GLY 790 RESEARCH IN GEOLOGICAL SCIENCES.** (0-6)  
Research in the geological sciences. May be repeated to a maximum of twelve credits. Prereq: Approval of instructor and Director of Graduate Studies.

## GRN Gerontology

- GRN 513 GERIATRIC PHARMACY.** (3)  
A course designed to educate students in the basic knowledge of attitudes and skills required to meet the pharmaceutical needs of the elderly. Topics include discussions of the aging process, physiological and psychological changes in the elderly, how these changes influence patient compliance and the responses to drug and nondrug treatments, monitoring drug use in long-term care facilities, and special community services available to the elderly. Prereq: PHR 849, 852, 853, 854 and 856 or permission of instructor. (Same as PHR 813.)
- GRN 600 A STUDY OF THE OLDER PERSON.** (3)  
This will be a didactic/experiential course designed to give the student an overview of the effects of the aging process on the individual person. Didactic lectures will focus on the psychological, social and biological impact of aging. The experiential component will consist of having the students interact with healthy elderly individuals from Donovan Scholars Program, the Sanders-Brown subject registry, and individuals suffering from diseases related to aging.

- GRN 610 AGING AND BIOMEDICAL ETHICS.** (3)  
This seminar will address the dominant medico-ethical issues surrounding the elderly. The issues will include concerns for the autonomy of the elderly; competency and decisional impairment; surrogate health care decision making; the role of families and elderly relatives; ethical and legal issues regarding the use of life-sustaining procedures such as mechanical ventilation, resuscitation and DNR orders, and nutritional support and hydration; decisions to enter nursing home and rights of nursing home residents; costs of health care to the elderly and costs of long term care; and critical ethical issues in conducting research involving elderly persons.
- GRN 612 BIOLOGY OF AGING.** (3)  
A multidisciplinary discussion of how the process of aging affects biological systems. Coverage will be quite broad and includes topics such as subcellular and cellular aging, genetics, immunology, anatomy and physiology, animal model of aging, etc. Prereq: Enrollment in a graduate program of a biomedical science department or consent of instructor. (Same as ANA/BIO 612.)
- GRN 620 HUMAN AGING AND ADJUSTMENT.** (6)  
The second core course of the Gerontology Ph.D. program is designed to provide students with an holistic examination of human aging and health. Five broad focal themes, combining perspectives from the biomedical and the social and behavioral sciences, will provide the framework for this course. These themes include the historical context of aging, theories of aging, individual experience of aging, aging of societies, and aging and health. Prereq: GRN 600.
- GRN 643 BIOMEDICAL ASPECTS OF AGING.** (3)  
A survey of the normal age-associated changes in biological function, the major disease entities found in the older population, and how the health care delivery system presently addresses these issues. Prereq: Graduate status or permission of the instructor. (Same as SW 643.)
- GRN 650 RESEARCH METHODS IN GERONTOLOGY.** (3)  
This course will provide training in research methods appropriate for the study of aging and the aged and will critically assess special considerations involved in studying this population. Topics to be covered will include: data sources for research on aging (including medical informatics and clinical epidemiology sources); the use of animal models in aging research; research designs for the study of aging [reconciling age, period, and cohort effects]; longitudinal research; measurement tools for assessing the elderly [functional assessment, ADLs, life satisfaction scales, etc.] issues in interviewing older people; qualitative methods in aging research; the ethics of research on aging and the aged. Prereq: STA 570 or equivalent.
- GRN 710 AGING OF THE NERVOUS SYSTEM.** (3)  
This course will examine the alterations in the brain that occur with aging and in neurodegenerative disorders such as Alzheimer's disease. The emphasis will be on human aging although the relevance of animal models to studies of human aging will be a recurrent theme. The course will examine aging at several levels, including molecular, cellular, organismic, and behavioral. Prereq: GRN 620. A strong background in the basic sciences.
- GRN 715 HEALTH POLICY AND AGING.** (3)  
This course will present an overview of health policy in the United States as it affects the older population. It will provide an overview of the health care system, allocation of health services across the population and projected impact of the increase in the aging population on health care delivery. Various health policy proposals will be analyzed with a focus on their impact on the older population. Prereq: GRN 600 and GRN 620.
- GRN 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.
- GRN 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.
- GRN 780 APPLIED RESEARCH PRACTICUM I.** (1)  
This course is designed to provide students an opportunity to serve as an intern within a clinic, service agency or organization which provides services to older persons. The student will gain in-depth experience in the organization and an introduction to problems in applied research. The course will be taken in conjunction with GRN 790. Prereq: GRN 600, GRN 620, GRN 650.
- GRN 781 APPLIED RESEARCH PRACTICUM II.** (1)  
The course provides an opportunity for students to serve as an intern in a clinic, service agency or organization which provides services to older persons. Students will identify a research problem within the organization and complete a research project. The course will be taken in conjunction with GRN 791. Prereq: GRN 780.

**GRN 785 INDEPENDENT RESEARCH IN GERONTOLOGY. (3)**

Independent research involving completion of a major research project resulting in a manuscript of publishable quality. Under the supervision of a Gerontology Program faculty member, this will involve review of appropriate literature, problem formulation, research design, data collection, data analysis and report writing on a topic in gerontology. Prereq: GRN 600 and GRN 620.

**GRN 790 INTEGRATIVE RESEARCH SEMINAR I. (3)**

This seminar will involve students and gerontology program faculty in in-depth exploration of major health and aging-related issues. The substantive focus will be a series of specific topical problems, such as health care access, housing, long-term care, preventive health care, etc. The problem areas will be explored from a variety of disciplinary research perspectives. Prereq: Extensive research methods background.

**GRN 791 INTEGRATIVE RESEARCH SEMINAR II. (3)**

This seminar is the second in a two-course sequence focusing on selected topics in aging. In this segment, students will participate in a research seminar team. A major gerontological issue with multidisciplinary implications (e.g. stroke, Alzheimer's disease, etc.) will be identified. Each member of the seminar team will identify a particular aspect of the topic and conduct a research project. Each member's findings will be integrated into a comprehensive research report on the topic. Prereq: GRN 790.

**GS The Graduate School**

**GS 600 SPECIAL TOPICAL GRADUATE COURSE. (1-3)**

An interdisciplinary, topical or experimental course to be approved by the Dean of the Graduate School. A particular course can be offered no more than twice under the number GS 600. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**#GS 650 PREPARING FUTURE FACULTY. (1)**

Preparing Future Faculty is designed to introduce graduate students to the roles and responsibilities of the college teacher and to assist them in understanding the variety of institutions in which effective teaching takes place. Students will focus on the academic expectations, institutional identities, and particular policies and procedures which characterize different types of institutions of higher learning. Skills to help students apply for positions and achieve success in their appointments will also be addressed. Lecture, two hours per week.

**HA Health Administration****HA 600 EPIDEMIOLOGY. (3)**

A study of the natural history of disease. (Same as HSM 600.)

**HA 601 OVERVIEW OF THE HEALTH CARE DELIVERY SYSTEM. (3)**

An introduction to the health care delivery system in the United States, including its composition, functioning, the interrelationships of organizations and professional groups within the system in various settings, health care terminology, and major problems and issues in the delivery of health services. Prereq: MHA/MPA program status. (Same as HSM 601/PA 671.)

**\*HA 602 STRATEGIC PLANNING AND MANAGEMENT OF HEALTH CARE ORGANIZATIONS. (3)**

This course is designed to focus on the future needs of the health care organization as contrasted to day-to-day operational management. Topics include basic strategic planning theory, the process of strategic plan development, specific methods of analysis including environmental and organizational analysis and appropriate analytical techniques. Several health care trends such as restructuring, innovation in health care delivery and financing and performance measurements will be illustrated through case analysis in a variety of provider settings. Prereq: MHA status and HA 601, HA 621 and HA 642. (Same as HSM 602.)

**HA 603 LEGAL ASPECTS OF HEALTH ADMINISTRATION. (3)**

The course will familiarize students with the application of law to management issues in health care organizations. Skills including terminology, legal reasoning, the tools of law, and topics specific to the health care setting are addressed. Prereq: MHA program status and HA 601. (Same as HSM 603.)

**HA 621 QUANTITATIVE METHODS OF RESEARCH. (3)**

A survey of behavioral science research methods for the public administrator. Emphasis is placed upon problem selection and identification, research design, and data analytic techniques. Prereq: MPA or MHA program status; prereq or concur: completion of MPA or MHA computer skills program requirement. (Same as PA 621.)

**HA 622 MENTAL HEALTH ADMINISTRATION. (3)**

This course focuses upon the administration of local mental health agencies, facilities and coordination of deinstitutionalization programs, e.g., group houses, halfway houses. The course will focus upon system coordination, finance and communication. Prereq: MHA/MPA program status. (Same as HSM 622.)

**\*HA 623 DECISION ANALYSIS. (3)**

An introduction to organizational decision making under conditions of uncertainty, risk, and certainty. Concepts of analysis from the areas of economics, mathematics, and statistics will be utilized in terms of administrative decision making in public administration. Prereq: PA 621. (Same as PA 623.)

**\*HA 624 QUALITY METHODS AND INFORMATION SYSTEMS IN HEALTH CARE. (3)**

This course will focus on the total quality management (TQM) concept and its applicability to health services organizations. The information systems and statistical central techniques required to support the effort will be covered along with the history of the Quality Assurance (QA) function. Prereq: HA 601, HA 621 and HA 635. (Same as HSM 624.)

**HA 632 PUBLIC FUNDS MANAGEMENT. (3)**

A study of the management of public funds including the accumulation, management and investment of such funds and the accounting for those transactions. It will also include topics such as fund accounting, cash forecasting, cash management practices and public funds investment strategies. Prereq: MPA or MHA program status; prereq or concur: completion of MPA or MHA computer skills program requirement. (Same as PA 632.)

**\*HA 635 MANAGEMENT ACCOUNTING FOR HEALTH CARE ORGANIZATIONS. (3)**

This course is designed to introduce the use of management accounting techniques to decision making in health care organizations. Lectures, problems and cases will be used to provide an opportunity to focus on the various types of health care providers. Prereq: MHA/MPA program status and HA 601 and HA 621. (Same as HSM 635.)

**HA 636 HEALTH ECONOMICS. (3)**

This course applies general theoretical principles of economics to the health care sector. The basic approach is to recognize the importance of scarcity and incentives, allowing for differences peculiar to health. The demand and supply of health and medical care are examined as they involve physicians, nurses and hospitals. The competitiveness of their markets, health insurance and the role of government are explored. Special topics include regulation and planning, benefit-cost analysis, and reform health plans. Prereq: PA 652, HA 601, HA 621, MHA or MPA program status. (Same as ECO/PA 636.)

**HA 637 HEALTH FINANCE. (3)**

This course applies general principles of finance to the financial management of health care institutions. The major financial incentives which dictate how health care is delivered are studied and proposals to change these incentives are explored. Prereq: MHA/MPA program status and HA 601, HA 621, PA 623, HA 635. (Same as FIN/PA 637.)

**HA 642 PUBLIC ORGANIZATION THEORY AND BEHAVIOR. (3)**

A course which examines the interaction of both external and internal resources and constraints upon the administrative decision processes in a number of public organizational settings. The objective is an understanding of the practice of administration in public organizations. Prereq: MPA or MHA program status and HA 601. (Same as PA 642.)

**HA 652 PUBLIC POLICY ECONOMICS. (3)**

Principles and practices of economical resource management in the governmental sector: tax and expenditure types, intergovernmental fiscal cooperation, debt financing, budgeting and financial planning. Prereq: MPA or MHA program status and HA 601 and HA 621. (Same as ECO/PA 652.)

**HA 656 HEALTH PROGRAM EVALUATION. (3)**

A study of the tools necessary for planning and evaluating health programs: planning systems, needs assessment methodologies, data analysis skills, the epidemiologic method, effectiveness and efficiency evaluation. An overview of trends and requirements leading to increased emphasis on planning and program accountability. Prereq: MHA/MPA program status, HA 601, HA 621, PA 623, and HA 635. (Same as PA 656.)

**HA 660 DECISION MAKING IN HEALTH CARE ORGANIZATIONS. (3)**

This course is designed to build on the concepts and techniques introduced in the MHA curriculum and integrate them with a decision making focus in a variety of health care problems and settings. Case analysis will be used extensively to develop an opportunity for the student to learn to apply the appropriate skills to an unstructured environment. Prereq: MHA program status and must be taken in last semester of MHA program studies. (Same as HSM 660.)

**HA 673 HEALTH POLICY DEVELOPMENT. (3)**

An analysis of the development and implementation of health policy on a national, state, local and organizational level. The course will focus on issue and policy analysis, formal and informal processes of policy development and the issues, values, and political and community factors affecting policy development and program implementation. Prereq: HA 601 and one of the following courses: HA 611, 621, or 622 and MHA/MPA program status. (Same as PA 673.)

**HA 711 RESIDENCY IN HEALTH ADMINISTRATION. (3)**

Practical field experience in a health administrative setting under the direction of an academic and a workplace supervisor. Prereq: MHA/MPA program status. (Same as HSM 711.)

**HA 775 SPECIAL TOPICS IN HEALTH ADMINISTRATION. (1-3)**

An analysis of selected issues with special significance for health administration. Prereq: MPA/MHA program status. (Same as HSM/PA 775.)

**HA 785 INDEPENDENT STUDY IN HEALTH ADMINISTRATION. (1-3)**

Supervised individual research on a topic related to health administration selected by the student. May be repeated to a maximum of six credits. Prereq: Consent of instructor. (Same as HSM/PA 785.)

## HDI Human Development Institute

### HDI 600 INTERDISCIPLINARY APPROACHES TO THE NEEDS OF CHILDREN WITH DISABILITIES AND SPECIAL HEALTH CARE NEEDS. (2)

This course provides a base of core knowledge and experience in interdisciplinary services and supports for children with disabilities and/or special health care needs and their families. This course is structured in an interdisciplinary seminar format, illustrating the application of each discipline's expertise to the needs of children with disabilities and their families. Lecture, three hours per week. Prereq: Graduate standing.

### HDI 601 INTERDISCIPLINARY APPROACHES TO THE NEEDS OF CHILDREN WITH DISABILITIES AND SPECIAL HEALTH CARE NEEDS: PRACTICUM. (2)

This course provides the experiential basis for HDI 600. Participants engage in a wide range of structured site visits and other university-based clinical and community-based learning experiences, related to services and supports for children with disabilities and/or special health care needs and their families. Lecture, one hour; laboratory, three hours per week. Prereq: Graduate level standing and acceptance in MCH Leadership Program; concurrent enrollment in HDI 600.

### HDI 602 INTERDISCIPLINARY SUPPORTS. (2)

This course will build on the disciplinary clinical competence of participating students and enhance their knowledge and skills related to specific issues regarding the needs of children with disabilities and other special health care needs. Topics covered include: Epidemiology, Prevention of Developmental Disabilities, Micro Environment, Early Intervention, School Age and Adult Issues, Cultural Diversity, the Rural and Underserved Population, Politics, Law and Health Care Reform Issues and Advocacy. Prereq: Graduate standing, completion of HDI 600.

### HDI 603 INTERDISCIPLINARY SUPPORTS PRACTICUM. (2)

This core course for the HDI-UAP-MCH Interdisciplinary Training Program will provide the experiential base for HDI 602. The course will include practica experiences in interdisciplinary assessments, as well as a long-term individualized student practicum. The practicum seminars will focus upon problem-solving strategies in providing high quality supports to children and youth with disabilities and their families. Lecture, one hour every two weeks; laboratory, 12 hours per week. Prereq: Graduate standing, completion of HDI 600 and 601, concurrent enrollment in HDI 602.

### HDI 604 INTERDISCIPLINARY LEADERSHIP SEMINAR. (2)

This course will provide a base of core knowledge and experiences in leadership, systems change, strategic planning, proposal development, group facilitation, conflict resolution, and interagency collaboration principles and strategies. These topical areas effectively represent key functions for those who would assume leadership roles in promoting inclusive, community supports for children with disabilities and their families. The course will utilize faculty and Institute staff from a wide range of disciplines. Prereq: Graduate standing, consent of instructor.

### HDI 605 INTERDISCIPLINARY LEADERSHIP PRACTICUM. (2)

This culminating core course for the HDI-UAP-MCH Interdisciplinary Training Program will provide the experiential base for HDI 604. This course will include the trainee's individually designed leadership project. As a final requirement for this course, the student will be required to develop a Leadership Project Summary, and make a class presentation on the Leadership Project. Laboratory, ten hours per week. Prereq: HDI 600, 601, 602, 603; and concurrent enrollment in HDI 604.

## HEE Home Economics Education

### HEE 210 INTRODUCTION TO VOCATIONAL EDUCATION. (3)

The history, status, philosophy, and objectives of vocational education in relation to general education. (Same as AED 210.)

### HEE 362 PRACTICUM IN VOCATIONAL EDUCATION, AGRICULTURAL COMMUNICATIONS, AND LEADERSHIP. (3)

Supervised experiences in schools, businesses and agencies. Required of all Agricultural Education, Communications, Leadership and Home Economics Education majors. Includes observation, participation, experience, field trips, inspection of programs and professional organizations. May be repeated to a maximum of nine credits. Prereq: Junior standing. (Same as AED/AGC/SOC 362.)

### HEE 501 PRACTICUM IN VOCATIONAL EDUCATION. (1-12)

Planned and supervised practicum in teaching, extension, governmental agencies, etc. Requires the integration of observation skills, development and use of objectives, using instructional strategies, developing effective interpersonal skills, using appropriate communication skills, developing a portfolio, selecting instructional materials, and evaluating instruction. Regularly scheduled seminars included as an integral part of course. May be repeated to a maximum of 12 credits. Prereq or concur: HEE/AED 586 or consent of instructor. (Same as AED 501.)

### HEE 535 PRINCIPLES AND PHILOSOPHY OF VOCATIONAL EDUCATION. (3)

Study is made of philosophy, accepted principles, and legislation affecting programs in vocational education. (Same as AED 535.)

### HEE 580 METHODS OF TEACHING VOCATIONAL EDUCATION I. (3)

Development of teacher competency in methods of teaching with emphasis on the problem-solving procedure and use of demonstrations, field trips, and audiovisual materials; evaluation of teaching-learning principles, studies of facilities and instructional materials needed in a vocational education program. Prereq: Permission of instructor. (Same as AED 580.)

### HEE 586 METHODS IN TEACHING VOCATIONAL EDUCATION II. (3)

A study of teaching methods, curriculum development, basic skills integration, utilization of resources, working with special needs students, and professional responsibilities of the vocational education teacher. Prereq: Consent of instructor. (Same as AED 586.)

### HEE 590 PROBLEMS IN VOCATIONAL EDUCATION. (3)

Problems in teaching vocational education for high school students and adults. May be repeated twice for a maximum of nine credits. Prereq: Permission of instructor. (Same as AED 590.)

### HEE 670 ADVANCED METHODS IN TEACHING VOCATIONAL EDUCATION. (3)

The principles of method applied to teaching in the field of vocational education. Prereq: Experience in teaching vocational education. (Same as AED 670.)

### HEE 671 YOUTH ORGANIZATIONS IN VOCATIONAL EDUCATION. (3)

A study of the underlying philosophy and principles for organizing and advising youth organizations in vocational education. Emphasis to be placed on activities which will enrich and motivate the instructional programs and which will develop leadership, cooperation and citizenship. (Same as AED 671.)

### HEE 672 CURRICULUM CONSTRUCTION IN VOCATIONAL EDUCATION. (3)

A study of the principles of curriculum building with an emphasis on development of curriculum in home economics and agriculture education from middle school to adult levels. (Same as AED 672.)

### HEE 678 SELECTING TEACHING MATERIALS. (3)

Selection and organization of specific references and other instructional materials to be used in teaching an area of vocational education. (Same as AED 678.)

### HEE 679 ADULT EDUCATION IN VOCATIONAL EDUCATION. (3)

Preparation for teaching adult classes in vocational education including organization of classes, development of curriculum, and methods of teaching. (Same as AED 679.)

### HEE 680 DIRECTING EXPERIENCE PROGRAMS IN VOCATIONAL EDUCATION. (3)

Directing experience programs including projects, activities, internships, and co-op education. Such areas as setting standards, planning, supervision, records, and evaluation will be discussed. (Same as AED 680.)

### HEE 684 CURRENT TRENDS IN VOCATIONAL EDUCATION. (3)

Class work in current trends and significant developments in vocational education. May be repeated to a maximum of nine credits. (Same as AED 684.)

### HEE 686 EVALUATION IN VOCATIONAL EDUCATION. (3)

A course to acquaint teachers of vocational education with techniques used in measuring attainment in vocational education in middle and high school, college, and adult education. Prereq: Teaching experience. (Same as AED 686.)

**HEE 694 THE ADMINISTRATION OF VOCATIONAL EDUCATION. (3)**  
A course designed for superintendents, high school principals, and other administrators. Its purpose is to train for administering and supervising vocational education in schools. (Same as AED 694.)

**HEE 695 SPECIAL PROBLEMS IN VOCATIONAL EDUCATION. (3)**  
An independent work course for students interested in vocational education. Students make individual investigations and report on special problems. (Same as AED 695.)

**HEE 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours. (Same as AED 768.)

**HEE 779 SEMINAR IN VOCATIONAL EDUCATION. (1-3)**  
A critical study of selected problems in vocational education. The course is open only to students with experience in the field. May be repeated to a maximum of nine credits. (Same as AED 779.)

**HEE 789 INDEPENDENT WORK IN VOCATIONAL EDUCATION. (1-3)**  
An independent work course for students who have completed a minimum of 12 semester hours of graduate work, one-half of which must have been in vocational education. May be repeated to a maximum of nine credits. (Same as AED 789.)

**HEE 799 RESEARCH IN VOCATIONAL EDUCATION. (1-3)**  
Individual research of importance to vocational education. May be repeated to a maximum of nine credits. (Same as AED 799.)

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## HES Human Environmental Sciences

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**HES 100 AN INTRODUCTION TO PROFESSIONS IN HUMAN ENVIRONMENTAL SCIENCES. (1)**  
An orientation to human environmental sciences, its contemporary issues, national development and philosophy, unifying concepts, areas of specialization, unique elements, leaders and professional organizations.

**HES 300 SPECIAL COURSE IN HUMAN ENVIRONMENTAL SCIENCES (Subtitle required). (1-3)**  
Interdisciplinary, topical or experimental course to be approved by the appropriate department chairperson and by the Dean of the College of Human Environmental Sciences. Open to all University students, subject to limits or prerequisites set by the instructor. May be repeated to a maximum of six credits.

**HES 320 SURVEY OF AGRICULTURE AND CONSUMER MEDIA. (3)**  
An exploration of the social, political, and economic factors that influence how agricultural producers and consumers receive information through the media. In addition, the course will analyze how the general mass media cover agricultural and consumer topics. (Same as AGC 320.)

**HES 400 CONCEPTS IN HUMAN ENVIRONMENTAL SCIENCES: INTEGRATION AND APPLICATION. (2)**  
Interdisciplinary approach to the solution of family and individual problems. Application of concepts from the developmental, relational, managerial, nutritional, and environmental studies within the college and support disciplines. Prereq: HES 100, senior standing in the College of Human Environmental Sciences, and consent of instructor (via permit).

**HES 596 SPECIAL PROBLEMS IN HUMAN ENVIRONMENTAL SCIENCES. (1-3)**  
Intensive work on specific topics in human environmental sciences. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**HES 600 RESEARCH METHODOLOGY IN HUMAN ENVIRONMENTAL SCIENCES. (3)**  
Students will study scientific techniques and accepted research methodologies in human environmental science research. Emphasis is placed on understanding the research process and developing the skills necessary to evaluate and implement research methods and design procedures. Prereq: Graduate standing. (Same as DMT 600.)

**HES 786 ADVANCED PROBLEMS IN HUMAN ENVIRONMENTAL SCIENCES. (1-3)**  
Advanced work in specific topics in human environmental sciences. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

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## HIS History

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### I. INTRODUCTORY COURSES

**HIS 104 A HISTORY OF EUROPE THROUGH THE MID-SEVENTEENTH CENTURY. (3)**  
This course is a survey of the development of European politics, society, and culture through the Age of Religious Conflict.

**HIS 105 A HISTORY OF EUROPE FROM THE MID-SEVENTEENTH CENTURY TO THE PRESENT. (3)**  
This course is a survey of the development of European politics, society, and culture from the Age of Absolutism to the present. It is a continuation of HIS 104.

**HIS 106 WESTERN CULTURE: SCIENCE AND TECHNOLOGY I. (3)**  
Presents the interactions of science and technology with the social and cultural development of Western civilization; the values in scientific inquiry as compared with other kinds of inquiry; the importance of science and technology in modifying social organization and human expectations. Emphasizes the period to the Industrial Revolution.

**HIS 107 WESTERN CULTURE: SCIENCE AND TECHNOLOGY II. (3)**  
Presents the interactions of science and technology with the social and cultural development of Western civilization; the values in scientific inquiry as compared with other kinds of inquiry; the importance of science and technology in modifying social organization and human expectations. Emphasizes the period since the Industrial Revolution.

**HIS 108 HISTORY OF THE UNITED STATES THROUGH 1865. (3)**  
This course traces the nation's development through the Civil War. It is designed to meet the demands for a general understanding of American history. This course fulfills the requirements for the elementary teachers' certificate.

**HIS 109 HISTORY OF THE UNITED STATES SINCE 1865. (3)**  
A continuation of HIS 108, from 1865 to the present.

**HIS 120 THE WORLD AT WAR, 1939-45. (3)**  
A global overview of the events of the Second World War, including consideration of the conflict's military, diplomatic, political, social and economic dimensions.

### II. UNDERGRADUATE SEMINARS, STUDIES AND INDEPENDENT WORK

**HIS 316 JUNIOR SEMINAR: HISTORICAL METHOD AND LITERATURE. (3)**  
An introduction to research and writing in the field of history with attention given to the problems of historical thought and interpretation. Preferably to be taken during the first semester of the junior year. Required of all history majors.

**HIS 330 A HISTORY OF WESTERN RELIGIOUS THOUGHT (I). (3)**  
A history of Judeo-Christian religious thought from the rise of Judaism through the Protestant Reformation.

**HIS 331 A HISTORY OF WESTERN RELIGIOUS THOUGHT (II). (3)**  
The history of Judeo-Christian religious thought from the Protestant Reformation to present.

**HIS 350 TOPICS IN U.S. HISTORY BEFORE 1789. (3)**  
Readings, research, and discussions in seminar format to illuminate problems of historical and contemporary significance, in areas of special faculty competence. May be repeated once. Lecture, two hours; conference, one hour. Prereq: Consent of instructor mandatory.

**HIS 351 TOPICS IN U.S. HISTORY SINCE 1789. (3)**  
Same as HIS 350. Prereq: Consent of instructor mandatory.

**HIS 352 TOPICS IN EUROPEAN HISTORY BEFORE 1789. (3)**  
Same as HIS 350. Prereq: Consent of instructor mandatory.

**HIS 353 TOPICS IN EUROPEAN HISTORY SINCE 1789. (3)**

Same as HIS 350. Prereq: Consent of instructor mandatory.

**HIS 354 TOPICS IN NON-WESTERN HISTORY BEFORE 1789. (3)**

Same as HIS 350. Prereq: Consent of instructor mandatory.

**HIS 355 TOPICS IN NON-WESTERN HISTORY SINCE 1789. (3)**

Same as HIS 350. Prereq: Consent of instructor mandatory.

**HIS 395 INDEPENDENT WORK. (1-3)**

Under special conditions selected students may investigate problems with weekly reports to the instructor. May be repeated to a maximum of six credits. Prereq: Major and a standing of 3.0 in the department.

**HIS 397 RESEARCH SEMINAR FOR SENIORS. (3)**

A seminar for senior history majors, which provides the opportunity to prepare a substantial research paper within a topical or chronological area announced by the instructor. May be repeated to a maximum of six credits. Prereq: HIS 316 and a 3.0 GPA in history courses or consent of instructor.

**HIS 516 ORIGINS OF THE SCIENTIFIC WORLD VIEW. (3)**

Ideas of natural order and man's place in the cosmos, the interactions of man and environment, the relationships of scientific thought and cultural values, from the ancients to the 18th century. Prereq: HIS 106 or consent of instructor.

**HIS 595 STUDIES IN HISTORY. (3)**

Professors will offer lecture and discussion courses in areas in which they have special teaching interest. May be repeated to a maximum of six credits. Prereq: To be denoted by the instructor.

**III. NON-WESTERN HISTORY**

**A. Africa**

**HIS 254 HISTORY OF SUB-SAHARAN AFRICA. (3)**

A survey of the social institutions, value systems and political organization of Sub-Saharan Africa since the 16th century but with particular emphasis on the 19th and 20th centuries.

**B. Latin America**

**HIS 206 HISTORY OF COLONIAL LATIN AMERICA, 1492 TO 1810. (3)**

A broad survey of the social, economic, political and cultural development of Latin America from the fifteenth century to 1810. Includes analysis of such topics as pre-Columbian societies on the eve of conquest, the Iberian kingdoms in the Age of Expansion, the conquest and colonization of the indigenous cultures of the New World, the establishment of Spanish and Portuguese institutions, the relations between the Church and the State, the encomienda and the hacienda, slavery and the impact of the Bourbon Reforms on America.

**HIS 207 HISTORY OF MODERN LATIN AMERICA, 1810 TO PRESENT. (3)**

A broad survey of the Latin American nations focusing on their social, economic, political and cultural development. Traces the history of the Independence movements, nation building, the struggle for modernization, dependency and the phenomenon of revolution in the twentieth century.

**HIS 561 THE INTELLECTUAL AND CULTURAL HISTORY OF LATIN AMERICA. (3)**

Following a brief survey of Latin American intellectual and cultural history from the Wars of Independence to the present, the course will center on specific topics such as modernism, liberalism, positivism, the resistance of indigenous peoples to Westernization, the novel, currents in historiography, the impact of Marxism, the development of the fine arts. Prereq: HIS 207 or LAS 201.

**HIS 562 MODERN MEXICO. (3)**

Following a brief survey of Mexican political history from Independence to the present, this course will examine topically major historical themes, such as landholding and agrarian problems, church and state, and assessment of the 1910 Revolution. Prereq: LAS 201 or equivalent or consent of instructor.

**#HIS 563 THE HISTORY OF WOMEN IN LATIN AMERICA. (3)**

This course will survey the history of women in Latin America from pre-Columbian period to the present. The emphasis will be mainly on the late nineteenth and twentieth centuries in order to understand the situation of women in Latin America today.

**C. Middle East**

**HIS 247 HISTORY OF ISLAM AND MIDDLE EAST PEOPLES, 500-1250, A.D. (3)**

A survey of the origins and development of the Islamic civilization from the time of the Prophet Muhammad to 1250, with special concentration on the role of the Arab, Iranian and Turkic peoples.

**HIS 248 HISTORY OF ISLAM AND MIDDLE EAST PEOPLES, 1250 TO THE PRESENT. (3)**

A continuation of HIS 247. A survey of the religion and institutions of the Islamic world in the Middle East with special emphasis on the Mongol, Ottoman, Safavid and Qajar empires. The demise of these empires, the response of the Middle East peoples to European imperialism, and their national development up to the present will be considered.

**\*HIS 548 HISTORY OF MIDDLE EAST: 1808-1952. (3)**

Emphasis is on the decline of the Ottoman and Iranian empires in the 19th century Middle East and British, French and Russian imperialism. The emergence and development of the national states of Turkey, Iran, Iraq, Syria, Lebanon, Saudi Arabia, Egypt and Israel from WWI to the end of WWII will be stressed. The religion, institutions and politics of Islam will also be a major focus.

**HIS 549 HISTORY OF THE MIDDLE EAST: 1952 TO THE PRESENT. (3)**

A continuation of HIS 548. Emphasis is on the politics of Middle Eastern nationalism, Pan-Arabism and its demise, the Arab-Israeli conflict, the politics of oil and nuclear weapons, the Islamic revolution in Iran, and the development of the Islamic movement since 1967.

**D. East Asia**

**HIS 295 EAST ASIA TO 1800. (3)**

A survey of Chinese, Japanese and Korean history from earliest times to 1800. Emphasis on political, economic, social and intellectual developments.

**HIS 296 EAST ASIA SINCE 1800. (3)**

A continuation of HIS 295. A survey of the political and economic modernization of traditional East Asian society with emphasis on nationalistic reactions to Western pressure and international rivalry in East Asia.

**HIS 590 JAPANESE HISTORY TO 1800. (3)**

A broad survey of Japanese history from the earliest times to the zenith of shogunate rule under the Tokugawa family. In addition to tracing the major developments in Japanese political, social, and economic history, this course also emphasizes Shinto, Buddhism, Confucianism, and the introduction of Christianity.

**HIS 591 JAPANESE HISTORY SINCE 1800. (3)**

A continuation of HIS 590, from 1800 to present.

**HIS 593 EAST ASIAN HISTORY SINCE WORLD WAR II. (3)**

A study of the revolutionary political, economic and social changes occurring in China, Japan, and Korea in the aftermath of World War II. Important political and institutional developments and their relations to pre-war trends will be emphasized.

**HIS 597 WESTERNERS IN EAST ASIA, 1839 TO THE PRESENT. (3)**

The history of interactions between the peoples of East Asia and those of Europe and North America in the nineteenth and twentieth centuries. The actions and goals of merchants, diplomats, missionaries, journalists, and soldiers will be examined, and such concepts as colonialism, imperialism, and cultural change will be discussed.

**HIS 598 CHINA IN REVOLUTION, 1895-1976. (3)**

After a brief survey of modern Chinese history, this course explores the ideas which inspired the people who organized China's Nationalist and Communist parties and examines the social conditions which influenced the outcome of the Chinese civil war. The course also covers the attempts of some Chinese Communists to "continue the Revolution" after 1949.

**IV. EUROPEAN AND BRITISH HISTORY**

**A. Science and Western Culture**

**HIS 390 TECHNOLOGY AND CULTURE. (3)**

Interaction of technology and culture with illustrations from the classical, medieval, Renaissance, Enlightenment, 19th century, and modern periods; also non-Western cultures. Emphasis on the character of the interactions. Prereq: HIS 106 or HIS 107 or consent of instructor.



**HIS 504 GREEK AND ROMAN MEDICINE. (3)**  
An historical introduction to the development of Greek and Roman medicine, from the pre-Socratic philosophers through Oribasius and early medieval influences. Prereq: A course in ancient history, or classics, or ancient philosophy, or consent of instructor.

**B. East Europe and Russia**

**HIS 285 HISTORY OF RUSSIA TO 1825. (3)**  
A broad survey of the life of the Russian people and the development of the state from the ninth century through the reign of Alexander I. Although emphasis will be placed on political, economic, and social trends, cultural and intellectual achievements will also be discussed.

**HIS 286 HISTORY OF RUSSIA SINCE 1825. (3)**  
A continuation of HIS 285, this course covers the last century of the Tsarist regime (1825-1917) and the evolution of the Soviet system that followed. Emphasis will be placed on the problems that led to the collapse of the monarchy, on the revolutionary movement, and on the Communist state and society under Lenin and Stalin.

**HIS 534 RUSSIA IN THE 20TH CENTURY I. (3)**  
A survey of the reign of Nicholas II (1894-1917), the Revolutionary and Civil War period (1917-1921), and the consolidation of the Soviet regime through the period of Stalin's first Five Year Plan in 1932.

**HIS 535 RUSSIA IN THE 20TH CENTURY II. (3)**  
A continuation of HIS 534, this course examines the principal features of Soviet society under Stalin's dictatorship and the evolution of Soviet internal and external policy under his successors.

**HIS 536 INTELLECTUAL AND CULTURAL HISTORY OF RUSSIA TO 1800. (3)**  
A study of Russian culture to 1800 emphasizing Slavic paganism, Orthodox Christian culture in Kiev, Novgorod, and Muscovy, and the impact of the West in the Seventeenth and Eighteenth Centuries.

**HIS 537 INTELLECTUAL AND CULTURAL HISTORY OF RUSSIA FROM 1800 TO THE PRESENT. (3)**  
A study of Russian culture from 1800 to the present emphasizing the conservative as well as the revolutionary tradition, the Russian avant-garde, Stalinist culture, and the Dissident Movement.

**HIS 546 THE BYZANTINE EMPIRE. (3)**  
A study of Byzantine history from the time of Constantine the Great to the capture of Constantinople by the Turks in 1453. Prereq: HIS 104 or 247.

**HIS 547 HISTORY OF THE OTTOMAN EMPIRE: 1200-1923. (3)**  
A survey and study of the origins, consolidation, decline, and demise of the Ottoman Empire. Special emphasis will be placed on the empire's relationship with the Slavic peoples of the Balkans, Iran, the Arabs and Europe.

**C. Britain and the British Empire**

**HIS 202 HISTORY OF BRITISH PEOPLE TO THE RESTORATION. (3)**  
From the Roman period to the Stuart period. A general survey of the various epochs and phases of the English people at home and abroad.

**HIS 203 HISTORY OF THE BRITISH PEOPLE SINCE THE RESTORATION. (3)**  
From the Stuart period to the present. A continuation of HIS 202.

**HIS 552 BRITISH SOCIAL HISTORY DURING THE TUDOR-STUART PERIOD. (3)**  
A study of the effects of demographic and economic changes upon life in town and country, with emphasis upon changing social aspirations.

**HIS 553 EIGHTEENTH CENTURY BRITAIN. (3)**  
An analysis of English society and politics in an important transition period when the country was transformed by the Industrial Revolution and challenged by the French Revolution.

**HIS 554 BRITISH HISTORY 1815-1901. (3)**  
A detailed study of Britain's political, social, diplomatic and industrial development in the 19th century.

**HIS 555 BRITISH HISTORY SINCE 1901. (3)**  
A detailed study of Britain in the 20th century with special consideration of Britain in World War I and World War II, and her position in the contemporary world.

**D. Western Europe**

**HIS 229 THE ANCIENT NEAR EAST AND GREECE TO THE DEATH OF ALEXANDER THE GREAT. (3)**  
Covers the birth of civilization in Egypt and Mesopotamia, and the history of the ancient Near East and Greece to the conquest of Greece by Philip of Macedon. (Same as CLA 229.)

**HIS 230 THE HELLENISTIC WORLD AND ROME TO THE DEATH OF CONSTANTINE. (3)**  
Covers the conquests of Alexander the Great, and the main features of the Hellenistic world, the Roman Republic, and the Roman Empire to the death of Constantine. (Same as CLA 230.)

**HIS 270 EARLY MIDDLE AGES. (3)**  
A survey of European history from the fourth through the mid-10th centuries.

**HIS 271 LATER MIDDLE AGES. (3)**  
A survey of European history from the mid-10th through the 15th centuries.

**HIS 323 THE HOLOCAUST. (3)**  
This course will attempt to help students understand the events that resulted in the virtual destruction of Europe's Jews during the Second World War. Topics will include the history of anti-semitism, the ways in which Nazi policy against the Jews was implemented, Jewish resistance, response of non-Jews and other governments to the Holocaust.

**HIS 500 PRECLASSICAL AND CLASSICAL GREECE. (3)**  
A history of Greece from earliest times to the death of Alexander the Great.

**HIS 501 FOURTH-CENTURY GREECE AND THE HELLENISTIC WORLD. (3)**  
A history of Greece and the Greek world from the death of Alexander to the Roman conquest of Egypt.

**HIS 502 A HISTORY OF THE ROMAN REPUBLIC. (3)**  
A history of Rome from earliest times to the fall of the Republic. Emphasis will be placed upon the territorial expansion of Rome and the effects of this expansion on republican institutions.

**HIS 503 A HISTORY OF THE ROMAN EMPIRE. (3)**  
A study of the foundation of the Roman Empire, the development of Imperial institutions, social and intellectual developments of the Graeco-Roman world. The decline of Rome and the barbarian invasions of the fourth century.

**HIS 509 ROMAN LAW. (3)**  
An historical introduction to the development of Roman law, from the Twelve Tables through the Codex Justinianus. (Same as CLA 509.)

**HIS 510 MEDIEVAL CIVILIZATION I. (3)**  
Selected topics in the cultural and intellectual history of Latin Europe during the Middle Ages. The specific topics for a given semester will be listed in the schedule book.

**HIS 511 MEDIEVAL CIVILIZATION II. (3)**  
A continuation of HIS 510. The specific topics for a given semester will be listed in the class schedule book.

**HIS 512 MEDIEVAL INSTITUTIONS TO THE MID-10TH CENTURY. (3)**  
A survey of medieval political, social, economic and ecclesiastical institutions from the fourth century to the breakup of the Carolingian Empire.

**HIS 513 MEDIEVAL INSTITUTIONS SINCE THE MID-10TH CENTURY. (3)**  
A survey of medieval political, social, economic and ecclesiastical institutions from the beginning of the High Middle Ages to the middle of the 15th century.

**HIS 519 THE ERA OF THE RENAISSANCE. (3)**  
An historical description and analysis of the development of political, economic, social, religious, intellectual and cultural institutions of Europe from Petrarch to Erasmus.

**HIS 520 THE ERA OF THE REFORMATION. (3)**  
An historical description and analysis of the development of the religious, intellectual, cultural, political, economic and social institutions of Europe from Luther to the Treaty of Westphalia.

**HIS 521 EUROPEAN SOCIAL HISTORY, 1400-1800. (3)**  
Survey of European social history in the early modern period, including analysis of demographic patterns, family and social structures, rural and urban economic patterns, and cultural and religious attitudes.

**HIS 522 THE FRENCH AND EUROPEAN REVOLUTIONS, 1760-1815. (3)**  
A study of the origins and development of the French Revolution and the influence of the Revolution and Napoleon on Europe.

**HIS 533 MODERN EUROPEAN IMPERIALISM. (3)**  
A comparative analysis of the motives, policies and sociopolitical effects of European overseas expansion in the 19th and 20th centuries.

**HIS 540 HISTORY OF MODERN FRANCE TO 1815. (3)**  
The course of French history to 1815, including the development of French political, administrative, legal, social, economic and cultural achievements and institutions and their contribution to the modern world.

**HIS 541 HISTORY OF MODERN FRANCE SINCE 1815. (3)**  
Continuation of HIS 540.

**HIS 542 GERMAN HISTORY 1815-1914. (3)**  
This course is designed as a study of domestic development in Germany. While political history is emphasized, due consideration is given to social, economic and intellectual trends. Prereq: HIS 104, 105 or consent of instructor.

**HIS 543 GERMAN HISTORY SINCE 1914. (3)**  
Examines the fall of Imperial Germany, the Weimar Republic, Hitlerian period, and the post-1945 era. The course is primarily concerned with internal affairs, but attention is directed to the international scene when crucial. Prereq: HIS 104, 105 or consent of instructor.

## V. AMERICAN HISTORY

**HIS 240 HISTORY OF KENTUCKY. (3)**  
A general survey of the chief periods of Kentucky's growth and development from 1750 to the present.

**HIS 260 AFRO-AMERICAN HISTORY TO 1865. (3)**  
A study of the Black experience in America through the Civil War. An examination of the African heritage, slavery, and the growth of Black institutions.

**HIS 261 AFRO-AMERICAN HISTORY 1865-PRESENT. (3)**  
This course traces the Black experience from Reconstruction to the Civil Rights Movement of the 1960's. The rise of segregation and the ghetto and aspects of race relations are examined.

**HIS 265 HISTORY OF WOMEN IN AMERICA. (3)**  
History of American women, with particular emphasis on the mid-19th through the mid-20th centuries. Major themes include the family, work, social ideas about women, and feminism. Prereq: HIS 109 or consent of instructor.

**HIS 460 COLONIAL AMERICA TO 1763. (3)**  
This course explores a number of important themes in early America: the comparative view of Western European colonization efforts; the dynamics of a multiracial environment; the character of family, community and religious life; regional distinctiveness in social/economic life; and the maturation of the colonies in the 18th century.

**HIS 461 THE AMERICAN REVOLUTION, 1763-1789. (3)**  
A study of the disagreement between Great Britain and the 13 colonies, the decision for independence, and the progress of revolutionary change through the ratification of the Federal Constitution.

**HIS 462 THE NEW REPUBLIC, 1789-1820. (3)**  
An intensive study of the launching of the federal government, the rise of America's first parties, and the conflict over the completion of the revolutionary experiment.

**HIS 463 EXPANSION AND CONFLICT, 1820-1860. (3)**  
A social and political study of the United States from 1820 to 1860, with special attention to the growth of Jacksonian democracy, territorial expansion, and the rise of the sectional controversy over slavery.

**HIS 464 CIVIL WAR AND RECONSTRUCTION, 1860 TO 1877. (3)**  
A study of events immediately preceding the outbreak of conflict, of the military campaigns, and of the social, economic, and political developments during the periods of war and reconstruction.

**HIS 465 EMERGENCE OF MODERN AMERICA, 1877-1917. (3)**  
A study of the transformation of the U.S. from an agrarian society into an industrial nation covering the years from the Gilded Age to the American entry into World War I. This course emphasizes the growth of corporate capitalism, the emergence of modern political institutions, and the development of modern American foreign policy. It also explores how various Americans—workers, farmers, immigrants, women—responded to and were affected by industrialization.

**HIS 466 MODERN AMERICAN HISTORY FROM WW I TO PEARL HARBOR, 1917-1941. (3)**  
A study of America in World War I and the interwar era, emphasizing political, economic, diplomatic, and social developments. The course examines the impact of the first world war and the great depression on America and the nature of the New Era and the New Deal.

**HIS 467 MODERN AMERICAN HISTORY SINCE 1941. (3)**  
An intensive study of the United States from the American entry into World War II to the present, emphasizing diplomatic, military, political, economic, and sociocultural changes.

**HIS 505 ETHNOHISTORY OF THE NATIVE AMERICAN SOUTHEAST. (3)**  
This course employs the methodology of ethnohistory, which asks ethnographic questions of historical evidence, to study Native peoples of the Southeastern U.S. from prehistoric times to the present. (Same as ANT 505.)

**HIS 568 NATIVE AMERICAN HISTORY: THE EAST. (3)**  
This course studies the histories of the Native Americans of the Woodlands cultural tradition residing east of the Mississippi from the time of their encounter with Europeans to the end of removal in the 1840s. It uses an ethnohistorical approach that rests heavily on the insights of archaeologists and cultural anthropologists as well as historians. Its primary purpose is to identify and explain the political, economic, social and cultural responses of Native people as they were exposed to the diseases, invasions, settlements, economic and political systems, and religions of the Europeans.

**#HIS 569 NATIVE AMERICAN HISTORY: THE WEST. (3)**  
This course studies the histories of the Native groups who live west of the Mississippi River: the Plains Indians, the Pueblos, the hunter/gatherers of the coast, and others. Beginning with Spanish entry of the Southwest in the 16th century, the course runs to the present and deals with the 20th century problems of identity, economic development, political organization, urbanization, among others.

**HIS 572 AMERICAN LEGAL HISTORY. (3)**  
A history of law in the United States, emphasizing interrelationship of law and society. Particular attention given to law and economic growth, the criminal justice system, legal reform, the bar, and minorities and the law.

**HIS 573 AMERICAN CONSTITUTIONAL HISTORY. (3)**  
A study of constitutional development in the United States from the colonial period to current times, with emphasis on the Supreme Court.

**HIS 574 THE DIPLOMACY AND FOREIGN POLICY OF THE UNITED STATES TO 1919. (3)**  
A survey designed to acquaint the student with the principles of American foreign policy and its historical evolution. Prereq: HIS 108 or equivalent.

**HIS 575 THE DIPLOMACY AND FOREIGN POLICY OF THE UNITED STATES SINCE 1919. (3)**  
A continuation of HIS 574. Foreign policy after the United States became a world power. Prereq: HIS 109 or equivalent.

**HIS 576 FRONTIER AMERICA, 1400-1869. (3)**  
A study of the ways in which America's people shaped and were transformed by the frontier; how they wrestled with the problems of nationhood, democracy, sacrifice, and innovation; and how the idealism and promise were fulfilled and betrayed, from the first settlers to the driving of the Golden Spike.

**HIS 577 FRONTIER AMERICA, 1869-PRESENT. (3)**  
A survey of the many Westerners, women as well as men, Native Americans, Chinese, and Hispanics as well as whites, sodbusters as well as six-shooters, and of the many Wests, wild and not-so-wild, from the prairie homesteaders to the Sagebrush Rebellion; and how they made, inherited, and were imprisoned by the frontier heritage.

**HIS 578 HISTORY OF THE OLD SOUTH. (3)**  
A study of the colonial beginnings and expansion of southern life, economics, and society. The growth of slavery, staple agriculture, and sectional politics will constitute the major interest. Prereq: HIS 108.

**HIS 579 HISTORY OF THE NEW SOUTH. (3)**

The evolution of southern life and society, agrarian politics, relationships with other sections, industrial growth, and new leadership.

**HIS 580 HISTORY OF APPALACHIA. (3)**

A survey of the social, economic, and cultural history of Appalachia from the colonial period to the present with emphasis on the interaction of this social state region with the broader forces of social change at work in modern America. Prereq: HIS 108, 109 or consent of instructor.

**HIS 581 U.S. URBAN HISTORY SINCE 1865. (3)**

A study of urban America since 1865, emphasizing the impact of cities in the development of the United States, the processes by which cities grew and the effects of urbanization on city dwellers.

**HIS 582 IMMIGRATION AND AMERICAN HISTORY, 1815 TO THE PRESENT. (3)**

A study of the role of the immigrant in American history, emphasizing the impact of large scale immigration upon the receiving society and changes effected by the migration upon the new arrivals themselves, in the century after 1815, and the consequences of restriction in the decades since World War I.

**HIS 583 SCIENCE IN AMERICAN SOCIETY. (3)**

This course will explore how many Americans, scientists and nonscientists, have felt about science. Topics will include the specialization and professionalization of scientific activity; controversial theories with profound social impact; and the 20th century alliance of government, private enterprise, and science.

**HIS 584 HEALTH AND DISEASE IN THE U.S. (3)**

Examines the emergence of modern medicine and the allied health professions, from colonial times to the present. Emphasis will be placed on the social, institutional, and scientific contexts of medical thought, education, and practice. It also explores how social and professional thought and action shape the meaning of health and disease.

**HIS 585 THE AGE OF JIM CROW, 1880-1930. (3)**

This course focuses on the causes, progression, completion and perfection of the color caste system popularly known as Jim Crow during the late nineteenth and early twentieth centuries. The course will examine the national and Southern milieu in which Jim Crow was born and justified as well as the impact of the system on the black community according to class and socio-economic status. Prereq: HIS 260 and HIS 261 or consent of instructor.

**HIS 586 THE IMAGES OF BLACKS IN AMERICAN SOCIETY. (3)**

This lecture course focuses on the images, stereotypes, and caricatures of African Americans in American society from the era of the American Revolution to the late 20th century. We will examine not only white-produced images and representations of African-Americans but black-produced images as well. We will also examine the image of blacks in popular culture and in the electronic and print media and their impact on American race relations and as a reflection of historical trends. Finally, we will also examine the impact of these images within the black community. Prereq: HIS 260 and HIS 261 or consent of instructor.

**HIS 596 THE U.S. FAMILY IN HISTORICAL PERSPECTIVE. (3)**

A study of American family experience and values from its pre-industrial Anglo-European roots to the present. Using an interdisciplinary focus, the course will examine the shifting boundary between family and community and the interaction between domestic life and demographic, religious, and economic influences in American history. Prereq: FAM 353 or SOC 409 or equivalent, or consent of instructor. (Same as FAM 509, SOC 509.)

**THE GRADUATE GROUP**

**Seminars**

These seminars are designed to acquaint students with the problems, sources and secondary literature in the designated fields in order to prepare them for the graduate written and oral examinations.

**HIS 606 HISTORICAL CRITICISM. (3)**

Required of every entering graduate student in history. For history graduate students only.

**HIS 613 READINGS IN EARLY MEDIEVAL HISTORY. (3)**

The problems, major sources and secondary literature in the period from the beginning of the fifth century to the end of the 10th century will be covered. Primary emphasis will be given to the Latin West. May be repeated to a maximum of six credits when topical coverage is sufficiently different from one semester to another.

**HIS 614 READINGS IN HIGH AND LATE MEDIEVAL HISTORY. (3)**

Major source collections, selected problems and the secondary literature concerning these problems will be covered, from the middle of the 10th century to the end of the 15th century. May be repeated to a maximum of six credits when topical coverage is sufficiently different from one semester to another.

**HIS 615 READINGS IN HISTORY OF SCIENCE AND MEDICINE (THROUGH THE RENAISSANCE). (3)**

An intensive study of bibliography and analytical reading of secondary literature for the areas of Antiquity, Middle Ages, and Renaissance. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**HIS 622 READINGS IN EUROPEAN HISTORY, 1500-1815. (3)**

This course is designed to provide systematic and extensive reading over broad areas of the period indicated, to acquaint the student with the standard source materials and literature of the field, and to provide opportunity for critical discussion of outstanding issues. May be repeated to a maximum of six credits if offered under a different instructor or if the topical coverage is sufficiently different. Prereq: An undergraduate course in European history.

**HIS 623 READINGS IN EUROPEAN CULTURAL HISTORY SINCE 1815. (3)**

A critical survey of problems and literature on cultural and ideological movements of the 19th and 20th centuries. Among the topics to be considered are: revolution, industrialization, romanticism, imperialism, fascism, and total war. May be repeated to a maximum of six credits when topical coverage is sufficiently different from one semester to another. Prereq: An undergraduate course in European history.

**HIS 624 READINGS IN EUROPEAN POLITICAL AND DIPLOMATIC HISTORY SINCE 1815. (3)**

A critical survey of problems and literature in political and diplomatic developments of the 19th and 20th centuries. May be repeated to a maximum of six credits when topical coverage is sufficiently different from one semester to another. Prereq: An undergraduate course in European history.

**HIS 625 READINGS IN BRITISH AND BRITISH EMPIRE HISTORY. (3)**

An intensive study of the Bibliography of British and British Empire History, primary and secondary, with readings, analyses and criticisms of selected titles in the literature of the field and of recent published research in the professional journals. May be repeated to a maximum of six credits if offered under a different instructor or if the topical coverage is sufficiently different. Prereq: An undergraduate course in British history.

**HIS 630 READINGS IN AMERICAN HISTORY: THE COLONIAL ERA. (3)**

An intensive survey of the major historiographical issues and the secondary literature of the Colonial Era. Lecture, two hours; library, one hour per week.

**HIS 631 READINGS IN AMERICAN HISTORY: THE AMERICAN REVOLUTION AND THE NEW REPUBLIC. (3)**

An intensive survey of the major historiographical issues and the secondary literature of the American Revolution and the New Republic.

**HIS 632 READINGS IN AMERICAN HISTORY: THE AGE OF JACKSON, THE CIVIL WAR, AND RECONSTRUCTION. (3)**

An intensive survey of the major historiographical issues and the secondary literature of the Age of Jackson, the Civil War and Reconstruction.

**HIS 633 READINGS IN AMERICAN HISTORY: THE GILDED AGE AND THE PROGRESSIVE ERA. (3)**

An intensive survey of the major historiographical issues and the secondary literature of the Gilded Age and the Progressive Era.

**HIS 634 READINGS IN AMERICAN HISTORY: AMERICA SINCE 1920. (3)**

An intensive survey of the major historiographical issues and the secondary literature of America since 1920.

**HIS 638 READINGS IN LATIN AMERICAN HISTORY. (3)**

Supervised reading at the graduate level of a selected topical bibliography covering the main themes of colonial Latin American history or the modern period. Prereq: Consent of instructor.

**HIS 650 READINGS IN SPECIAL TOPICS IN HISTORY. (3)**

Supervised reading at the graduate level of a selected bibliography of the essential literature of various special topics. May be repeated to a maximum of nine credits with different topics. Prereq: Consent of instructor.

**HIS 651 READINGS IN U.S. FOREIGN RELATIONS SINCE 1900.** (3)  
This course will involve intensive reading in the history of United States foreign relations in the twentieth century. It will examine various theoretical approaches to the subject. It will analyze the sources and consequences of America's global expansion as well as the historiography of important events such as World War I and II, Korea and Vietnam.

**HIS 652 READINGS IN AMERICAN HISTORY OF SCIENCE AND TECHNOLOGY.** (3)  
An intensive readings course that will focus on the major historiographical themes in the history of the sciences and technology in the U.S.

**HIS 653 READINGS IN U.S. WOMEN'S HISTORY.** (3)  
This course will introduce students to the main currents in U.S. women's history in four broad chronological units: Traditional America, 1600-1820; Industrializing America-Part I, 1820-1880; Industrializing America-Part II, 1880-1920; and Modern America, 1920-present. Within this framework, the course will explore such topics as: work, communities and public life; gender, families and sexuality; race and African-American experiences; and religion, reform and political culture. The course will also familiarize students with the ongoing theoretical debates within women's history.

**HIS 654 READINGS IN MODERN AFRICAN-AMERICAN HISTORY.** (3)  
Introduces graduate students to the historical literature on 20th century African-American history and major historiographical issues.

**HIS 655 READINGS IN ANTEBELLUM SOUTHERN HISTORY.** (3)  
Introduces graduate students to the historical literature on the antebellum South and the major historiographical issues.

**HIS 656 READINGS IN NEW SOUTH HISTORY.** (3)  
Introduces graduate students to the historical literature on the New South and the major historiographical issues.

**HIS 695 INDEPENDENT WORK.** (1-3)  
Under special conditions selected students may investigate problems, with weekly reports to instructor. May be repeated to a maximum of nine credits. Prereq: Consent of instructor.

**Courses in the 700 Group**

These seminars are designed to introduce students to the methods, resources and auxiliary disciplines necessary to research in the designated fields in order to prepare them for the writing of theses and dissertations.

**HIS 700 SPECIAL PROBLEMS IN HISTORY.** (3)  
Professors will conduct research seminars in topics or problems in which they have special research interests. May be repeated to a maximum of 12 credits. Prereq: Consent of instructor.

**HIS 706 SEMINAR IN MEDIEVAL HISTORY.** (3)  
Directed research on a common problem. May be repeated to a maximum of 12 credits. Prereq: A reading knowledge of Latin or of one European language or consent of instructor.

**HIS 710 SEMINAR IN AMERICAN HISTORY, 1607-1815.** (3)  
May be repeated to a maximum of 12 credits.

**HIS 711 SEMINAR IN AMERICAN HISTORY, 1815-1865.** (3)  
May be repeated to a maximum of 12 credits.

**HIS 712 SEMINAR IN AMERICAN HISTORY, 1865 TO THE PRESENT.** (3)  
May be repeated to a maximum of 12 credits.

**HIS 722 SEMINAR IN MODERN EUROPEAN HISTORY, 1870 TO THE PRESENT.** (3)  
May be repeated to a maximum of 12 credits.

**HIS 730 SEMINAR IN MODERN BRITISH HISTORY.** (3)  
May be repeated to a maximum of 12 credits.

**Theses**

**HIS 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**HIS 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**HIS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.

**HIS 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.

**HMN Humanities**

**\*HMN 300 TOPICS IN THE HUMANITIES (Subtitle required).** (1-4)

A multidisciplinary, topical course, experimental in nature, approved by the Gaines Center Faculty Advisory Committee. Open to all juniors and seniors; enrollment will be limited to ten students selected by Gaines Center Faculty Advisory Committee through competitive application. Cannot be repeated under same subtitle. Prereq: Junior/senior status; approval of Gaines Center for the Humanities Director.

**\*HMN 301 GAINES SEMINAR IN THE HUMANITIES I.** (4)  
A multidisciplinary seminar directed to topics of major concern in humanistic studies and to include consideration of culture, literature, history and landscape. Prereq: Gaines Fellowship Program; junior status.

**\*HMN 302 GAINES SEMINAR IN THE HUMANITIES II.** (4)  
Continuation of HMN 301. A multidisciplinary seminar directed to topics of major concern in humanistic studies and to include consideration of culture, literature, history and landscape. Prereq: Gaines Fellowship Program; HMN 301.

**HMN 303 CONTEMPORARY ISSUES CONCERNING THE HUMANITIES.** (1-3)  
An interdisciplinary seminar in the humanities which will focus on contemporary issues. Open to all University students, subject to such limits or prerequisites as set by the instructor. May be repeated to a maximum of six credits under different subtitles. Prereq: Set by individual instructors.

**HMN 497 GAINES SENIOR THESIS.** (3-15)  
An independent research course leading to an undergraduate thesis in the humanities, to be supervised by three faculty members, to be a minimum of 50 pages in length, and to be defended in an oral examination. A minimum of six credit hours must be taken in the fall semester. May be repeated to a maximum of 15 credits. Prereq: Gaines Fellowship Program; HMN 302.

**HMT Hospitality Management**

**HMT 120 INTRODUCTION TO HOSPITALITY AND TOURISM MANAGEMENT.** (2)  
A survey of the historical development and management structure of organizations that comprise the hospitality and tourism industry. The course format includes presentation by industry representatives, lectures and student led discussions.

**HMT 210 HOTEL ROOMS DIVISION MANAGEMENT.** (3)  
A comprehensive study of the management principles which apply to the rooms division of a hotel property that includes front desk and housekeeper operations, reservations and billing, accounting procedures and public relations. Prereq: HMT 120, ACC 201 or consent of instructor.

**HMT 301 PRINCIPLES OF TRAVEL AND TOURISM.** (3)  
An introduction to the structure, operation and characteristics of domestic and international tourism. Topics include transportation modes, destination planning and marketing, wholesale and retail travel agent agreements; geographic, social and cultural aspects of tourism. Prereq: HMT 120.

**HMT 420 HOSPITALITY MANAGERIAL ACCOUNTING.** (3)  
Theoretical and practical investigation of the principles and applications of accounting systems and accounting data for hotels, restaurants and other organizations in the hospitality industry. Prereq: HMT 120, ACC 201, ACC 202.

**HMT 488 MANAGEMENT ISSUES AND ANALYSIS IN HOSPITALITY MANAGEMENT. (3)**

An integrative and applied hospitality management course that allows students to evaluate strategic planning, decision making and implementation for single and multiple business hospitality firms through analysis of current trends, cases and simulation exercises. Prereq: HMT 120, NFS 342, NFS 346, HMT 210, HMT 420, FIN 300, MKT 300, MGT 301.

**HMT 499 HOSPITALITY SENIOR FIELD EXPERIENCE. (3)**

Planned managerial work experience of at least 400 hours in a hospitality or institutional organization. The experience is coordinated by the field experience coordinator and the on-site supervisor. Written progress reports are submitted by the student and the on-site supervisor. A daily log is maintained by the student. Prereq: At least 30 hours of courses that include HMT 120, NFS 342, 400 hours of verifiable work experience in the hospitality industry, HMT 210 or consent of instructor.

**HON Honors**

**HON 101 THE ANCIENT WORLD. (3)**

From Greek and Roman antiquity to the early Christian centuries; an interdisciplinary course in intellectual history. Readings vary at the discretion of the faculty. Prereq: Membership in the Honors Program.

**HON 102 THE MEDIEVAL AND RENAISSANCE WORLD. (3)**

From the Middle Ages through the Reformation; an interdisciplinary course in intellectual history. Readings vary at the discretion of the faculty. Written assignments required. Prereq: Membership in the Honors Program.

**HON 201 THE EARLY MODERN WORLD. (3)**

From the development of the modern scientific method through mid-19th century industrialism; an interdisciplinary course in intellectual history. Readings vary at the discretion of the faculty. Prereq: Membership in the Honors Program.

**HON 202 THE CONTEMPORARY WORLD. (3)**

The contemporary world; an interdisciplinary course in intellectual history. Readings vary at the discretion of the faculty. Prereq: Membership in the Honors Program.

**HON 300 SPECIAL COURSE. (1-6)**

Interdisciplinary, topical, experimental course to be approved by Honor subcommittee, taught by one or several instructors. Prereq: Membership in good standing in the Honors Program or consent of instructor.

**HON 301 PROSEMINAR. (3)**

An interdisciplinary seminar in the history of culture; topics will vary from semester to semester, but a substantial research essay is always required. This course will satisfy the Honors program requirement for Independent Study. May be repeated to a maximum of six hours. Prereq: At least two Honors colloquia and membership in good standing in Honors Program or consent of instructor.

**HON 333 JOURNAL/JOURNEY PROJECT. (1)**

Special credit for Honors Program students who keep an intellectual journal for both fall and spring semesters, receiving one credit during the spring semester. Regular consultation with an assigned advisor, several group meetings during the year. May be repeated to a maximum of five credits. Pass/Fail only. Prereq: Membership in the Honors Program.

**HON 395 INDEPENDENT WORK. (3-15)**

Prereq: Upper division standing, membership in Honors Program, consent of Honors Director.

**HON 398 UNDERGRADUATE THESIS. (6-15)**

A formal thesis on a subject of the student's choosing, to be directed by a professor in his major department with the assistance of two other faculty members, one of whom must be from the Honors Program faculty. Prereq: Junior-Senior status, good standing in Honors Program, and written permission from the Director of the Honors Program.

**HON 399 FIELD-BASED/ COMMUNITY-BASED EDUCATION. (1-15)**

A community-based or field-based experience under the supervision of a faculty member. May be repeated to a maximum of 30 credits. Prereq: Consent of instructor and department chairperson; completion of departmental learning agreement. Prereq: Membership in the Honors Program.

**HOR Horticulture**

**HOR 100 AN INTRODUCTION TO HORTICULTURE PROFESSIONS. (1)**

A survey of horticulture as a profession; to inform students of opportunities and to develop an appreciation of horticultural science as it relates to the human environment. Offered on a pass/fail basis only.

**HOR 203 HOME HORTICULTURE. (3)**

A general horticulture course encompassing the use of ornamental plants, vegetable and fruit crops, and landscape design for the nonhorticulture major. (May not be used to fulfill horticulture departmental requirements.)

**HOR 320 WOODY PLANTS. (4)**

A detailed study of evergreen and deciduous trees, shrubs, vines, and ground covers occurring in the landscape; their systematic identification, hardiness, form, growth habit, size, culture, adaptation to environmental conditions, uses, and outstanding horticultural characteristics. Lecture, three hours; laboratory, three hours. Prereq: HOR 220.

**HOR 330 HERBACEOUS PLANTS I. (2)**

The identification and cultural requirements of herbaceous plants. A designated number of annuals, perennials, commercial cut flowers, flowering pot plants, bulbs, and foliage plants readily available in the fall will be covered. Lecture, three hours; laboratory, two hours per week for one half semester. Prereq: PLS 220.

**HOR 332 HERBACEOUS PLANTS II. (2)**

The identification and cultural requirements of herbaceous plants. A designated number of annuals, perennials, commercial cut flowers, flowering pot plants, bulbs, and foliage plants readily available in the spring will be covered. Lecture, three hours; laboratory, two hours per week for one half semester. Prereq: PLS 220.

**HOR 352 NURSERY PRODUCTION. (3)**

An introduction to the production practices of container and field grown nursery stock as they relate to management and operation of a nursery business. A two to three-day field trip is required. Two hours lecture per week; three hours laboratory per week. Prereq or concur: HOR 327 and HOR 335, both of which can be taken concurrently or consent of instructor.

**HOR 399 EXPERIENTIAL LEARNING IN HORTICULTURE. (1-6)**

An experience working in horticulture or a closely related field in which the student develops manual and management skills and applies theory to practice. May be repeated for a maximum of six credits as an elective on a pass/fail basis. Prereq: Completion of learning agreement prior to registration with a faculty member of the department.

**HOR 402 FRUIT CROP PRODUCTION. (3)**

A detailed study of the principles of the care and management of commercial plantings of deciduous fruits (both small and tree). Lecture, two hours; laboratory, two hours per week. Prereq: A course in botany.

**HOR 410 GROWTH AND DEVELOPMENT OF HORTICULTURE CROPS. (3)**

A study of the physiological basis of growth and development of horticultural crops, with an emphasis on topics specific to horticultural crop management. Prereq: PLS 210, CHE 107.

**HOR 450 PLANT PROPAGATION. (3)**

A study of the principles and practices involved in producing plants by sexual and asexual methods and to provide the basic skills necessary for using these methods. The interrelationship of plant growth, structure and the environment as they affect the ability to propagate plants by a specific method. Lecture, two hours; laboratory, three hours per week. Prereq: PLS 210 and HOR 410.

**HOR 451 LANDSCAPE MAINTENANCE. (3)**

Discussion of the protection, pruning, repair, and culture of plant material in landscape plantings as well as the diagnosis of plant-related problems and the management principles of landscape maintenance. Lecture, two hours; laboratory, three hours per week. Prereq: HOR 329, PPA 400G, ENT 320.

**HOR 460 GREENHOUSES AND CONTROLLED ENVIRONMENTS. (2)**

A study of greenhouse structures, coverings, equipment, and the monitoring and regulation of the environment including temperature, light, carbon dioxide, and relative humidity. Other types of controlled environments will also be included. Lecture, one hour; lecture/laboratory, two hours per week. Prereq: PLS 386 and HOR 375.

- HOR 510 VEGETABLE CROP MANAGEMENT.** (3)  
A study of the fundamental principles underlying management of vegetable crops produced in the field and in the greenhouse. Lecture, two hours; laboratory, two hours. Prereq: HOR 370 and HOR 410 or consent of instructor.
- HOR 515 TURF MANAGEMENT.** (3)  
A study of the selection, culture, and management of certain turf species used for home lawns, golf courses, athletic fields, and highway slopes. Lecture, two hours; laboratory, two hours. Prereq: BIO 106 and PLS 366. (Same as AGR 515.)
- HOR 525 GREENHOUSE FLORAL CROP MANAGEMENT.** (3)  
The study of methods of control of flowering and growth of selected flowering pot plants, cut flowers and bedding plants produced commercially in greenhouses. Lecture, two hours; laboratory, two hours. Prereq: HOR 370, 420, 460.
- HOR 582 SPECIAL PROBLEMS IN HORTICULTURE.** (1-4)  
May be repeated to a maximum of nine credits. Prereq: Consent of instructor.
- HOR 597 SPECIAL TOPICS IN PLANT AND SOIL SCIENCE (Subtitle required).** (1-3)  
Special topical or experimental courses in crop science, soil science or related areas of horticulture, or plant physiology for graduate and advanced undergraduate students. Special subtitle required and must be approved by the chair of Agronomy or Horticulture. A particular subtitle may be offered twice under AGR 597. Students may not repeat under the same subtitle. Prereq: Permission of instructor. (Same as AGR 597.)
- HOR 601 PHYSIOLOGICAL MECHANISMS IN HORTICULTURAL PLANTS.** (3)  
A critical evaluation of the recent concepts in certain selected areas of horticultural science. Prereq: BIO 530 or equivalent.
- HOR 622 PHYSIOLOGY OF PLANTS I.** (3)  
A physiological/biochemical treatment of central topics in modern plant physiology. Topics will include: plant-cell biology, ion transport, water and translocation, respiration and photosynthesis. Prereq: BIO 430G or equivalent or consent of coordinator. Prereq or concur: BCH 501. (Same as AGR/BIO/FOR 622.)
- HOR 623 PHYSIOLOGY OF PLANTS II.** (3)  
A physiological/biochemical treatment of central topics in modern plant physiology. Topics will include: plant hormones, an introduction to plant biotechnology, senescence and abscission, stress physiology, phytochrome-photomorphogenesis-phototropism nitrogen and sulfur metabolism. Prereq: BIO 430G or equivalent, and BCH 501 or consent of coordinator. (Same as AGR/BIO/FOR 623.)
- HOR 650 SOIL-PLANT RELATIONSHIPS.** (3)  
An advanced course on the relationships between media and the root systems of plants growing therein. Prereq: AGR 366, BIO 430G (or equivalent), or consent of instructor. (Same as AGR 650.)
- HOR 657 SEED BIOLOGY.** (3)  
Structure, development and function during plant reproductive development and seed ontogeny, including fertilization, embryogeny and endosperm development, seed formation, maturation, germination, dormancy and deterioration. Prereq: AGR 360, BIO 440G or consent of instructor. (Same as AGR 657.)
- HOR 732 MINERAL NUTRITION OF PLANTS.** (3)  
Discussion of accumulation, translocation, and utilization of mineral elements by higher plants. Emphasis will be placed on the relationships between these processes and plant metabolism. Prereq: BIO 430G or equivalent; BCH 501 or consent of instructor. (Same as AGR/BIO 732.)
- HOR 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.
- HOR 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.
- HOR 770 SEMINAR.** (1)  
May be repeated to a maximum of three credits.
- HOR 772 PLANT AND SOIL SCIENCE SEMINAR.** (1)  
Reports and discussion of problems and research in crops, soils, horticultural science and plant physiology. May be repeated three times for a maximum of four credits. (Same as AGR 772.)
- HOR 790 RESEARCH IN HORTICULTURE.** (1-4)  
May be repeated to a maximum of nine credits. Prereq: Consent of instructor.

## HSE Health Sciences Education

- HSE 101 INTRODUCTION TO THE HEALTH SCIENCES.** (1)  
Limited to students contemplating a career in one of the health sciences.
- HSE 320 PROFESSIONAL HEALTH EDUCATION METHODOLOGY.** (3)  
A systematic review of research and practice literature, observation of persons serving in professional health education positions, and development of skills as a professional health catalyst (educator). This course will be built upon the background knowledge and skills learned in previous education, and natural, and social science courses. Prereq: Allied Health Education major or consent of department.
- HSE 340 WOMEN, HEALTH AND HEALING.** (3)  
The course provides students with a broad overview of health issues facing American women. Students will examine health concerns such as eating disorders, mental health, reproductive process and issues, menopause, aging, surgeries and self-health from historic, social, gender roles and political perspectives. Prereq: An introductory course in sociology, anthropology or women's studies.
- HSE 440 WOMEN AND MENTAL HEALTH.** (3)  
An examination of historical and current factors affecting women's mental health across the life span. Emphasis is placed on identification of hidden biases; treatment and social control issues; and policy implications. Selected mental health problems are examined in-depth. (Same as NUR 440.)
- HSE 481 PROFESSIONAL HEALTH EDUCATION PRACTICE.** (4-8)  
To provide the professional health education specialist an opportunity to observe and practice classroom-learned principles and skills in a community. Prereq: HSE 321.
- HSE 502 PERFORMANCE EVALUATION IN THE CLINIC AND LABORATORY.** (3)  
Concepts and principles of performance evaluation in health care settings with emphasis on: defining performance and developing criteria; designing the performance evaluation system; implementing performance appraisal documentation; and, utilizing supervisory and feedback techniques. Prereq: A health professions background.
- HSE 510 OLDER WOMEN AND THEIR HEALTH.** (3)  
This course is designed to increase the awareness and understanding of the relationships among gender, health status and the aging process among older women. Such issues as changing social and cultural mores, public policies and utilization of health care resources are discussed as they impact women. Prereq: Upper division or graduate standing. (Same as NUR 510.)
- HSE 595 DIRECTED STUDIES.** (1-3)  
Independent work devoted to research on specific problems, to challenge the student to synthesize concepts from his total program and relate them to his allied health specialty. Conference, one to three hours per week. May be repeated to a maximum of six credits. Prereq: Consent of instructor.
- HSE 660 ADVANCED CLINICAL PRACTICUM IN ALLIED HEALTH.** (1-6)  
Offers advanced supervised clinical experience appropriate to the student's specialty. Forty clinical hours for one semester hour credit. May be repeated for a maximum of six credits. Prereq: Graduate standing; consent of instructor.
- HSE 670 ADVANCED SEMINAR IN ALLIED HEALTH.** (1-3)  
Content of this course is determined by the clinical department(s) offering the seminar. It includes in-depth consideration of recent research and its application to health care delivery. May be repeated for a maximum of nine credits. Prereq: Consent of instructor.
- HSE 690 RESEARCH PROBLEMS IN ALLIED HEALTH.** (3)  
An independent research course for the study of special problems in allied health education. May be repeated to a maximum of 12 credits. Prereq: Graduate standing; consent of instructor.
- HSE 831 EFFECTS OF DISEASE AND INJURY ON THE PATIENT AND FAMILY.** (2)  
Focuses on the psychosocial aspects of disease and injury encountered by physical therapists as they affect the adjustment of patients and families. The role of personality, the family, and the physical therapist in reaction and adjustment to specific medical conditions is emphasized and intervention techniques for facilitating patient adjustment are addressed. Prereq: Admission to the physical therapy curriculum or consent of instructor and two semesters of psychology.

**HSE 842 CLINICAL PRACTICUM IN ALLIED HEALTH. (1-6)**  
Offers supervised clinical experience appropriate to the student's allied health specialty as determined by the clinical department. May be repeated to a maximum of 12 credits. Prereq: Admission to College of Allied Health Professions Program or permission of instructor.

**HSE 854 BIOLOGY OF DISEASE. (3)**  
A study of the concept and process of disease. May be repeated for a total of five credits. Prereq: Admission to the Physical Therapy professional program and successful completion of the spring and summer semesters (first year of professional program). (Same as PT 854.)

**HSE 880 SEMINAR IN ALLIED HEALTH (Variable Topic). (1-3)**  
Study and analysis of current and topical problems and issues regarding the roles, trends and research for allied health educators. May be repeated to a maximum of six credits. Prereq: Admission to the College of Allied Health Professions Program.

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## HSM                      Health Services    Management

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**HSM 241 HEALTH AND MEDICAL CARE DELIVERY SYSTEMS. (3)**  
Review of the wellness-illness spectrum and the societal response in terms of health services. Topics to be covered include the nature and functions of health services agencies and professionals, and the impact of social, political, economic, regulatory, and technological forces. Also includes a discussion of major health problems and related health care programs.

**HSM 250 INTRODUCTORY EPIDEMIOLOGY. (3)**  
An introduction to the science of epidemiology as the study of the distribution and determinants of health and disease. Prereq: Area I Mathematics requirement; BIO 110.

**HSM 260 INTRODUCTION TO HEALTH ADMINISTRATION. (1)**  
Introduction to administrative roles, functions, settings and requirements through interviews with practicing administrators, site visits, discussion, and case studies.

**HSM 351 HEALTH SERVICES ADMINISTRATION. (3)**  
Theories and practices of administration in health care institutions with special emphases on organizational behavior and analyses of various administrative processes and techniques. Prereq: HSM 260, CLA 131 and professional program status.

**HSM 353 HEALTH ADMINISTRATION, PLANNING AND MANAGEMENT TECHNIQUES. (3)**  
Review of quantitative and nonquantitative techniques used in health care settings for planning, implementation and control. Emphasis will be placed on health service area delineation, patient origin studies, research methods, management information systems such as PAS, HAS, I.C.D.A., and quality assessment systems. Prereq: HSM 351, STA 291 or STA 370, and professional program status.

**HSM 354 HEALTH LAW. (3)**  
Introduction to concepts of administrative and tort law applicable to health care settings. Topics to be considered include governance, patient rights, informed consent, medical/moral problems, malpractice, tax laws, contracts, labor law, regulation and institutional liability.

**HSM 355 FINANCIAL MANAGEMENT OF HEALTH CARE INSTITUTIONS. (3)**  
A review of financial management practices in health care institutions. Course will analyze regulatory and third party reimbursement for financial management, financial management practices, impact of financing mechanisms and practices on health services decision making. Prereq: ACC 201, ACC 202, CH 351, ECO 260 and ECO 261 or consent of department.

**HSM 450 HOSPITAL AND HEALTH SERVICES: INTERORGANIZATIONAL RELATIONSHIPS. (3)**  
Environment of interacting organizations in the health industry is considered. Attention given to multi-hospital organizations and other forms of interorganizational relationships. Prereq: HSM 351 and HSM 843.

**HSM 451 TOPICS IN HEALTH ADMINISTRATION (Subtitle required). (1-6)**  
Readings, projects, lecture and/or discussion in seminar format to illuminate current topics of special interest or concern in health administration. May be repeated to a maximum of six hours. Prereq: Consent of department.

**HSM 452 COMMUNITY AND INSTITUTIONAL PLANNING FOR HEALTH SERVICES DELIVERY. (3)**  
Theoretical foundations for health planning. History of health planning and regulation. Specific attention will be given to integration of institutional planning with community health planning. Prereq: HSM 843.

**HSM 502 ORGANIZATION AND SUPERVISION IN HEALTH CARE DELIVERY. (3)**  
An analysis of the structure, functions and operations of systems for health care delivery. Emphasis is placed upon interrelationships among health care agencies; the role of the health care professional in supervision; human relations in health care delivery; and recent developments and trends in health care delivery. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**HSM 510 ORGANIZATION OF THE LONG-TERM CARE SECTOR. (3)**  
This course examines the structure and function of the long-term care sector with emphasis on nursing homes and the role of noninstitutional alternatives. Analysis focuses on the impact of changes in reimbursement and regulatory policy, interorganizational relations, newly emerging treatment modalities, and the influence of the external organizational, economic, and political environment. Prereq: A course in health care delivery systems or permission of instructor.

**HSM 511 INDEPENDENT STUDY IN HEALTH SERVICES ADMINISTRATION. (1-3)**  
Directed independent library and/or community health study. May be repeated to a maximum of six hours. Prereq: Major in health administration and/or consent of department chairperson.

**HSM 538 FINANCIAL MANAGEMENT TECHNIQUES FOR THE CLINICAL MANAGER. (3)**  
This course is designed to develop an understanding of basic financial management concepts and techniques and their use in decision making by clinical managers. The focus will be on non-financially trained clinicians who have assumed or plan to assume managerial positions in health care organizations. Lectures, problems, and case studies will be used to provide an opportunity to apply the material to a variety of organizational settings. Prereq: Senior level or graduate student standing in the College of Allied Health Professions or consent of the instructor.

**HSM 600 EPIDEMIOLOGY. (3)**  
A study of the natural history of disease. (Same as HA 600.)

**HSM 601 OVERVIEW OF THE HEALTH CARE DELIVERY SYSTEM. (3)**  
An introduction to the health care delivery system in the United States, including its composition, functioning, the interrelationships of organizations and professional groups within the system in various settings, health care terminology, and major problems and issues in the delivery of health services. Prereq: MHA/MPA program status. (Same as HA 601/PA 671.)

**\*HSM 602 STRATEGIC PLANNING AND MANAGEMENT OF HEALTH CARE ORGANIZATIONS. (3)**  
This course is designed to focus on the future needs of the health care organization as contrasted to day-to-day operational management. Topics include basic strategic planning theory, the process of strategic plan development, specific methods of analysis including environmental and organizational analysis and appropriate analytical techniques. Several health care trends such as restructuring, innovation in health care delivery and financing and performance measurements will be illustrated through case analysis in a variety of provider settings. Prereq: MHA status and HA 601, HA 621 and HA 642. (Same as HA 602.)

**HSM 603 LEGAL ASPECTS OF HEALTH ADMINISTRATION. (3)**  
The course will familiarize students with the application of law to management issues in health care organizations. Skills including terminology, legal reasoning, the tools of law, and topics specific to the health care setting are addressed. Prereq: MHA program status and HA 601. (Same as HA 603.)

**HSM 622 MENTAL HEALTH ADMINISTRATION. (3)**  
This course focuses upon the administration of local mental health agencies, facilities and coordination of deinstitutionalization programs, e.g., group houses, halfway houses. The course will focus upon system coordination, finance and communication. Prereq: MHA/MPA program status. (Same as HA 622.)

**\*HSM 624 QUALITY METHODS AND INFORMATION SYSTEMS IN HEALTH CARE. (3)**

This course will focus on the total quality management (TQM) concept and its applicability to health services organizations. The information systems and statistical central techniques required to support the effort will be covered along with the history of the Quality Assurance (QA) function. Prereq: HA 601, HA 621 and HA 635. (Same as HA 624.)

**\*HSM 635 MANAGEMENT ACCOUNTING FOR HEALTH CARE ORGANIZATIONS. (3)**

This course is designed to introduce the use of management accounting techniques to decision making in health care organizations. Lectures, problems and cases will be used to provide an opportunity to focus on the various types of health care providers. Prereq: MHA/MPA program status and HA 601 and HA 621. (Same as HA 635.)

**HSM 660 DECISION MAKING IN HEALTH CARE ORGANIZATIONS. (3)**

This course is designed to build on the concepts and techniques introduced in the MHA curriculum and integrate them with a decision making focus in a variety of health care problems and settings. Case analysis will be used extensively to develop an opportunity for the student to learn to apply the appropriate skills to an unstructured environment. Prereq: MHA program status and must be taken in last semester of MHA program studies. (Same as HA 660.)

**HSM 711 RESIDENCY IN HEALTH ADMINISTRATION. (3)**

Practical field experience in a health administrative setting under the direction of an academic and a workplace supervisor. Prereq: MHA/MPA program status. (Same as HA 711.)

**HSM 775 SPECIAL TOPICS IN HEALTH ADMINISTRATION. (1-3)**  
An analysis of selected issues with special significance for health administration. Prereq: MPA/MHA program status. (Same as HA/PA 775.)

**HSM 785 INDEPENDENT STUDY IN HEALTH ADMINISTRATION. (1-3)**

Supervised individual research on a topic related to health administration selected by the student. May be repeated to a maximum of six credits. Prereq: Consent of instructor. (Same as HA/PA 785.)

**HSM 842 SEMINAR IN HEALTH ADMINISTRATION: PRE-PRACTICUM. (1)**

Preparatory seminar for the field practicum in health administration. Will cover such topics as self assessment, interviewing skills, forms of organizational behavior, consultation skills, time management, and documentation. Prereq: CH 351, 355; Majors only with permission of department.

**HSM 843 HEALTH ADMINISTRATION PRACTICUM. (1-12)**

Application of theoretical concepts in practice settings selected by faculty under the supervision of a preceptor and on-campus faculty. Includes in-depth study of an applied problem in health administration. Must be repeated to a maximum of 12 credits. Laboratory: one 40-hour week equals one credit hour. Prereq: Majors only— with permission of department.

**HSM 844 SEMINAR IN HEALTH ADMINISTRATION: POST-PRACTICUM. (1)**

Review of practicum experiences and an integration of theoretical concepts of health administration with the practice environment. Prereq: CH 843—majors only—with permission of department.



## ISC Integrated Strategic Communication

### ISC 161 INTRODUCTION TO INTEGRATED STRATEGIC COMMUNICATION. (3)

An introductory course in all phases of integrated strategic communication and its role in contemporary business and society. Includes an historical and socio cultural overview of advertising, public relations, sales promotion and direct response marketing as well as an exploration of their interrelationships. Covers strategic planning for integrated communication, message approaches and their foundations in theories of persuasion and information processing, and characteristics of message delivery systems. Provides a discussion of ethics and regulation, and the economic and social impact of the industries.

### ISC 261 STRATEGIC PLANNING AND WRITING. (3)

Introduces students to the systematic planning processes and techniques of creative and persuasive message preparation for integrated strategic communication. Extensive practice in writing and visual communication for print and electronic vehicles in the disciplines of advertising, public relations, sales promotion and direct marketing. Lecture, two hours; laboratory, two hours per week. Prereq: ISC 161 or consent of instructor; keyboarding 30 wpm.

### ISC 311 ETHICS AND THE STRATEGIC COMMUNICATOR. (1)

An introduction to the ethical dilemmas inherent in the strategic persuasion that permeates a democratic, free-market society. Emphasis will be placed on the consequences such persuasion can have on targeted groups as well as society as a whole and on the nature and exercise of responsibility as it links client to persuader to intended target. Prereq: Major standing or consent of instructor.

### ISC 321 RESEARCH METHODS FOR THE INTEGRATED STRATEGIC COMMUNICATION PROFESSIONAL. (3)

Introduces students to applied research as a decision making tool for the integrated communications professional. Students acquire basic skills in: identification of information needs, stating of research objectives, selection of appropriate research technique (s), sample selection, questionnaire design, analysis procedures, report writing, and budget management. Topics prepare students to conduct small-scale survey research and to buy and evaluate studies from custom and/or syndicated research suppliers. Legal and ethical issues are also examined. Prereq: Major standing; one course in statistics.

### ISC 331 ADVERTISING CREATIVE STRATEGY AND EXECUTION I. (3)

Ideas and their translation into words and images which inform and persuade. Emphasis is on a disciplined, strategic approach to creative decision-making across all media. Topics include setting objectives, selection of appeal, copy structure demands of different media, design principles, layout and storyboarding, and regulations affecting messages. Lecture, two hours; laboratory, two hours per week. Prereq: Concurrent or previous enrollment in ISC 311 and ISC 321, or consent of instructor.

### ISC 341 STRATEGIC PUBLIC RELATIONS. (3)

A course introducing students to the basic concepts of public relations, including its theory and practices, professional history, function in organizations, and role in society. This course meets the needs of those planning or currently involved in professional and managerial careers which require an understanding of public relations. Prereq: For ISC majors, concurrent or previous enrollment in ISC 311 and ISC 321, or consent of instructor; for all others, admission to upper-division in the College of Communications and Information Studies.

### ISC 351 INTEGRATED STRATEGIC COMMUNICATION MANAGEMENT: THE CASE APPROACH. (3)

Planning and implementation of integrated communication strategy in practical applications. Students analyze business objectives and communications alternatives in the context of case studies drawn from existing industry situations, then develop and present solutions involving advertising message and media strategy, consumer and trade sales promotions, public relations, and direct marketing tools. Other topics include budgeting, research effectiveness measurement, and managing the client-firm relationship. Prereq: Concurrent or previous enrollment in ISC 311 and ISC 321 or consent of instructor.

### ISC 361 DIRECT RESPONSE TARGETING: MEDIA AND DATABASE MANAGEMENT. (3)

This course will introduce students to direct marketing practices with emphasis on data base marketing, strategic business planning, importance of the offer, selection and selling merchandise, business-to-business direct marketing, fund raising, mailing lists, print and electronic media, co-ops, telemarketing, production lead generation, direct marketing math, idea development, research and integrating direct marketing into the overall marketing mix. The course will be practical rather than theoretical in nature. Prereq: Concurrent or previous enrollment in ISC 311 and ISC 321, or consent of instructor.

### ISC 371 SPECIALIZED PUBLIC RELATIONS WRITING. (3)

Audience and purposes of writing are assessed as students develop a formal strategy to guide - and to evaluate - their writing. Strategic writing tasks include writing of position papers, speech writing, and writing for brochures, media releases, letters and newsletters. Societal impact and ethical considerations are examined across all writing tasks. Lecture, two hours; laboratory, two hours per week. Prereq: ISC 341 or consent of instructor.

### ISC 431 ADVERTISING CREATIVE STRATEGY AND EXECUTION II. (3)

Students refine their ability to meet strategic goals through creative message executions. Media options and their impact on message structure and preparation are explored more fully. Application is made of pertinent theoretical principles such as source credibility, selective exposure/perception, and learning theory. Presentation skills stressed. Portfolio preparation and review. Lecture, two hours; laboratory, two hours. Prereq: ISC 331 or consent of instructor.

### ISC 441 CASE STUDIES IN PUBLIC RELATIONS. (3)

This course is designed to reinforce and expand the knowledge learned in the introductory public relations course, ISC 341. The course will provide students with an opportunity to apply public relations principles and approaches to institutional experiences. Emphasis will be placed on actual case studies, and students are expected to demonstrate a high level of proficiency in written and oral communication skills. Prereq: ISC 341 or consent of instructor.

### ISC 451 INTEGRATED STRATEGIC MEDIA MANAGEMENT. (3)

An overview of the strategic use of media in integrated promotional campaigns is provided. Students acquire basic skills in quantitative and qualitative evaluation of media; choice of target audiences; use of secondary research on products and audiences; development of media objectives, strategies and tactics; and the oral and written presentation of media plans. The basic structure of media organizations is discussed. Lecture, two hours; laboratory, two hours per week. Prereq: ISC 351 or consent of instructor.

### ISC 461 DIRECT RESPONSE MESSAGE STRATEGIES. (3)

Examines the purpose, range, social and economic impact, and techniques of direct response messages. Students review type and role of suppliers as well as legal considerations. Based on a strategic plan, students frame messages for print, broadcast, and computer-based media that guide and facilitate response from prime prospects. Examines methods to evaluate message effectiveness. Prereq: ISC 361 or consent of instructor.

### ISC 489 TOPICAL STUDIES IN MASS MEDIA PROFESSIONS (Subtitle required). (1)

Each course module offers advanced, pinpoint study of a topic central to the mass media professions. Depending on the topic, the course format may include lectures, seminars, and/or studio work. May be repeated to a maximum of three credits when identified by different subtitles. Prereq: Variable, given when topic is identified.

### ISC 491 INTEGRATED STRATEGIC COMMUNICATIONS CAMPAIGNS. (2)

An advanced course which enables senior students to unify strategic and tactical abilities developed in their research, creative, account management/media, public relations and/or direct response courses. The format for this synthesis requires students to establish strategy, develop, execute, and present a multimedia integrated campaign. Student teams compete for client approval on national, regional, or local accounts. Lecture, one hour; laboratory, two hours per week. Prereq: Completion of Major Path or consent of instructor.

### ISC 541 CRITICAL TOPICS IN INTEGRATED STRATEGIC COMMUNICATION (Subtitle required). (3)

Students will use psychological or sociological perspectives to analyze one or more important aspects of the interaction between integrated strategic communication and society. Topics that may be considered include behavioral, political, economic, and/or international issues. The course may be repeated to a maximum of six credits when identified by different subtitles. Prereq: Senior or graduate standing; ISC 161 or consent of instructor.

**ISC 543 REGULATION OF STRATEGIC COMMUNICATION. (3)**  
Course examines regulation of strategic, persuasive communication by federal, state, and local agencies as well as self-regulation. Privacy, copyright, and deception are among featured issues. Prereq: Major standing or consent of instructor.

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## ISP International Studies Program

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**ISP 499 STUDY ABROAD IN SPONSORED PROGRAM. (12-16)**  
A course designed for undergraduate students who go abroad to take courses in a foreign institution as part of a University of Kentucky program. A plan of study must be developed with the advice and approval of the UK faculty advisor for the particular study abroad program. The variable credits for ISP 499 are based on the number of credit hours the student plans to complete at the foreign institution. The actual credit hours recorded represent those credits completed by the student and sent to the Office of International Affairs by the foreign institution. University equivalent credit will be determined prior to the beginning of the student's study abroad. Prereq: Approval by student's academic department, the faculty advisor for the study abroad program, and the Office of International Affairs.

**ISP 599 STUDY ABROAD. (1)**  
A course designed for undergraduate and graduate students who go abroad for study following a plan developed as part of their academic program and who are not otherwise registered at the University during the period overseas. Registration in the course would constitute full-time status. The course may be taken on a pass-fail basis for undergraduate students and audited by graduate students. Evaluation by the academic adviser will be an element of the plan. May be repeated to a maximum of three credits. Prereq: Approval by each student's academic department, the Registrar, and the Office for International Programs.

## JAT Journalism, Advertising, and Telecommunications

### JAT 101 INTRODUCTION TO COMMUNICATION MEDIA. (3)

Lectures, readings, and other materials provide an introductory survey of the journalism, advertising, and telecommunications professions. This course will foster an understanding of the historical development, theory, effects, regulation, practice, and professional opportunities of these three industries. Students will gain an awareness of the possibilities and limitations of evolving communication technologies, preparing them to become intelligent consumers, producers, and managers of communication media.

### JAT 201 TELECOMMUNICATIONS TECHNOLOGIES AND SOCIETY. (3)

Overview of electronic media technologies, emphasizing their historical development and interrelationships with economics, policy, and society.

### JAT 204 WRITING FOR THE MASS MEDIA. (3)

A course designed to introduce students in the mass communications fields to practices and techniques in preparation of information materials for the printed and broadcast media. Designed for students in the School of Journalism and the College of Communications. Lecture, one hour; laboratory, four hours per week. Prereq: JAT 101 or consent of instructor; typing 30 wpm.

### JAT 241 COMMUNICATIONS PRACTICUM. (1-4)

Supervised laboratory work in the media of mass communications, with meetings for evaluation of work, study of techniques, analyses of problems, and reports. May be repeated to a maximum of four credits. (Offered in Community College System only.)

### JAT 300 TELECOMMUNICATIONS RESEARCH METHODS. (3)

An introduction to behavioral research relating to telecommunications basic survey and experimental methodology including reliability of simple measurements. Prereq: JAT 101, JAT 201.

### JAT 301 NEWS REPORTING. (3)

A reporting course which emphasizes special fields of information, news gathering, and news evaluation. Lecture, two hours; laboratory, two hours per week. Prereq: JAT 204 or equivalent.

### JAT 303 COPYREADING AND EDITING. (3)

Instruction and practice in newspaper deskwork. Preparation of local, state, telegraph, and radio news and features; picture editing, and page make-up. Lecture, two hours; laboratory, two hours per week. Prereq: JAT 204.

### JAT 305 TELECOMMUNICATIONS PROGRAM ANALYSIS. (3)

Course designed to assist students in developing criteria for analyzing structure and content of program material and for analyzing the relationships of audiences, programs, and American telecommunications systems. Lecture, two hours; laboratory, two hours. Prereq: JAT 101, JAT 201.

### JAT 310 TELECOMMUNICATIONS REGULATIONS. (3)

A study of the governmental regulations of telecommunications by the FCC, and other federal, state and local agencies, including licensing, libel and slander, copyrights, illegal practices, self regulation. Prereq: JAT 101, JAT 201.

### JAT 312 TELEVISION PRODUCTION I. (3)

An introduction to the fundamentals of video production, from conception to completed product. Practical training with essential production equipment will be offered. Lecture, two hours; laboratory, two hours per week. Prereq: JAT 101 and consent of department chair.

### JAT 319 WORLD MEDIA SYSTEMS. (3)

A comparison of the communications media in different countries of the world and the theories used to justify them. How various political and social systems affect the media and how the media affect the societies in which they exist. Prereq: COM 101, JAT 101 or consent of instructor. (Same as COM 319.)

### JAT 320 RADIO AND TELEVISION NEWS REPORTING. (3)

Writing for broadcast builds upon the skills learned in JAT 101, Introduction to Journalism; JAT 204, Writing for the Mass Media; and JAT 303, Reporting, to help the student acquire proficiencies required for careers at radio and television news gathering facilities. Writing conversationally and for time instead of space will be essential throughout the course. Voice development and presentation including diction and projection will be studied and put into practice. Basic editing of radio and television news tape will be taught. Ethical problems and situations will be considered. Prereq: JAT 301 or consent of instructor for non-degree journalism students.

### JAT 387 INTRODUCTION TO PRESS PHOTOGRAPHY. (3)

A basic course in the use of cameras, and laboratory equipment in modern press photography, and a study of selected readings on photographic methods and skills.

### JAT 395 INDEPENDENT STUDY. (1-3)

Designed for advanced students with research or special study problems. Regular consultation with the instructor. May be repeated to a maximum of six credits. Enrollment normally limited to juniors and seniors with a 3.0 standing in the major. These requirements may be waived by the department in exceptional circumstances. Prereq: Consent of instructor.

### JAT 399 INTERNSHIP (Subtitle required). (1-3)

Qualified students enter the professional sector to refine skills and knowledge. Supervised internships approved by the School allow placements in industry, government, radio, television, print media, research agencies, etc. A signed contract must be completed prior to the start of the internship. Pass/Fail only. Prereq: admission to upper-division, fulfillment of internship prerequisites for the major, and approval of internship director for the major.

### JAT 409 MAGAZINE ARTICLE WRITING. (3)

Lectures, personal conferences, and practice in writing and submitting material for publication in magazines; study of the markets for this material; free-lance article writing. Prereq: JAT 301 or consent of instructor.

### JAT 410 PUBLICATIONS PRODUCTION. (3)

Study of the theory and practice in the techniques of effective communication through print. Primary emphasis will be on magazine, but other publications will be considered. The course will provide instruction in the processes involved in defining the purpose of, designing and producing a publication. Those are: planning, design, article grading and editing, picture selection, page layout, headline and title writing. Lecture, two hours; laboratory, two hours per week. Prereq: Consent of instructor.

### JAT 412 TELEVISION PRODUCTION II. (3)

A follow-up to JAT 312, this course is an advanced television production course and will feature instruction in directing, camera work, editing and lighting. Lecture, three hours; laboratory, one hour per week. Prereq: JAT 312.

### JAT 413 AUDIO PRODUCTION. (3)

Elements of audio production, including basic machines, microphones, patch panels, the production mixing. Different audio products are discussed. Lecture, two hours; laboratory, two hours per week. Prereq: JAT 305.

### JAT 414 TELECOMMUNICATIONS PERFORMANCE. (3)

Offers the students the unique opportunity to develop essential skills for professional on-air performance. Development of on-camera presence, pleasing and articulate vocal presentation and a thorough understanding of the performer's radio and television performance are covered. Lecture, two hours; laboratory, two hours per week. Prereq: JAT 312.

### JAT 420 TELECOMMUNICATIONS PROGRAM CRITICISM. (3)

Examination of each of several critical theories and approaches to the criticism of telecommunications program content. Practical experience in evaluating critical writing and in the writing of critical pieces. Prereq: JAT 305.

### JAT 439 REPORTING PUBLIC AFFAIRS. (3)

Instruction and practice in reporting the news originating in courts and other public institutions. Lecture, two hours; laboratory, two hours per week. Prereq: JAT 301.

### JAT 455 MASS MEDIA AND DIVERSITY. (3)

This course will examine gender and minority issues in the media. The course offers a critical framework for analysis of socio-cultural issues pertaining to women, ethnic groups, disabled persons, and others and of their presentation in the media. Prereq: JGED, JOAD, TELE major or permission of instructor.

### JAT 464 ECONOMICS OF REGULATED INDUSTRIES. (3)

A study of economic principles and regulatory procedures related to regulated industries. The study includes an analysis of particular regulated industries, such as electric, gas, communications, and transportation. Prereq: ECO 202 or equivalent. (Same as AEC/ECO 464.)

### JAT 485G COMMUNITY JOURNALISM. (3)

A study of all phases—editorial, advertising, circulation, production, management—of small town and suburban newspapers, with emphasis on the special concerns and opportunities of community newspaper editors and publishers. Prereq: JAT 204 or consent of instructor.

**JAT 487 PHOTOJOURNALISM. (3)**

This course provides an in-depth study of the many facets of photojournalism from the photo editor's vantage as opposed to that of the news photographer. The student will, while continuing to shoot assignments, probe the legal aspects of news photography; the ethics of the profession; look at the future of the field; shoot and lay out stories, and attend lectures by visitors from the profession. Lecture, one hour per week; laboratory, four hours per week. Prereq: JAT 387 and consent of instructor.

**JAT 497 SPECIAL TOPICS IN JOURNALISM (Subtitle required). (1-3)**

Course will focus on selected topics drawn from various areas of general editorial, advertising, and public relations, taught by faculty members with special interest. May be repeated in courses of differing topics to a maximum of six credits. A title assigned each time course is offered. Prereq: Consent of instructor.

**JAT 499 ADVANCED WRITING FOR THE MASS MEDIA. (3)**

A course designed to provide communications majors advanced training in reporting and writing articles on current events, public issues, personalities, culture and entertainment for newspapers, magazines and the broadcast media. Twice weekly seminars; laboratory and independent work by students as needed to complete assignments; individual consultation between instructor and students. Prereq: Consent of instructor.

**JAT 504 TELECOMMUNICATIONS MANAGEMENT. (3)**

To introduce students to the principles of modern telecommunication management as applied to telecommunication properties. Prereq: JAT 301 and JAT 305, or consent of instructor.

**JAT 505 ADVANCED TOPICS IN TELECOMMUNICATIONS POLICY. (3)**

Examination of the purposes and processes of formation of public and private policy toward radio, television, and other information industries. Prereq: JAT 301.

**JAT 508 ADVANCED RESEARCH METHODS. (3)**

Provides advanced training for research design, sampling, analysis and evaluation procedures in telecommunication. Telecommunication problem areas will be analyzed through readings, discussion and use of analytic techniques. Prereq: JAT 300 and a statistics course.

**JAT 510 ADVERTISING AND ELECTRONIC MEDIA. (3)**

The data and techniques of radio and television advertising, including problems of coverage and circulation, spot campaigns, testing, time buying, the agency, measuring broadcast effectiveness, merchandising radio and television advertising and time selling. Prereq: JAT 300.

**JAT 511 TELECOMMUNICATIONS INSTRUCTIONAL SYSTEMS. (3)**

The course is designed to assist telecommunication professionals and students to design, operate and evaluate telecommunication tools and materials in support of organized instruction. Lecture, three hours; laboratory, two hours. Prereq: Consent of instructor.

**JAT 513 SOCIAL EFFECTS OF TELECOMMUNICATIONS. (3)**

An examination of the economic, political, social and behavioral effects of telecommunication systems in American society. Focus on theory and empirical research generated since 1940. Prereq: JAT 300.

**JAT 520 ECONOMICS OF INFORMATION. (3)**

Exploration of the economics of information industries, with particular attention to the special characteristics of information, the economic behavior of communication channels, and the role of information in decision making, the economy, organizational behavior, and other domains. Prereq: Consent of instructor.

**JAT 530 PROSEMINAR IN TELECOMMUNICATIONS. (3)**

Discussion and reports on current trends in telecommunication industries and the behavioral, political and regulatory implications attending such trends. Prereq: By departmental invitation only.

**JAT 531 LAW OF THE PRESS. (3)**

A study of the special laws of libel, copyright, and regulatory provisions that pertain to the press.

**JAT 532 ETHICS OF JOURNALISM AND MASS COMMUNICATION. (3)**

An examination of the nature, role, and evaluation of ethics in journalism and mass communication. Key ethical issues will be analyzed conceptually and illustrated in case studies. The social, political, and economic context of ethical issues in journalism will be identified and examined. The objectives are to enhance the ability to use reason in resolving issues of value as they arise in the practice of journalism and mass communication. Prereq: PHI 130 or consent of instructor.

**JAT 535 HISTORY OF JOURNALISM. (3)**

A study of the rise and development of American journalism and newspapers.

**JAT 545 ENTERTAINMENT FUNCTIONS OF THE MASS MEDIA. (3)**

This course provides an understanding of telecommunication content designed primarily for entertainment. It looks at why audiences seek such content, at the immediate and long-term probable consequences and at the role telecommunication entertainment content plays in society from the vantage both of classic and contemporary theory and research. Prereq: JAT 300.

**JAT 599 TELECOMMUNICATIONS TOPICAL SEMINAR. (3)**

In-depth seminar approach to a single topical issue in telecommunication. Different topical issues each offering. Course will be offered on demand. May be repeated to a maximum of six credits. Prereq: Consent of department.

**JPN Japan Studies**

**\*JPN 101 BEGINNING JAPANESE I. (4)**

A course in first semester Japanese language.

**\*JPN 102 BEGINNING JAPANESE II. (4)**

A course in second semester Japanese language. Prereq: JPN 101 or equivalent.

**\*JPN 201 INTERMEDIATE JAPANESE I. (3)**

A course in third semester Japanese language. Prereq: JPN 102/RAE 121 or equivalent.

**\*JPN 202 INTERMEDIATE JAPANESE II. (3)**

A course in fourth semester Japanese language. Prereq: JPN 201/RAE 220 or equivalent.

**#JPN 320 INTRODUCTION TO JAPANESE CULTURE, PRE-MODERN TO 1868. (3)**

This course, taught in English, is designed as a general introduction to the culture of pre-modern Japan (up to the Meiji Restoration of 1868). This discussion will focus heavily on the literary arts but will also encompass film, architecture, and the fine arts.

**#JPN 321 INTRODUCTION TO JAPANESE CULTURE, MEIJI (1868) TO PRESENT. (3)**

General introduction to Japanese culture from Meiji Restoration (1868) to the present, focusing mainly on the literary arts, but also including film, architecture and the fine arts.

**#JPN 334 ENVIRONMENT, SOCIETY AND ECONOMY OF JAPAN. (3)**

This course examines some of the major aspects of the society, culture, and economy of Japan. It discusses Japan's human and natural environments; natural hazards and disasters; cultural history and geography; economic and technological developments, their prospects and potentials; challenges to the management of environment and its resources; and Japan's role in global economy. (Same as GEO 334.)

**#JPN 395 INDEPENDENT WORK IN JAPANESE. (1-6)**

Independent work to pursue special problems in reading and research. May be repeated to a maximum of six credits. Prereq: Instructor approval.

**#JPN 405 SEMINAR IN JAPANESE AND ASIAN STUDIES (Subtitle required). (3)**

An interdisciplinary seminar focusing on a topic in Japanese and Asian Studies. May be repeated to a maximum of six credits. Prereq: Instructor approval.

## KHP Kinesiology and Health Promotion

### PHYSICAL EDUCATION

#### KHP 100-KHP 135 SERVICE COURSES. (1)

Instruction in a variety of motor skills activities. Courses are designed for students at a beginner level. Up to six hours credit may be earned in service courses; however, the same activity may not be repeated for credit.

#### KHP 136-KHP 144 ADVANCED SERVICE COURSES. (1)

Instruction in a variety of motor skills activities. The courses are designed for students who already possess intermediate skill in the activity. Instructors will assess skill at start of course. Up to six hours credit may be earned in service courses; however, the same activity may not be repeated for credit. Assignment of specific titles will occur internally in the department. Laboratory, three hours. Prereq: Completion of comparable service course or demonstrated competency.

#### KHP 146 FLAGBALL AND SPEEDBALL. (1)

Designed to familiarize the professional physical education student with the skills, practices, lead-up games, techniques, and theory of flagball and speedball. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach flagball and speedball. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: Department major or consent of instructor.

#### KHP 147 DANCE FOUNDATIONS I. (1)

Designed to familiarize the professional physical education student with the skills, practices, techniques, and theory of social, folk and square dancing. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach social, folk, and square dance. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: PHED, KINE, and ELED majors only.

#### KHP 148 BASKETBALL. (1)

Designed to familiarize the professional physical education student with the skills, practices, and theory of basketball. Development of at least intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach basketball. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester.

#### KHP 150 SOCCER. (1)

Designed to familiarize the professional physical education student with the skills, practices, techniques, and theory of soccer. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach soccer. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: PHED and KINE majors only.

#### KHP 152 TECHNIQUES OF SWIMMING. (1)

Acquisition of intermediate and advanced swimming skills. Includes techniques of teaching beginning and intermediate swimming and diving. Other topics include mechanical analysis of strokes, skin diving, survival swimming, basic first aid, rescue and safety in the aquatic environment. Laboratory, three hours per week. Prereq: Intermediate skill test first day of class and PHED, KINE majors only.

#### KHP 153 VOLLEYBALL. (1)

Designed to familiarize the professional physical education student with the skills, practices, techniques, and theory of volleyball. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach volleyball. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: PHED and KINE majors only.

#### KHP 154 DANCE FOUNDATIONS II. (1)

Designed to familiarize the professional physical education student with the techniques, skills, theory and composition of dance. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach dance and transfer its attributes to sports areas. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: PHED, KINE, and ELED majors only.

#### KHP 155 PRINCIPLES OF CONDITIONING. (1)

Designed to familiarize the professional physical education student with the theory, techniques, and practices of conditioning. Understanding of the basic principles, and an attainment of above average personal physical fitness status is expected of the students. The primary goal of the course is to equip students with knowledge and skill to design and carry out safe and meaningful physical conditioning programs. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester.

#### KHP 156 GYMNASTICS. (1)

Designed to familiarize the professional physical education student with the skills, practices, techniques and theory of gymnastics. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach gymnastics. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: KHP 115 or demonstrated competence and PHED, KINE majors only.

#### KHP 157 TRACK AND FIELD. (2)

Designed to familiarize the professional physical education student with the skills, practices, techniques, and theory of track and field. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach track and field. Laboratory, six hours.

#### KHP 158 ARCHERY AND SOFTBALL. (1)

Designed to familiarize the professional physical education student with the skills, practices, and theories of archery and softball. Development of at least an intermediate skill level is expected of the students. The goal of the course is to provide the students with the teaching methods and skills to effectively teach archery and softball in the public schools. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester.

#### KHP 159 TENNIS. (1)

Designed to familiarize the professional physical education student with the skills, practices, techniques, and theory of tennis. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach tennis. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: PHED and KINE majors only.

#### KHP 160 BADMINTON. (1)

Designed to familiarize the professional physical education student with the skills, practices, techniques, and theory of badminton. Development of at least an intermediate skill level is expected of the students. The primary goal of the course is to equip the student with the skills necessary to effectively teach badminton. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: PHED and KINE majors only.

#### KHP 161 GOLF. (1)

Designed to familiarize the professional physical education student with the skills, strategies, rules and teaching techniques of golf. Development of at least an intermediate skill level is expected. The primary goal of the course is to equip the student with skills necessary to effectively teach golf. Laboratory: Six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: PHED and KINE majors only.

#### KHP 162 OUTDOOR EDUCATION THROUGH ACTIVITIES. (1)

An overview of outdoor educational skills and wilderness related activities for use by physical education majors in the school and/or recreational setting. Laboratory, two hours per week. Prereq: PHED and KINE majors only.

#### KHP 163 TEAM HANDBALL/NEW GAMES. (1)

This course is designed to familiarize the physical education student with the skills, practices, techniques, and theory of team handball and new games. Development of at least an intermediate skill level in team handball and a knowledge base of at least 20 new games is expected of the students. The primary goal of this course is to equip students with the skills necessary to effectively teach handball and new games. Laboratory, six hours per week for one-half the semester or three hours per week per semester.

#### KHP 181 MODERN DANCE I. (2)

Techniques of creative dance including movement sequences leading to individual and group studies in initial compositional elements. Laboratory, four hours. Prereq: KHP 106 or demonstrated skill for consent of instructor.

#### KHP 182 MODERN DANCE II. (2)

Advanced techniques for creative dance. Special emphasis on the development of movement themes as motivated by specific content. Laboratory, four hours. Prereq: KHP 181.

**KHP 200 THE HISTORY AND PHILOSOPHY OF PHYSICAL EDUCATION AND SPORT. (3)**  
An introduction to the history and philosophy of physical education. An emphasis will be on: (1) the role of philosophy, educational philosophy, and the philosophy of physical education and (2) the major historical influences in the development of existing physical education programs in the United States.

**KHP 220 SEXUALITY EDUCATION. (2)**  
This course is designed to prepare educators to offer sexuality education in the schools. Emphasis is placed on justification of sexuality education, relevant content, appropriate teaching techniques, and precautions to take when teaching sexuality education.

**KHP 222 DRUG EDUCATION. (2)**  
This course is designed to prepare educators to offer drug education in the schools. Emphasis is placed on the prevalence of drug use by youth; physiological, psychological, and social effects of various drugs; effective and ineffective approaches to drug abuse prevention; appropriate teaching strategies; and evaluating drug curricula.

**KHP 240 NUTRITION AND PHYSICAL FITNESS. (3)**  
Course focuses on the interrelationship between nutrition and physical fitness. The intent is to provide the student with the information necessary to formulate an individualized plan for the achievement and maintenance of adequate nutrition and physical fitness. Weight control will be discussed in this content. Team taught by nutrition faculty and health, physical education and recreation faculty. Lecture, two hours; laboratory, two hours. (Same as NFS 240.)

**KHP 241 BASKETBALL COACHING FUNDAMENTALS. (2)**  
Theory and practice in coaching fundamentals involved in basketball. Laboratory, four hours.

**KHP 244 BASEBALL AND SOFTBALL COACHING FUNDAMENTALS. (2)**  
Theory and practice in coaching fundamentals involved in baseball and softball. Laboratory, six hours.

**KHP 252 WATER SAFETY LEADERSHIP. (2)**  
Leadership training in the teaching of swimming, lifesaving, diving, synchronized swimming, competitive swimming, camp waterfront, beach and pool operation and exhibition. Laboratory, four hours. Prereq: Current lifesaving certificate or equivalent.

**KHP 263 CURRICULUM DESIGN AND DEVELOPMENTAL SPORTS SKILLS IN THE ELEMENTARY SCHOOL. (3)**  
The study of sports skills development and their inclusion in the elementary programs of games of low organization, lead-up games, and refined sports skills. Lecture, two hours; laboratory, two hours per week.

**KHP 290 HISTORY AND PHILOSOPHY OF THE DANCE. (3)**  
The study of the evolution of dance through the cultural periods of history and the interrelation of the arts of social structure and dance forms.

**KHP 293 CLASSICAL BALLET I. (2)**  
The basic techniques and theories of traditional classic dance. Designed for beginning dance students. Lecture, one hour; laboratory, two hours. Prereq: KHP 129 or demonstrated skill for consent of instructor.

**KHP 294 CLASSICAL BALLET II. (2)**  
Intermediate techniques and theories of classical dance. Lecture, one hour; laboratory, two hours. Prereq: KHP 293 or equivalent.

**KHP 300 PSYCHOLOGY AND SOCIOLOGY OF PHYSICAL EDUCATION AND SPORT. (3)**  
A survey course in the social science foundation of sport. Study of the sociological and psychological concepts which are relevant in understanding of sport in this country and the world. After the successful completion of this course, the student should be able to define, discuss, and identify the basic social and psychological factors which are related to the pursuit of movement through sport.

**KHP 321 OFFICIATING BASKETBALL. (1)**  
A course designed to provide the student with the knowledge, interpretations, skills, and mechanical techniques of officiating basketball. The standards of officiating as offered by KHSAA or the Affiliated Board of Officials of the National Associations for Girls and Women's Sports will be emphasized in the course. Instructional methods include lectures, discussion, situational drills and observation. Independent of course evaluation, students will be given the opportunity to take KHSAA or ABO qualifying examinations. Two hours lecture per week for one-half semester; two hours laboratory per week for one-half semester.

**KHP 322 OFFICIATING VOLLEYBALL. (1)**  
A course designed to provide the student with the knowledge, interpretations, skills, and mechanical techniques of officiating volleyball. The standard of officiating as offered by KHSAA or the Affiliated Boards of Officials of the National Associations for Girls and Women's Sports will be emphasized in the course. Instructional methods include lectures, discussion, situational drills and observation. Independent of course evaluation, students will be given the opportunity to take KHSAA or ABO qualifying examinations. Two hours lecture per week for one-half semester; two hours laboratory per week for one-half semester.

**KHP 323 OFFICIATING BASEBALL-SOFTBALL. (1)**  
A course designed to provide the student with the knowledge, interpretations, skills, and mechanical techniques of officiating baseball-softball. The standards of officiating as offered by KHSAA or the Affiliated Boards of Officials of the National Associations for Girls and Women's Sports will be emphasized in the course. Instructional methods include lecture, discussion, situational drills, and observation. Independent of course evaluation, students will be given the opportunity to take the KHSAA or ABO qualifying examinations. Two hours lecture per week for one-half semester; two hours laboratory per week for one-half semester.

**KHP 340 ATHLETIC TRAINING. (2)**  
Consideration is given to the prevention, treatment and rehabilitation of injuries. Films and other visuals, visiting physicians and team trainers will be used to supplement instruction. The student will have an opportunity to gain practical experience. Lecture, one hour; laboratory, three hours.

**KHP 344 PHYSICAL EDUCATION IN THE SECONDARY SCHOOL. (3)**  
Required for teacher certification in physical education. Theory and practice in methods of teaching physical education activities and supervising programs in the secondary school. Lecture, two hours; laboratory, two hours per week. Prereq: Admission to the Teacher Education Program or permission of the instructor.

**KHP 360 PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL. (3)**  
An introduction to the necessary skills needed for the planning and conduct of modern elementary physical education programs. Emphasis is placed on teaching basic movement skills, fundamental rhythmic and sports skills. Lecture, two hours; laboratory, two hours per week. Prereq: KHP 263 or equivalent or consent of instructor via permit; and admission to Teacher Education Program or consent of instructor via permit.

**KHP 361 FIELD EXPERIENCES WITH ELEMENTARY SCHOOL CHILDREN. (1)**  
Field experience with elementary school age children in programs of sports, physical education and recreation. Prereq: KHP 360 or equivalent experience or consent of field experience director.

**KHP 362 FIELD EXPERIENCES IN SECONDARY EDUCATION. (1)**  
Supervised experiences in school, agency, and recreation department programs of secondary education. Required of all majors in Secondary Teacher Education Programs in the Department of Health, Physical Education and Recreation. Includes field trip, inspection of programs and professional organizations. Prereq: Admission to the Teacher Education Program.

**KHP 369 STUDENT TEACHING IN PHYSICAL EDUCATION. (3-12)**  
For students who expect to teach and who meet the requirements for a major in physical education. Experience in working with children in physical education activities comprises basic part of course. Safety education also included. To be offered only on a pass-fail basis. Prereq: Admission to the Teacher Education Program or permission of instructor.

**KHP 382 PHYSICAL EDUCATION FOR ELEMENTARY SCHOOL TEACHERS. (2)**  
Provides physical education concepts and content to be taught to the elementary students. Includes instructional methods and management techniques appropriate for physical education programs at the elementary school level. Lecture, one hour; laboratory, two hours per week. Prereq: Admission to elementary or early childhood teacher education program or consent of instructor.

**KHP 390 DANCE ACTIVITIES IN THE ELEMENTARY SCHOOL. (2)**  
Designed for teachers of elementary children to give depth in significant phases of physical education of the elementary child. Special emphasis is given to acquisition of skills and understandings of the total dance program. Lecture, one hour; laboratory, two hours. Prereq: KHP 360 or consent of instructor.

- KHP 391 THEATER DANCE I.** (2)  
Theory and practice of theater dance from the primitive era to the 20th century. Lecture, one hour; laboratory, two hours.
- KHP 392 THEATER DANCE II.** (2)  
Intermediate theater dance, modern dance, dance for television, musical comedy, and stage plays. Lecture, one hour; laboratory, two hours. Prereq: KHP 391 or equivalent.
- KHP 393 RHYTHMICAL FORMS, IMPROVISATION, AND ANALYSIS.** (3)  
An analysis of rhythmical forms of movement incorporating the principal elements of dance improvisation. The craft of improvisation using the principles of dance as an art form will be explored.
- KHP 395 INDEPENDENT WORK IN HEALTH AND SAFETY OR PHYSICAL EDUCATION OR RECREATION.** (3)  
May be repeated to a maximum of 12 credits. Prereq: Major and 3.0 standing in area or consent of instructor.
- KHP 420G PHYSIOLOGY OF EXERCISE.** (3)  
An in-depth study of the immediate and long-term effects of exercise on the human organism. Lecture, two hours; laboratory, two hours. Prereq: ANA 206, PGY 206 or equivalent.
- KHP 430 METHODS OF TEACHING HEALTH EDUCATION.** (3)  
A variety of contemporary teaching methods appropriate for use in grades K-12 will be presented. Students will be exposed to these methods through textbook and outside readings and through observation of the instructor, public school teachers, and peer teachers. Methods will be critically examined for effectiveness in the cognitive, affective, and behavioral areas. Prereq: KHP 220, 230, or equivalent, or consent of instructor via permit; and admission to Teacher Education Program or consent of instructor via permit.
- KHP 440 ORGANIZATION AND ADMINISTRATION OF PHYSICAL EDUCATION.** (3)  
Policies and procedures of administration on the secondary school and collegiate levels. Special emphasis on construction and care of facilities, equipment, and supervision of personnel. Prereq: KHP 344 or equivalent.
- KHP 445 INTRODUCTION TO TESTS AND MEASUREMENTS.** (3)  
An analysis of written and motor performance tests in health, safety, physical education, and recreation. Laboratory experiences in the administration, scoring, and interpretation of motor performance tests are provided. Lecture, two hours; laboratory, two hours.
- KHP 485 SPORT IN AMERICA.** (3)  
An overview of the history and development of sport in the United States from colonial times to the present with emphasis on the scope and diversity of modern day sport and its impact on society.
- KHP 515 ANATOMICAL AND MECHANICAL KINESIOLOGY.** (3)  
A quantitative and qualitative study of human motion as it relates to locomotor and physical education activities. Lecture, two hours; laboratory, two hours. Prereq: ANA 206, PGY 206, or equivalent and consent of instructor.
- KHP 546 PHYSICAL EDUCATION WORKSHOP.** (1-3)  
A concentrated study in a specific sport or activity or field of emphasis in physical education. May be repeated to a maximum of six credits.
- KHP 547 PSYCHOLOGY OF SPORT AND PHYSICAL ACTIVITY.** (3)  
An analysis of research findings in the psychology of teaching and coaching with emphasis placed on those factors which influence the acquisition of motor skills as well as on the psychological benefits of exercise and sport. Prereq: Undergraduate psychology course and basic statistics or consent of instructor.
- KHP 560 MOTOR DEVELOPMENT IN INFANTS AND YOUNG CHILDREN.** (3)  
An analysis of the processes of learning to move and moving to learn in infants and young children. Emerging interrelationships among the motor, social, emotional, and cognitive forms of behavior are explored. Laboratory experiences are provided in early childhood education programs. Prereq: PSY 100.
- KHP 579 ADAPTED PHYSICAL EDUCATION.** (3)  
A study of programs of adapted and developmental physical education for individuals with disabilities. Experiences will include the appraisal of psychomotor functioning, design of instructional intervention, and program implementation and evaluation. Lecture, two hours; laboratory, two hours. Prereq: KHP 515 or consent of instructor.

- KHP 592 CHOREOGRAPHY.** (2)  
Creation and production of dances in ballet, modern, and theater dance forms. Lecture, one hour; laboratory, two hours. Prereq: Beginning ballet, modern and theater dance.

### **GRADUATE COURSES**

- KHP 615 BIOMECHANICS OF FUNDAMENTAL MOVEMENTS.** (3)  
A research oriented, qualitative and quantitative investigation into the fundamental human movement patterns of ambulation, jumping, throwing, and striking. Lecture, two hours; laboratory, two hours. Prereq: An introductory course in physics, KHP 515, and consent of instructor.
- KHP 620 ADVANCED EXERCISE PHYSIOLOGY.** (3)  
Aimed at development of an in-depth understanding of the acute and chronic adaptations of the human body to the stress of exercise. Lecture, two hours; laboratory, two hours. Prereq: KHP 420G or consent of instructor.
- KHP 621 EXERCISE AND CORONARY HEART DISEASE.** (3)  
An examination and analysis of the theories relating the level of physical activity to the development of heart disease. Discussion of the role of exercise in the diagnosis, prevention and rehabilitation of heart disease. Prereq: KHP 420G, 445 or consent of instructor.
- KHP 644 RESEARCH TECHNIQUES APPLIED TO HEALTH, PHYSICAL EDUCATION AND RECREATION.** (3)  
A critique of research procedures for purposes of developing more efficient research designs applicable to problems in health, physical education and recreation. Should be preceded or accompanied by basic statistics and introduction to measurement.
- KHP 676 CURRENT ISSUES AND PROBLEMS IN SPORT MANAGEMENT.** (3)  
An in-depth analysis of pertinent issues and problems affecting the management of sport and fitness programs.
- KHP 680 SPORT MARKETING.** (3)  
An introduction to the broad area of sport marketing to include a focus on marketing management as it applies to sport, the general nature of the sport consumer, pricing strategies and promotions, licensing, and the role of research in sport marketing. Prereq: MKT 300 and MKT 310 or 320 or 340 and HPER, KHPR majors or consent of instructor.
- KHP 681 FINANCIAL ASPECTS OF SPORT.** (3)  
Course focuses on principles, practices and theories associated with financial planning and management of enterprises engaged in the provision of sport related services and/or products. Topics include budget planning and preparation, preparing and analyzing financial statements, revenue sources, money management, preparation of business plans and feasibility studies. Prereq: ACC 201 and 202 and HPER, KHPR majors or consent of instructor.
- KHP 685 SUPERVISION OF SPORT AND FITNESS PERSONNEL.** (3)  
A study of the three major functions of the supervisor: planning, directing and controlling and their application to the area of organized sport. Prereq: KHP 580 or consent of instructor.
- KHP 686 SPORT MANAGER'S LABORATORY.** (3)  
A combination of lectures and laboratory experiences which enable the student to demonstrate competence in the application of various applied management skills learned in KHP 685. Skills such as delegation, performance appraisal, coaching and counseling employees will be covered. Students will be videotaped as a method of providing feedback. Prereq: KHP 685 or consent of instructor.
- KHP 687 PRACTICUM IN SPORT MANAGEMENT.** (3-9)  
Extensive work experiences under the immediate supervision of qualified managers and sport management faculty coordinator. May be repeated to a maximum of nine credits. Prereq: HPER, KHPR majors (Sport Management) or consent of advisor.
- KHP 695 INDEPENDENT STUDY IN PHYSICAL EDUCATION.** (1-3)  
A specific topic in physical education related to the student's interests and program needs is selected for intensive study. Work to be supervised by a graduate faculty member proficient in the area under investigation. May be repeated to a maximum of six credits. Prereq: Consent of instructor.
- KHP 696 INDEPENDENT STUDY IN RECREATION.** (1-3)  
A specific topic in recreation related to the student's interests and program needs is selected for intensive study. Work supervised by a graduate faculty member proficient in the area under investigation. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**KHP 720 SPORTS MEDICINE. (3)**  
A study of the basic areas covered in sports medicine with readings and discussions of current international trends in the research and practice in this field. Prereq: Twelve semester hours; credit in the field of biological sciences; consent of instructor.

**KHP 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**KHP 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**KHP 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**KHP 769 RESIDENCE CREDIT FOR THE DOCTORAL DEGREE. (0-12)**  
May be repeated indefinitely.

**KHP 770 SEMINAR IN PHYSICAL EDUCATION. (3)**  
Each semester some contemporary topic in the field of physical education will be studied intensively. May be repeated to a maximum of nine credits.

**KHP 780 SEMINAR IN RECREATION. (3)**  
Each semester some contemporary topic in the field of recreation will be studied intensively. May be repeated to a maximum of nine credits.

**KHP 782 INDEPENDENT RESEARCH. (3)**  
Systematic investigation of a problem selected from the areas of health, safety, physical education or recreation. Satisfies the research requirement for the Master's degree in Plan B. Repeatable with new problem. May be repeated to a maximum of nine credits.

**RECREATION**

**KHP 280 RECREATION PROGRAM PLANNING AND LEADERSHIP. (3)**  
A study of the essential elements and basic principles involved in the organization, supervision, promotion and evaluation of various types of recreation programs.

**KHP 370 FUNDAMENTALS OF CAMPING. (2)**  
An introduction to camping as an educational program. Fundamental camping skills basic to group and individual camping experiences. Methods in leading, teaching, and supervising in outdoor education programs are emphasized.

**KHP 570 DESIGN AND MANAGEMENT OF FACILITIES FOR SPORT. (3)**  
An introduction to the design and management of sports facilities. The course will focus on elements of planning, design and management while examining functions related to maintenance, security, operations budgeting and evaluation. The course will be presented primarily in lecture format utilizing guest speakers but will also include facility visitations as integral parts of the course. Prereq: Upper division PHED, KINE majors or HPER, KHPR majors or consent of instructor.

**KHP 573 MANAGEMENT OF SPORT. (3)**  
An introduction to the five functions of management: planning, organizing, staffing, directing and controlling, and their application to organized sport settings. Prereq: Upper division PHED, KINE majors or HPER, KHPR majors or consent of instructor.

**KHP 576 INTRAMURAL AND SPORTS CLUB ADMINISTRATION. (3)**  
This course will provide the student with a broad theoretical base in intramural "sports club" programming and administration, together with an opportunity for practical experience. Philosophy and objectives, administrative concerns, and programming strategies will be addressed. Prereq: Upper division PHED, KINE majors or HPER, KHPR majors or consent of instructor.

**KHP 577 PRACTICUM IN RECREATION. (3-9)**  
Extensive practical work experiences under the immediate supervision of qualified practitioners and recreation faculty coordinator. Prereq: Recreation majors and physical education majors.

**KHP 580 INTRODUCTION TO TEAM DEVELOPMENT. (3)**  
An introduction to the concept of teams to include an overview of group theory, dynamics and properties as they apply to the team development in sport and non-sport settings. Students may be required to participate in a low ropes/challenge course as part of course requirements. Prereq: Upper division PHED, KINE majors or HPER, KHPR majors or consent of instructor.

**KHP 585 FOUNDATIONS OF SPORT MANAGEMENT. (3)**  
Overview of the broad field of sport management to include program identification, settings, career options, and competencies required for each option. Prereq: Upper division PHED, KINE majors or HPER, KHPR majors or consent of instructor.

**HEALTH EDUCATION**

**KHP 190 FIRST AID AND EMERGENCY CARE. (2)**  
A study of first aid subject matter and orientation in the various first aid teaching methods. Lectures and demonstrations on first aid measures with skill training. American Red Cross Certificate made available. Lecture, one hour; laboratory, two hours.

**KHP 220 SEXUALITY EDUCATION. (2)**  
This course is designed to prepare educators to offer sexuality education in the schools. Emphasis is placed on justification of sexuality education, relevant content, appropriate teaching techniques, and precautions to take when teaching sexuality education.

**KHP 222 DRUG EDUCATION. (2)**  
This course is designed to prepare educators to offer drug education in the schools. Emphasis is placed on the prevalence of drug use by youth; physiological, psychological, and social effects of various drugs; effective and ineffective approaches to drug abuse prevention; appropriate teaching strategies; and evaluating drug curricula.

**KHP 230 HUMAN HEALTH AND WELLNESS. (3)**  
The study of health promotion, wellness, and disease prevention concepts as applied to individual, familial, and community health.

**KHP 330 PLANNING AND IMPLEMENTING SCHOOL HEALTH EDUCATION PROGRAMS. (3)**  
A study of the foundations of school health education and the various factors that are involved in the processes of conceptualizing, planning, drafting, and implementing effective health education programs. Prereq: KHP 220 and KHP 230 or equivalents or permission of instructor.

**KHP 371 STUDENT TEACHING IN HEALTH EDUCATION. (3-12)**  
For students who expect to teach and who meet the requirements for a teaching certificate in Health Education. Includes objectives, courses of study, methods, materials, and testing in Health Education. The course includes observation, practice, safety education, audio-visual aids and planning conferences with supervising teacher. Six-24 lab hours per week. May be taken on a pass/fail basis only. Prereq: Admission to the Teacher Education Program in Health.

**KHP 380 HEALTH EDUCATION IN THE ELEMENTARY SCHOOL. (2)**  
Presents health concepts to be taught in the elementary school. A brief discussion of the school health program and a review of instructional methods appropriate to health education in the elementary school are presented. Prereq: Admission to elementary or early childhood teacher education program or consent of instructor.

**KHP 430 METHODS OF TEACHING HEALTH EDUCATION. (3)**  
A variety of contemporary teaching methods appropriate for use in grades K-12 will be presented. Students will be exposed to these methods through textbook and outside readings and through observation of the instructor, public school teachers, and peer teachers. Methods will be critically examined for effectiveness in the cognitive, affective, and behavioral areas. Prereq: KHP 220, 230, or equivalent or consent of instructor via permit; and admission to Teacher Education Program or consent of instructor via permit.

**KHP 509 WORKSHOP IN HEALTH AND SAFETY. (1-3)**  
Designed as a variable topic course including aspects of school health or safety education with emphasis upon the needs of teachers. May be repeated to a maximum of six credits.

**KHP 535 SCHOOL HEALTH DILEMMAS OF SPECIAL POPULATIONS. (3)**  
The course studies the physical, emotional, cognitive, moral and social health dilemmas of special populations. Emphasis is on the health dilemmas of special groups that the prospective teacher may encounter in the classroom (i.e., poor, disabled, migrants, rural children, urban children, children from single parent homes, abused children, etc.) Prereq: KHP 220, KHP 230 or permission of instructor.



**KHP 609 SEMINAR IN HEALTH AND SAFETY EDUCATION. (3)**

Overview of the problems confronting persons in these fields and selected research findings applicable to these areas. Emphasis is given to gaining a better understanding of research data and to a greater utilization of research findings in both school and community health and safety endeavors. May be repeated to a maximum of nine credits. Prereq: Consent of instructor.

**KHP 694 INDEPENDENT STUDY IN HEALTH EDUCATION. (1-3)**

A specific topic in Health Education related to the student's interests and program needs is selected for intensive study. Work to be supervised by a graduate faculty member proficient in the area under investigation. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**KHP 781 PRO SEMINAR IN KHP (Subtitle required). (1-3)**

Advanced study of topics of current importance in health education, physical education and recreation. May be repeated under a different subtitle to a maximum of nine credits. Prereq: Consent of instructor.

## LA Landscape Architecture

**LA 205 HISTORY OF LANDSCAPE ARCHITECTURE. (3)**  
A study of landscape design through past civilizations and how these have influenced our present approach to dealing with our landscape.

**LA 206 CONTEMPORARY LANDSCAPE ARCHITECTURE. (3)**  
A survey of contemporary landscape architecture, its evaluation and implications for the future of the practice. Prereq: LA 205.

**#LA 821 LANDSCAPE ARCHITECTURE DESIGN STUDIO I. (6)**  
Introduction to the fundamental elements and principles of design and drawing. Emphasis on the representation and perception of pictorial space; and observation and association as a means to visual literacy. Lecture, three hours; studio, nine hours per week. Prereq: Student must be accepted into the Landscape Architecture Program.

**#LA 822 LANDSCAPE ARCHITECTURE DESIGN STUDIO II. (6)**  
Application of the basic design vocabulary established in the fall semester for solving more complex spatial problems. Focus on the identification, creation and exploration of space in three dimensions, and the development of conceptual problem solving. Lecture, three hours; studio, nine hours per week. Prereq: LA 821 with a minimum grade of "C" and enrollment in ARC 828 (or previous completion of equivalent CAD course).

**\*LA 833 LANDSCAPE ARCHITECTURE DESIGN STUDIO III. (6)**  
Design studio emphasizing design process applied to site programming, landscape analysis, and site planning. Use of actual sites to emphasize relationships between landscape analysis processes and landscape topology. Project presentation and public speaking sessions are videotaped and critiqued. Required field trip. Lecture, three hours; studio, nine hours per week. Prereq: LA 822 with a minimum grade of "C" and ARC 828 or equivalent CAD course.

**\*LA 834 LANDSCAPE ARCHITECTURE DESIGN STUDIO IV. (6)**  
Design studio emphasizing design process applied to site design and integration of design theories. Investigation and application of context, composition, typology, landscape ecology and other theoretical constructs as design determinants. Expression of design using two and three dimensional communications media. Required field trip. Lecture, three hours; studio, nine hours per week. Prereq: LA 833 with a minimum grade of "C", HOR 320, GLY 101/111.

**\*LA 841 LANDSCAPE ARCHITECTURE DESIGN STUDIO V. (6)**  
Studio design course emphasizing design process and principles in the development of design solutions for a variety of projects. Lecture, three hours; studio, nine hours per week. Prereq: PLS 366, HOR 320 and LA 832 with a minimum grade of "C".

**\*LA 842 LANDSCAPE ARCHITECTURE DESIGN STUDIO VI. (6)**  
Studio design course with emphasis on project-type design and an introduction to large scale site planning. Lecture, three hours; studio, nine hours per week. Prereq: LA 841 with a minimum grade of "C".

**LA 850 LANDSCAPE ARCHITECTURE GRAPHICS. (3)**  
A study of landscape architecture graphics including freehand sketching, plan, section, and perspective drawing. Rendering techniques in both black and white and color will be explored with a variety of media including pencil, marker, pastel, and airbrush. Lecture, two hours; studio, two hours per week. Prereq: May not be taken with or after LA 852; non-LA majors must have permission of instructor.

**\*LA 851 DESIGN WITH PLANTS. (3)**  
The application of design principles to the functional and aesthetic use of plant materials in the landscape. Lecture, two hours; studio, two hours per week. Prereq: HOR 320, LA 205 and LA 850 or permission of instructor.

**\*LA 853 HISTORY AND THEORY OF URBAN FORM. (3)**  
Exploration of the patterns and concepts of human settlement - how and why we inaugurate LAND to become SITE - through case studies of historical and contemporary urban spaces. Topics will range from civic topography and democratic terrain to the phenomenon of place and other current issues in urban design. Prereq: LA 205 and LA 206 or permission of the instructor.

**\*LA 854 HISTORIC LANDSCAPE PRESERVATION. (3)**  
An introduction to historic landscape preservation philosophy, strategies, and methods. Exploration of regional landscape preservation case studies and application of preservation principles and methods to solve landscape preservation problems with an emphasis on process. Lecture, two hours; studio, two hours per week. Prereq: LA 206 and LA 833 or permission of instructor.

**LA 855 GEOGRAPHIC INFORMATION SYSTEMS AND LANDSCAPE ANALYSIS. (3)**  
An introduction to the concepts and methods of compilation, management, analysis, and display of spatially-referenced data. Lectures will be complemented with computer based laboratory exercises. Lecture, two hours; laboratory, four hours per week. Prereq: Fourth/fifth year LA major, upper division or graduate student, or permission of instructor. (Same as NRC/SOC 555.)

**#LA 857 DESIGN THEORIES IN LANDSCAPE ARCHITECTURE. (3)**  
This course will act as an introduction to some of the conceptual design issues integral to the studio experience. The objective of the course is to develop a theoretical and philosophical foundation for our actions and interventions in the environment. Prereq: LA 834 or permission of instructor.

**#LA 858 REGIONAL LAND USE PLANNING SYSTEMS. (3)**  
An introduction to regional land use planning and its relationship to environmental, social, and economic systems. Students will develop an understanding of how land use decisions have impacted the development of the United States and how they are used to determine future development directions. Prereq: LAAR major or permission of instructor.

**#LA 859 GLOBAL POSITIONING SYSTEMS (GPS). (1)**  
Introduction to the concepts and applications of global positioning systems (GPS) for field mapping. Students will develop skills to collect, calibrate and analyze data collected with GPS equipment. Lectures are supplemented with field exercises in the use of GPS equipment. Lecture, two hours per week for five weeks; laboratory, four hours per week for three weeks. Prereq: Permission of instructor. (Same as NRC 359.)

**\*LA 871 DESIGN IMPLEMENTATION I. (4)**  
An introductory study of landscape architecture design implementation; construction materials, including wood, paving types, and wall types, along with their applications; development of surface grading and drainage; and preparation of working drawings and materials specifications. Lecture, two hours; studio, six hours per week. Prereq: AEN 103 or permission of the instructor.

**\*LA 872 DESIGN IMPLEMENTATION II. (4)**  
A continuation of design implementation to develop competency in solving problems relating to subsurface drainage systems, road alignment, and detailed site engineering. Lecture, two hours; studio, six hours per week. Prereq: LA 871 with a minimum grade of "C".

**LA 895 INDEPENDENT WORK IN LANDSCAPE ARCHITECTURE. (1-6)**  
Advanced topical studies in landscape architecture allowing for individual research or a work/travel experience coordinated with academic pursuits. May be repeated to a maximum of nine credits. Prereq: Permission of faculty.

**†LA 901 REGIONAL LAND USE PLANNING AND DEVELOPMENT.**

**\*LA 952 ADVANCED LANDSCAPE ARCHITECTURAL GRAPHIC COMMUNICATION. (3)**  
Study and application of advanced level landscape architectural graphic communication methods with an emphasis on perspective graphics. Effective use of color, quick methods for creating perspectives as an integral part of design processes, a variety of presentation media, and computer aided three-dimensional drawing are explored and applied to the communication of design ideas. Lecture, two hours; laboratory, two hours per week. Prereq: LA 834 or permission of instructor.

**\*LA 956 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND LANDSCAPE ANALYSIS. (3)**  
Advance concepts in data base analysis, model development, and ancillary functions in geographic information systems. Lecture, two hours; laboratory, four hours per week. Prereq: LA 855, LAAR major, upper division, graduate student, or permission of instructor. (Same as NRC/SOC 556.)

**#LA 959 ADVANCED REGIONAL LAND USE PLANNING APPLICATIONS. (3)**  
This course builds on the systems learned in LA 858 and applies them, through GIS technology, to real world situations. In this course we will deal with rural development, decision making, and comprehensive land use within the context of the physical environment. Lecture, two hours; studio, three hours per week. Prereq: LAAR major and LA 858 or permission of the instructor.

**\*LA 971 SENIOR PROJECT. (3)**  
A major research, investigation or design project to serve as the capstone experience in landscape architecture. Prereq: Senior landscape architecture major and an approved project proposal.

**\*LA 973 ADVANCED DESIGN IMPLEMENTATION. (6)**  
Advanced instruction and practicum in the development phase of design drawings. Students will produce a comprehensive set of working drawings that apply the principles and techniques commonly used in the landscape architecture profession. Lecture, three hours; studio, nine hours per week. Prereq: LA 872 with a minimum grade of “C”.

**\*LA 975 ADVANCED LANDSCAPE ARCHITECTURE STUDIO. (6)**  
Application of landscape architecture design principles to solve problems at a variety of scales emphasizing process as well as form generation in a creative and historic context. Lecture, three hours; studio, nine hours per week. Prereq: LA 842 with a minimum grade of “C”.

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## LAS Latin American Studies

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**LAS 201 INTRODUCTION TO LATIN AMERICA. (3)**  
An interdisciplinary approach to the people, culture and development of the Latin American republics. Attention will be concentrated on significant aspects of the indigenous peoples, geography, economic processes, gender roles, social structures and politics of Latin America, with special attention paid to value structures and value conflicts. Musical, literary and artistic expression in Latin America will also be introduced. Team taught, with a course coordinator from the LAS faculty.

**LAS 395 INDEPENDENT WORK IN LATIN AMERICAN STUDIES. (3)**  
Directed study for students wishing to do specialized work on a topic related to the Latin American Studies area. May be repeated to a maximum of six credits. Prereq: LAS 201 and six hours course work from approved LAS courses.

**LAS 401 DIRECTED RESEARCH IN LATIN AMERICAN STUDIES. (3)**  
Research on an interdisciplinary topic approved by the LAS Advisory Committee in the area of Latin American Studies. Prereq: Major in Latin American Studies; senior standing.

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## LAW College of Law

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**LAW 801 CONTRACTS/SALES I. (3)**  
Formation of contracts; offer, acceptance, consideration. Statute of Frauds, parol evidence rule. Sale of goods under Article 2 of the Uniform Commercial Code.

**LAW 802 CONTRACTS/SALES II. (3)**  
Continuation of Contracts/Sales I - Statute of Frauds, performance, express and implied conditions, repudiation, impossibility.

**LAW 804 LEGAL RESEARCH AND WRITING SKILLS. (3)**  
Instruction in the use of research materials, in legal writing, in the fundamentals of legal analysis and in the solution of selected legal problems.

**LAW 805 TORTS I. (3)**  
Intentional torts and defenses, negligence, causation, duties of occupants of land, contributing negligence, strict liability.

**LAW 806 TORTS II. (2)**  
A continuation of Torts I - products liability, invasion of privacy, defamation, interference with advantageous relationships.

**LAW 807 PROPERTY I. (3)**  
Rights in personal and real property, gifts, estates, uses and easements.

**LAW 808 PROPERTY II. (3)**  
Leasehold estates, rights of tenant and landlord, land transfers, land contracts, covenants, recording acts.

**LAW 809 FEDERAL CRIMINAL LAW. (2-3)**  
This course will cover federal white collar criminal issues, including RICO, mail and wire fraud, political corruption, bank secrecy laws, and false statement laws.

**LAW 810 CRIMINAL LAW. (3)**  
Jurisdiction; the criminal act, complete and incomplete; criminal intent, actual and constructive; duress and mistake of fact, of law; justification; parties in crime; crimes against the person and crimes against property.

**LAW 811 CRIMINAL PROCEDURE I. (3)**  
This course will cover search and seizure, the privilege against self-incrimination, confessions and identification procedures – in general, the constitutional cases arising out of the conflict between police practices and the Bill of Rights.

**LAW 812 CONTRACTS. (4)**  
Formation of contracts, offer, acceptance, consideration. Statute of Frauds, parol evidence rule, contracts for benefit of third persons, assignments, performance of contracts, express and implied conditions, impossibility of performance, discharge and illegal contracts.

**LAW 814 CRIMINAL TRIAL PROCESS. (3)**  
This course will cover in-depth the criminal trial process from the initial court appearance: grand jury proceedings, pretrial motions, discovery, trial, pleas, sentencing, appeals, double jeopardy and habeas corpus. Students who have taken LAW 813, Criminal Procedure II, may not take this course.

**LAW 815 CIVIL PROCEDURE I. (3)**  
Introduction to the civil action; personal and in rem jurisdiction; service or process and notice; subject matter jurisdiction; venue; choice of law; pleading.

**LAW 817 CIVIL PROCEDURE II. (2-3)**  
Joinder of claims and parties; discovery; summary judgment; right to jury trial; trials and posttrial motions; res judicata and collateral estoppel.

**LAW 818 REMEDIES. (3)**  
Nature of damages; nature of specific relief; personal interests; contractual interests; property interests; specific relief and the government.

**LAW 819 THE FEDERAL COURTS AND THE FEDERAL SYSTEM. (3)**  
The nature of the federal judicial function and its development, distribution of power among federal and state courts, Supreme Court review of state court decisions, the law applied in federal district courts, federal question and diversity jurisdiction, federal habeas corpus, removal jurisdiction and procedure.

**LAW 820 CONSTITUTIONAL LAW I. (3)**  
Judicial interpretation of the Constitution; the federal system; powers of the national government; limitations on the exercise of state powers.

**LAW 821 LITIGATION SKILLS. (3)**  
The skills of litigation, including trial advocacy, interviewing and counseling, negotiation and pleading. Lecture, one hour; laboratory, five hours. Prereq or concur: LAW 890.

**LAW 822 CONSTITUTIONAL LAW II. (3)**  
Protection of individuals and organizations by the Bill of Rights, the fourteenth amendment, and other provisions of the Constitution.

**LAW 823 FIRST AMENDMENT LAW. (3)**  
Survey of the doctrines of freedom of speech, press, association, and religion under the First Amendment to the United States Constitution.

**LAW 824 ALTERNATE DISPUTE RESOLUTION. (3)**  
Methods of dispute resolution other than trial; statutory and judicial regulation; presenting a claim in different formats of ADR.

**LAW 825 THE NEGOTIATING PROCESS. (2)**  
Analysis of the elements of bargaining power; exercises in the negotiating process in various contexts; basic techniques of negotiation; ethical norms of the lawyer-investigator. Lecture, one hour; laboratory, two hours per week.

**LAW 826 LEGAL DRAFTING. (2-3)**  
This course systematically explores drafting process and technique and provides drafting practice. Students complete drafting-related exercises which become the focus of class discussions. Students also complete major drafting projects. These may consist of a will, a contract, a piece of legislation or other common lawyer work product. Major drafting projects are the focus of class discussions and individual or small group meetings with the instructor.

**LAW 827 LEGAL MEDICINE. (3)**  
Legal-medical issues, including medical negligence, regulation of health care providers, aiding and altering reproduction, and defining death.

**LAW 828 STATUTORY CIVIL RIGHTS. (3)**

This is a survey course designed to cover the entire field of federal antidiscrimination law. Topics to be covered may include employment discrimination (primarily focusing on race, sex, age, and disability issues and possibly affirmative action); housing discrimination (primarily focusing on race, disability, and family issues); other disability discrimination issues under the Americans with Disabilities Act; discrimination in public accommodations and government programs; voting rights litigation issues involving proof (e.g., how cases based on direct evidence of intent, circumstantial evidence of intent, and disparate impact differ from one another), special defenses, and remedies; and a brief survey of the more important questions that arise in Section 1983 litigation. Prereq: LAW 822.

**LAW 835 PROFESSIONAL RESPONSIBILITY. (2-3)**

An examination of the varying roles played by lawyers in society and the conflicting pressures created to each role. Special attention is paid to the Code of Professional Responsibility as a guide and control in the lawyer-client relationship. Also considered at length is the role of law in society and the place of the legal profession in society. Guest speakers are used to bring into focus employment options for lawyers and the viewpoints of varying types of practicing lawyers to the pervasive problems of the legal profession.

**#LAW 836 LAW AND ECONOMICS. (2)**

This course applies neoclassic economics concepts to the law. It offers economic explanations of legal rules (for example, explaining how legal rules tend to move society toward or away from economic efficiency). The course also explores normative issues, such as whether the pursuit of economic efficiency is morally attractive. The course looks at the following areas of the law: property, contracts, torts, family law, criminal law, employment law, corporate law, and securities law.

**LAW 837 PHILOSOPHY OF LAW. (3)**

Concept of law; relations between law and morals; nature of legal reasoning; analysis of legal concepts; justification of punishment. Pass/fail basis only for law students. (Same as PHI 537.)

**LAW 839 GENDER DISCRIMINATION. (2-3)**

Constitutional aspects of sex discrimination, employment discrimination. A criminal law unit covering women as victims and as offenders.

**LAW 850 LEGAL ACCOUNTING. (2-3)**

This course is designed to introduce students to general bookkeeping and accounting principles. Class discussion will concentrate on the relevance of accounting judgments to legal issues rather than focusing on technical problems. Students will examine income statements, balance sheets, and other accounting documents. Emphasis will be placed on an understanding of accepted accounting principles (GAAP) and the abuses of GAAP. Students with undergraduate financial accounting can take this course only with permission of the professor.

**LAW 851 BUSINESS ASSOCIATIONS. (4)**

Legal introduction to business organization; emphasis on nature and structure under modern American business corporation law. Areas: partnership planning (formation, property rights, dissolution and liquidation rights); steps for corporate organizing (including legal consequences of defective incorporation); nature of corporate entity concept; corporate control and management (including problems of close corporation); fiduciary duties of directors and controlling shareholders under state law; nature and characteristics of shareholders' derivative suit. Prereq: Completion of first year of law study generally is expected.

**LAW 855 CORPORATION FINANCE LAW. (3)**

A study of selected problems in advanced corporation law, including corporate promotion and capitalization (with special emphasis on senior securities and their characteristics); corporate distributions (dividends); recapitalizations (elimination of accrued dividends); public regulation of security issues (Securities Act of 1933 and state Blue Sky laws).

**LAW 856 BUSINESS PLANNING. (3)**

This course involves the planning of business transactions and combines the applicable corporate, tax, and securities considerations of such transactions in a single course. Emphasis will be on some of the more important types of corporate transactions, such as the organization of a private corporation and a public corporation, conflicts between stockholders of a close corporation, and corporate combinations. Course is limited to third-year students who have had a background in corporations and income tax. Knowledge of securities regulation and corporate tax is desired.

**LAW 860 TAXATION I. (3-4)**

Problems in federal and state income taxation.

**LAW 861 TAXATION OF BUSINESS ENTERPRISES I. (4)**

Federal income taxation of transactions between partners and their partnership and shareholders and their corporation; organization of partnerships and corporations; taxation of distributions of operating profits, liquidations, and sales of interests. Prereq: LAW 860.

**LAW 863 TAXATION OF BUSINESS ENTERPRISES II. (3)**

Advanced problems of federal income taxation of corporations and partnerships; mergers and acquisitions; reorganizations, recapitalizations; affiliated corporations; consolidated returns. Prereq: LAW 860 and LAW 861.

**LAW 865 ESTATE AND GIFT TAXATION. (3)**

Donative transfers of property, including inter vivos transfers and wills; income, estate, and gift tax consequences of the various methods of disposition; administration of estates.

**LAW 866 ESTATE PLANNING SKILLS. (2-3)**

This course offers practical experience in advanced estate planning; interviewing, counseling, planning and drafting wills, trusts and related documents. Prereq: LAW 865 and LAW 876.

**LAW 867 TAX PRACTICE AND PROCEDURE. (3)**

An advanced tax elective dealing with administrative practice before the IRS; court procedures governing judicial resolution of tax controversies; civil and criminal tax penalties; and the ethical standards governing tax practice. Prereq: LAW 860.

**LAW 870 MINERAL LAW. (3)**

An examination of legal problems connected with coal, oil, and gas. The course will cover: ownership and conveyances of mineral interests, the laws affecting mine development and operations, coal mine employment, sale and marketing of extracted materials, and legal issues affecting the use of minerals.

**LAW 872 LAND USE PLANNING. (2-3)**

A comprehensive survey of the basic legal devices to control the use of land, theories of land use planning, nuisance, private agreements, zoning and zoning procedure, the role of the federal government in land planning, exercise of eminent domain, and selected Kentucky problems, such as rural zoning and proposed New Towns for Appalachia.

**LAW 873 LAND TRANSFER LAW. (3)**

An elective course for second-year law students. A basic study of the body of land development law, including: land transfers, land sales contracts; deed covenants; recording acts; title insurance; contemporary landlord and tenant law; and public utility, subdivision and zoning regulations. The indicated problem areas are treated together to illuminate the lawyer's role in the land development process.

**LAW 874 BANKING LAW. (2-3)**

History of banking; overview of agencies which regulate bank activities; formation and regulation of bank holding companies; bank mergers and acquisitions; branch banking; antitrust considerations; trust operations conducted by banks; impact of securities legislation on bank loans and bank financing; the FDIC and its impact on a failing bank.

**LAW 875 SECURITIES REGULATION. (3)**

The law governing the issuance, distribution and trading of securities under the Securities Act of 1933 and the Securities Exchange Act of 1934; the obligation to register securities; public offerings by issuers; secondary distributions; and registration requirements growing out of mergers, definition of a "security" and the exemptions from registration requirements; insider trading prohibitions; antifraud provisions in tender offers, self tenders, proxy solicitations and the purchase and sale of securities.

**LAW 876 TRUSTS AND ESTATES. (4)**

An elective course for second-year law students. Examination of rules governing intestate distribution of property; formal requirements governing execution, alteration and revocation of wills; requisite elements of express trusts and requirements for their creation; special rules relating to charitable trusts and spendthrift trusts; rules concerning construction of wills and trusts and general rules governing administration of decedents' estates and trusts.

**LAW 877 FUTURE INTERESTS. (2)**

An advanced elective course for third-year law students treating in-depth future interests of ownership in property, including the kind of future interests, rules as to class gifts, the rule against perpetuities, and powers of appointment with emphasis on the lawyer's use of future interests in estate planning and the pitfalls relating thereto.

**LAW 879 COMMERCIAL LAW I. (3)**

A study of problems involved in the sale of goods as governed by the Uniform Commercial Code. Attention is given to statutory methodology.

**LAW 880 BASIC UNIFORM COMMERCIAL CODE. (4)**

A study of problems involved in secured transactions and the exchange of commercial paper as governed by the Uniform Commercial Code.

**LAW 881 PAYMENT SYSTEMS. (2)**

This course examines the law relating to various means of payment or insuring payment including checks, electronic funds transfers, and letters of credit. Bodies of law covered include Articles 4, 4A, and 5 of the Uniform Commercial Code, the Federal Electronic Fund Transfers Act, and federal regulations relating to check collections and the availability of funds. Successful completion of Basic Uniform Commercial Code is a prerequisite. Prereq: Basic Uniform Commercial Code.

**LAW 883 BUSINESS BANKRUPTCY. (2)**

A study of the issues relative to business bankruptcies, including defining the estate; claims against the estate; trustee's power to enhance the estate; preservation of the estate; priorities; and reorganization under Chapter Eleven.

**LAW 885 COMMERCIAL DEBTOR- CREDITOR RELATIONS. (2-3)**

Minimizing risk of loss through bankruptcy by business creditors and debtors; Uniform Commercial Code versus the federal Bankruptcy Act; nonbankruptcy creditors' and debtors' remedies in commercial context, including assignments and arrangements under state law; commercial bankruptcy; rehabilitation under Bankruptcy Act.

**LAW 887 INSURANCE. (2-3)**

Nature of contract, insurable interest, making the contract, concealment, representations, warranties, implied conditions of forfeiture, waiver and estoppel, rights under the contract, and construction of the policy.

**LAW 890 EVIDENCE. (4)**

Rules of admissibility, real, circumstantial, testimonial and documentary evidence, witnesses, hearsay rule and its exceptions, procedure of admissibility, law and fact, judge and jury, burden of proof and presumption, judicial notice, and parole evidence rule.

**LAW 898 ENVIRONMENTAL LAW. (3)**

The role of the legal system in regulating the interrelated subsystems within the physical environment, including water and air pollution, solid waste disposal, and strip mining. Emphasis on: constitutional limitations on the public's power to implement planning proposals; relationships between federal, state and local governments; structure of agencies regulating environmental quality; standards for administrative discretion; the openness of administrative hearing procedures; and the scope of judicial review of administrative decisions. Prereq: None directly, although completion of first-year law courses is expected for second- and third-year elective courses.

**LAW 900 LAW SPECIAL COURSE. (2 or 3)**

Interdisciplinary, topical or experimental courses to be approved by the faculty and Dean of the College of Law. A particular course may be offered no more than twice under the LAW 900 number.

**LAW 905 CONFLICT OF LAWS. (3)**

Nature of the subject, penal laws, procedure, judgments, domicile, capacity, form, particular subjects, litigation, family law, inheritance, foreign administrators.

**LAW 910 LABOR LAW. (3)**

History, organization, and structure of American labor unions; obligations and prerogatives of employers; questions of representation; privileges and obligations of unions; collective bargaining and dispute settlement.

**LAW 912 EMPLOYMENT LAW. (3)**

This course surveys and examines that multitude of important legal doctrines, statutes and rules that regulate those rights and responsibilities of employers and workers which are not controlled by collectively bargained agreements. The structures for administering the more important areas of such regulation are also studied. The subject matter of this course affects most dimensions of the manner in which over three quarters of our Gross National Income is distributed. Course coverage includes: the law of individual employment contracts, special employment relations such as civil service, the employer's right to various forms of work products, the employer's responsibility for job health and safety, protection of the worker's property, worker responsibility for wrong-doing, wage-hour laws, vacation benefits, bonuses, retirement benefits, health insurance benefits, and unemployment compensation.

**LAW 914 ADVANCED TORTS. (2-3)**

Advanced torts provides a detailed and sophisticated treatment of one or more areas of tort law. Potential topics include defamation and privacy; products liability; medical malpractice; commercial torts; toxic torts and mass tort litigation, emphasizing innovative alternative methods of resolving such litigation; and comparative law aspects of tort litigation with a focus on analyzing other compensation systems.

**LAW 915 FAMILY LAW. (2-3)**

Contracts to marry; the marriage status; annulment, divorce and separation; parent and child; infants and incompetent persons.

**LAW 920 ADMINISTRATIVE LAW. (3)**

Establishment of administrative tribunals, limits on discretion. Notice and hearing, orders, methods of judicial relief, scope of judicial review.

**LAW 925 INTERNATIONAL LAW. (3)**

Introduction to the legal process by which interests are adjusted and decisions reached on the international scene. Treaties, the law of international organizations, the "common law" of nations and national laws with significant international ramifications are examined to determine their effect on international cooperation and coercion.

**LAW 926 INTERNATIONAL BUSINESS TRANSACTIONS COURSE. (3)**

This course will cover the basic legal structure regulating international trade. Topics covered include: international sales contracts, international finance, international civil litigation and arbitration (jurisdiction, choice of law, enforcement of foreign judgments and arbitration awards), tariff and non-tariff trade barriers, export licensing, international aspects of intellectual property (patents, trademarks and copyrights), regulation of foreign investment, regional trade organization with emphasis on the EEC and North American Free Trade Area and fundamentals of taxation of international transactions.

**LAW 927 LEGISLATION. (3)**

This course provides an introduction to legislation and the legislative process, with an emphasis on federal legislation. Among the subjects considered are theories of representation by the legislature, includes one person-one vote; legal process theory and the roles that judicial review and separation of powers play in that theory; and statutory construction, including the rules and canons of statutory construction and the use of legislative history in interpreting statutes.

**LAW 928 EMPLOYEE BENEFITS LAW. (3)**

This course provides a broad overview of federal law governing employee benefits. Topics covered include: origins and fundamentals of the pension system, origins of ERISA, taxation of employee benefits, fiduciary rules, and preemption. Students who take this course should have completed a basic tax course.

**LAW 929 COPYRIGHT LAW. (3)**

This course provides a broad understanding of most aspects of this branch of intellectual property including copyrightable subject matter, standards for protection, registration and deposit requirements, the bundle of rights, remedies, standards for infringement, defenses to infringement including fair use, and a variety of other concepts. Intellectual Property is not a prerequisite. Grades will be based on three writing projects assigned during the semester.

**LAW 930 ANTITRUST LAW. (2-3)**

The body of law structuring economic organization and activities in a free enterprise national system. Major matters considered in the course are government creation and regulation of the legal monopolies, controls over collaborative conduct of competing economic entities, and legal controls over the vertical distributive relationship of suppliers, dealers, and customers.

**LAW 931 STATE AND LOCAL TAXATION. (2-3)**

This course provides an introduction to the fundamentals of state and local taxation. Topics covered include: property taxation, sales taxation, corporate taxation, and constitutional limitations on state and local taxation.

**LAW 935 UNFAIR TRADE. (2-3)**

Analysis of the various common law unfair competition areas; examination of statutory relief in areas of trademarks, copyright, and misleading advertising; survey and analysis of various portions of Federal Trade Commission Act and Robinson-Patman Act.

**LAW 950 SEMINAR. (1-3)**

Seminar in selected legal problems. Normally, each seminar is centered upon a particular field of legal learning, such as office practice, current constitutional litigation, etc. May be repeated to a maximum of 10 credits.

**LAW 958 ENVIRONMENTAL MEDIATION EXTERNSHIP. (2)**

Through a placement with the Kentucky Natural Resources and Environmental Protection Cabinet's Office of Administrative Hearings, this externship provides practical training and experience in mediating environmental disputes. The externship also provides exposure to the Cabinet's administrative hearings process as well as an introduction to various aspects of environmental law. Students engage in mediation training, analysis of the mediation process, analysis of mediated cases, and mediation simulations. Each student observes both the Cabinet's mediation of environmental administrative disputes and the Cabinet's entire administrative hearing process. Students also co-mediate actual environmental administrative disputes before the Cabinet. Offered on a pass-fail basis only.

**LAW 960 TRIAL ADVOCACY BOARD. (1)**

In the second year all students who successfully complete the intra-school competition and are asked to become a member of the Board will receive one hour of pass-fail credit at the end of the spring semester of the third year for meaningful participation in the activities of the Board, which includes national inter-school competitions and conducting the second year membership competition. Prereq: LAW 890.

**LAW 961 MOOT COURT/BOARD. (1-2)**

Second year competition for one hour credit. Those selected for the Moot Court Board receive an additional two hours credit in the third year. Offered on a pass/fail basis only. May be repeated to a maximum of three credits.

**LAW 962 KENTUCKY LAW JOURNAL. (1-3)**

This course, required of all members of the Law Journal staff, offers experience in legal writing, editing, and the process of publication of a scholarly periodical. Offered on a pass/fail basis only.

**LAW 963 JOURNAL OF NATURAL RESOURCES AND ENVIRONMENTAL LAW. (3)**

The course required of all members of the Journal of Natural Resources and Environmental law, offers experience in legal writing, editing and the process of publication of a scholarly journal. Pass-fail only.

**LAW 964 JUDICIAL CLERKSHIP. (2)**

Clerking for trial and appellate judges. May be repeated once with permission of the Dean. Offered on a pass/fail basis.

**LAW 965 LEGAL INTERNSHIP. (2)**

Supervised handling of criminal cases under the limited practice rule of the Kentucky Supreme Court. Instruction and practice in investigation, preparation and trial advocacy. Open to third year students only. May be repeated once with permission of the Dean. Offered on a pass/fail basis.

**LAW 966 MOOT COURT NATIONAL TEAM. (2)**

Participation on Moot Court National Team. National Team members should sign for this course instead of 961 in their third year.

**LAW 967 PRISON INTERNSHIP. (3)**

Supervised handling of cases for prisoners at the Federal Correctional Institution; instruction and practice in interviewing, counseling, negotiation, and study of applicable substantive law. Offered on a pass/fail basis only. Prereq: Completion of all first-year courses.

**\*LAW 968 RESEARCH PROBLEMS. (2)**

Independent study of legal problems under faculty supervision, and supervised training in legal aid, moot court and legal writing. May be repeated to a maximum of six credits.

**\*LAW 969 SENIOR RESEARCH PROBLEMS. (2)**

Independent study of legal problems under faculty supervision, and supervised training in legal aid, moot court and legal writing. May be repeated to a maximum of six credits.

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**LIN Linguistics**

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**LIN 211 INTRODUCTION TO LINGUISTICS. (3)**

Introduction to the scientific study of human language. Emphasis on the fundamental principles of linguistic theory; applications of these principles in the investigation of grammatical structure, language change, regional and social dialect variation, and the acquisition of language by children. Credit will not be given to students who already have credit for either ANT 215 or ENG 414G. Prereq: Two college semesters or two high school years of a foreign language. (Same as ENG 211.)

**LIN 395 INDEPENDENT WORK. (3)**

Study of special problems in linguistics under the direction of an instructor in the linguistics program. Prereq: LIN 211; major and 3.0 in linguistics or consent of instructor.

**LIN 515 PHONOLOGICAL ANALYSIS. (3)**

An investigation of speech-sounds and systems of speech-sounds. Articulatory phonetics, analysis of phonological systems, phonological theories. Includes fieldwork on the phonology of a non-Indo-European language; within a given academic year, the same language serves as the basis for fieldwork in ANT/ENG/LIN 515 and ANT/ENG/LIN 516. Prereq: ENG/LIN 211 or equivalent. (Same as ANT/ENG 515.)

**LIN 516 GRAMMATICAL ANALYSIS. (3)**

Emphasis on the systematic interrelationships of morphemes within words and sentences. Practical training in the writing of grammars and exposure to various theories of grammatical description. Includes fieldwork on the morphology and syntax of a non-Indo-European language; within a given academic year, the same language serves as the basis for fieldwork in ANT/ENG/LIN 515 and ANT/ENG/LIN 516. Prereq: ENG/LIN 211 or equivalent. (Same as ANT/ENG 516.)

**LIN 517 SPECIAL TOPICS IN LINGUISTICS (Subtitle required). (3)**

The focus will be on intensive study of problems and issues that do not fall under linguistics course headings. These may have an interdisciplinary emphasis, or they may concentrate on some special topics of current research. All topics will be subject to review by the director of the program. May be repeated under different subtitle to a maximum of six credits. Prereq: Consent of instructor.

**LIN 519 HISTORICAL LINGUISTICS. (3)**

Language change; reconstruction of linguistic systems; language classification; comparative linguistics; temporal, spatial, and social context of language change. Prereq: ANT 215, ENG/LIN 211, or ENG 414G; or equivalent. (Same as ANT 519.)

**LIN 617 STUDIES IN LINGUISTICS (Subtitle required). (3)**

A comprehensive investigation of some designated topic in general or applied linguistics. May be repeated to a maximum of nine credits under different subtitles. Prereq: An introductory course in linguistics (ANT 215, ENG/LIN 211, or ENG 414G) or permission of instructor. (Same as ENG 617).

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**LIS Library and Information Science**

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**LIS 510 CHILDREN'S LITERATURE AND RELATED MATERIALS. (3)**

A survey of children's literature, traditional and modern. Reading and evaluation of books with multimedia materials with emphasis on the needs and interests of children. Covers media for use by and with children from preschool through grade six.

**LIS 513 LITERATURE AND RELATED MATERIALS FOR EARLY ADOLESCENCE. (3)**

A study of integrated media to support the curriculum of the middle school. Emphasis is placed on evaluating literature appropriate for early adolescent problems and interests.

**LIS 514 INFORMATION RESOURCES AND SERVICES FOR YOUNG ADULTS. (3)**

A consideration of the special characteristics and needs of young adults approximately 12-20 years old. Emphasis given to the literature and information resources and services in all types of libraries designed to meet their needs.

**LIS 550 INTRODUCTION TO CATALOGING AND CLASSIFICATION. (3)**

Introductory study of types of bibliographic records and the fundamentals of bibliographic description and subject analysis of print and nonprint information. Includes brief introduction to online cataloging.

**\*LIS 600 INFORMATION IN SOCIETY. (3)**

An introduction to the nature of information (both utilitarian and aesthetic) in contemporary society, and to the role played by libraries and other information organizations in disseminating that information. Emphasis is on developing perspective.

**\*LIS 601 INFORMATION SOURCES AND SERVICES. (3)**

An introduction to basic information sources and services provided by libraries and information organizations. Consideration is also given to the ethics of information services, the user-system interface including question-negotiation and the formulation of effective search strategies, and the evaluation of information sources and information services.

**\*LIS 602 INFORMATION STORAGE AND RETRIEVAL. (3)**

An introduction to principles and practices of information analysis, organization, storage, retrieval and dissemination. Examines the structure of bibliographic records, indexing processes, indexing languages, catalogs and files, storage media, retrieval strategies and information delivery systems.

**\*LIS 603 MANAGEMENT IN LIBRARY AND INFORMATION SCIENCE.****(3)**

An introduction to the basic elements of management and how these are applied to the effective administration of information systems. Focus will be placed on two major roles in a system, the person who is supervised as well as the manager or supervisor. Examination of the functions of planning, organization, staffing and controlling as well as the theories of management and the effective use of these in an information system.

**LIS 604 LIBRARY AND BOOK HISTORY.****(3)**

Development of libraries and books from earliest time to the present with special reference to their relationship to contemporary social, economic, cultural and political trends. Emphasis is given to American library and book history.

**LIS 608 METHODS OF RESEARCH IN LIBRARY AND INFORMATION SCIENCE.****(3)**

Basic tools, techniques and methods of research. Consideration is given to the role and purpose of research in library and information science and its relationship to research in other disciplines. Includes critical evaluation of current research in library and information science and the development of a research proposal.

**LIS 609 CURRENT PROBLEMS IN LIBRARY AND INFORMATION SCIENCE.****(3)**

A seminar which examines current philosophical and managerial issues in library and information science. Focus is on the analysis, origins, evaluation and current status of these issues. Prereq: LIS 530, LIS 550, and LIS 560.

**LIS 610 CREATIVE LIBRARY PROGRAMS FOR CHILDREN.****(3)**

A study of the oral tradition and its place in the cultural heritage of today. An introduction to the principles of storytelling, selection of stories, practice in telling, program planning, and development of creative visual forms. Prereq: LIS 510 and permission of instructor.

**LIS 611 CRITICAL ANALYSIS OF CHILDREN'S LITERATURE.****(3)**

Advanced study of book evaluation, literary criticism, children's book publishing, awards, and current trends in the field. Individual projects require extensive critical reading. Prereq: LIS 510 and permission of instructor.

**LIS 618 ADULT INFORMATION NEEDS AND SERVICES.****(3)**

The study of adult reading and information needs, interests and abilities; developmental psychology and life-long learning concepts. Selection and evaluation of materials and their use in designing and implementing an effective program of library services to adults.

**LIS 622 SOCIAL SCIENCE INFORMATION.****(3)**

The content and structure of bibliographic and other information resources in the social sciences. Consideration of formal and informal communication within the social sciences with emphasis on information sources and services in anthropology, history, business, law, political science, psychology, economics, education, geography, sociology, and other closely related subjects. Prereq: LIS 530.

**LIS 623 INFORMATION IN THE HUMANITIES.****(3)**

The content and structure of bibliographic and other information resources in the humanities. A consideration of formal and informal communication within the humanities with emphasis on information sources and services in religion, philosophy, literature, linguistics, visual arts, music, dance, theatre, film and other closely related subjects. Prereq: LIS 530.

**LIS 624 INFORMATION IN SCIENCE AND TECHNOLOGY.****(3)**

The content and structure of bibliographic and other information resources in science and technology. A consideration of formal and informal communication in science and technology with emphasis on sources and services in agriculture, astronomy, biology, chemistry, mathematics, natural resources, zoology, and other closely related subjects. Prereq: LIS 530.

**LIS 626 GOVERNMENT PUBLICATIONS.****(3)**

Study of the nature and scope of government documents, including problems and methods of acquisition, organization, and reference use of federal, state, local and international publications. Prereq: LIS 530 or equivalent.

**LIS 630 ONLINE INFORMATION SYSTEMS AND SERVICES.****(3)**

Focus on online information systems and services and their management in libraries and information centers. Consideration given to concepts of online information retrieval, major commercial information services, online public access catalogs, CD-ROM-based information systems, and basic online search techniques and strategies. Prereq: LIS 530; prereq or concur: LIS 535.

**LIS 636 MICROCOMPUTERS IN LIBRARIES AND INFORMATION CENTERS.****(3)**

Examines microcomputer software applications commonly used in libraries and information centers. Consideration given to the structure of microcomputer operating systems, and the elements of software evaluation.

**LIS 637 INFORMATION TECHNOLOGY.****(3)**

Study of computer and communication technology used in modern information storage and retrieval systems. Consideration also given to managing microcomputer services, hardware evaluation and selection, and system security.

**LIS 640 HEALTH SCIENCES LIBRARIES.****(3)**

A survey of health sciences libraries including a study of information needs, sources, and services in the health sciences. Consideration is also given to technical services functions in health sciences libraries, the management of health sciences libraries, and current trends and developments. Prereq: LIS 530.

**LIS 641 LAW LIBRARIANSHIP.****(3)**

A study of the materials of legal research and reference work. Emphasis is placed on the methods of effective research and the actual use of legal materials in the solution of practical reference problems. The selection, cataloging, classification, and storage of materials in a law collection are considered. The specialized requirements of law librarianship and law library administration are treated. Prereq: Consent of instructor.

**LIS 643 ARCHIVES AND MANUSCRIPTS MANAGEMENT.****(3)**

This course is designed to cover the management, care, and servicing of manuscript and archival material. Attention will also be given to criteria for building an archival/manuscript collection in a repository and to the description and interpretation of its holdings in guides and catalogs for the use of researchers. Prereq: LIS 535 or consent of instructor.

**\*LIS 644 ADMINISTRATION OF SCHOOL LIBRARY MEDIA CENTERS.****(3)**

Examines the philosophy behind current national and state guidelines for library media programs and addresses the roles of library media professionals in program and resource management in the K-12 school setting. Students will work on their individual exit portfolios and plan a practicum experience to meet requirements for performance-based certification by the Kentucky Department of Education. Prereq: May be taken concurrently with last requirements or following completion of all requirements (with the exception of LIS 576) for certification as school media librarian.

**LIS 645 PUBLIC LIBRARIES.****(3)**

An analysis of public library objectives and of the services provided and techniques employed to achieve them. Some attention is given to special problems of public library management and to trends in public library development. Prereq: LIS 504.

**LIS 646 ACADEMIC LIBRARIES.****(3)**

History, aims and functions of university and college libraries including organization, collection building and evaluation, finance and personnel. Recent trends in national and regional cooperation. Undergraduate libraries, community colleges and the "library college" will also be reviewed. Prereq: LIS 504.

**LIS 647 CURRENT TRENDS IN SCHOOL MEDIA CENTERS.****(3)**

An intensive study of trends in school media centers with emphasis upon research and current programs. Prereq: School library media experience.

**LIS 650 TECHNICAL PROCESSING SYSTEMS.****(3)**

A survey of manual and computer-based technical processing systems in libraries. Consideration given to circulation, acquisitions, cataloging and serial control systems. Trends and developments in technical processing, files and records management, and technical processing procedures and activities are examined. Prereq: LIS 550 and LIS 560.

**LIS 651 LIBRARY AND INFORMATION NETWORKS.****(3)**

An analysis of the structure and governance, topology, technology, and service functions of networks based on electronic telecommunications and technology. Examines the impact of networks on information users, settings, and organizations nationally and internationally. Prereq: LIS 535 or consent of instructor.

**LIS 655 DESCRIPTIVE CATALOGING.****(3)**

An advanced study of principles and standards of bibliographic description for print and nonprint information. Emphasis will be on the Anglo-American Cataloging Rules and on the description of monographic and serial publications. Prereq: LIS 550 or consent of instructor.

**LIS 656 SUBJECT CATALOGING AND CLASSIFICATION.****(3)**

An advanced study of subject analysis of library materials, including subject cataloging and subject classification. Prereq: LIS 550 or consent of instructor.

**LIS 659 COLLECTION DEVELOPMENT. (3)**  
Intellectual and administrative aspects of building, maintaining and evaluating library collections. Topics include: library cooperation; national standards; the writing and implementation of collection policies; strategies of selection and evaluation; contemporary publishing and the book trade. Prereq: LIS 530.

**LIS 660 ADMINISTRATIVE BEHAVIOR IN LIBRARY MANAGEMENT. (3)**  
An emphasis upon human behavior in library administration including an understanding of group process, interpersonal relationships, communications, motivation, leadership, and developing an awareness of self in the administrative process. Prereq: LIS 560.

**LIS 668 INFORMATION SYSTEMS DESIGN. (3)**  
Study of concepts and methods of information system design and development with particular relevance to library and information center applications. Emphasis is given to modeling of system functions, data, and processes of computer-based information systems including the development of small scale information systems. Prereq: LIS 636.

**\*LIS 675 PROFESSIONAL FIELD EXPERIENCE. (3)**  
Professional field experience in a library or other information-related organization. Student assumes entry level professional duties and responsibilities in an operational setting under the close supervision of an information professional. Available only to those students lacking similar experience and may not be repeated. Requires minimum of 140 hours of experiential learning, and the completion of a term paper or special project under the direction of the course coordinator. Prereq: Completion of 18 hours of graduate work in library and information science and consent of course coordinator.

**\*LIS 676 SCHOOL MEDIA PRACTICUM. (1-12)**  
Supervised experience at the elementary and secondary levels in school library media centers. Required for students seeking certification as school/media librarians in Kentucky. Experience will be under the joint supervision of college faculty and cooperating media librarians. Prereq: Admission to Teacher Education Program and consent of instructor.

**LIS 690 SPECIAL TOPICS IN LIBRARY AND INFORMATION SCIENCE. (1-3)**  
Intensive study of one aspect of library and information science under the leadership of an authority in the area. May be repeated to a maximum of six semester hours when topics vary.

**LIS 695 INDEPENDENT STUDY IN LIBRARY AND INFORMATION SCIENCE. (3)**  
Opportunity for directed study in a subject, issue, or problem of professional interest to the student, and which is not treated in a regular course. Student may structure independent study as independent research or as independent reading, and a substantial written report is required in either case. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**LIS 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**LIS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.



**MA Mathematics****MA 108R INTERMEDIATE ALGEBRA. (3)**

This course is remedial in nature and covers material commonly found in second year high school algebra. Specific topics to be discussed include numbers, fractions, algebraic expression, simplifying, factoring, laws of exponents, linear equations, simple graphs and polynomial algebra. This course is not available for degree credit toward a bachelor's degree. Credit not available on the basis of special examination. Prereq: One year of high school algebra. Recommended for students with a Math ACTE score of 17 or less, or consent of department.

**MA 109 COLLEGE ALGEBRA. (3)**

Selected topics in algebra and analytic geometry. Develops manipulative algebraic skills required for successful calculus study. Includes brief review of basic algebra, quadratic formula, systems of linear equations, introduction to analytic geometry including conic sections and graphing. This course is not available for credit to persons who have received credit in any mathematics course of a higher number with the exceptions of MA 112, 123, 162, 199, 201 and 202. Credit not available on the basis of special examination. Prereq: Two years of high school algebra and a Math ACTE score of 18 or above, or MA 108R, or math placement test.

**MA 110 ANALYTIC GEOMETRY AND TRIGONOMETRY. (4)**

This is a course specifically designed for students intending to enroll in a calculus sequence. Topics will include trigonometric functions, exponentials and logarithms, graphs, polar coordinates, conic sections and systems of conics. Students may not receive credit for MA 110 and either of MA 109 or MA 112. This course is not available for credit to students who have received credit in any higher numbered mathematics course except for MA 123, 162, 199, 201 or 202. Credit is not available by special examination. Lecture, three hours; recitation, two hours per week. Prereq: Two years of high school algebra and a Math ACTE score of 23 or above, or consent of department.

**MA 112 TRIGONOMETRY. (2)**

A standard course. Includes trigonometric functions, identities, multiple analytic formulas, laws of sines and cosines and graphs of trigonometric functions. This course is not available to persons who have received credit for any mathematics course of a higher number with the exception of MA 113, 123, 131, 132 and 162. Credit not available by special examination. Prereq: Two years of high school algebra or MA 108R.

**MA 113 CALCULUS I. (4)**

A course in one-variable calculus, including topics from analytic geometry. Derivatives and integrals of elementary functions (including the trigonometric functions) with applications. Lecture, three hours; recitation, two hours per week. Prereq: Math ACTE score of 26 or above, or MA 109 and MA 112, or consent of department.

**MA 114 CALCULUS II. (4)**

A continuation of MA 113, primarily stressing techniques of integration. Lecture, three hours; recitation, two hours per week. Prereq: High school trigonometry or MA 112; and a grade of C or better in MA 113, MA 132, or MA 223.

**MA 123 ELEMENTARY CALCULUS AND ITS APPLICATIONS. (3)**

An introduction to differential and integral calculus, with applications to business and the biological and physical sciences. Not open to students who have credit in MA 113. Prereq: Math ACTE score of 21 or above, or MA 109 or math placement test.

**MA 132 CALCULUS FOR THE LIFE SCIENCES. (3)**

Introduction to integral calculus, integration of logarithmic and exponential functions. Applications to the life sciences including biochemical rates and reactions and radioactive decay. An introduction to biological models and their associated differential equations. Prereq: MA 123 or consent of instructor.

**MA 162 FINITE MATHEMATICS AND ITS APPLICATIONS. (3)**

Finite mathematics with applications to business, biology, and the social sciences. Linear functions and inequalities, matrix algebra, linear programming, probability. Emphasis on setting up mathematical models from stated problems. Prereq: MA 109 or equivalent.

**MA 193 CALCULUS WORKSHOP I. (1-2)**

Intensive group study and practice relevant to MA 113. Admission only by consent of instructor. Laboratory, two hours per week per credit. Offered on a pass-fail basis only. Coreq: MA 113.

**MA 194 CALCULUS WORKSHOP II. (1-2)**

Intensive group study and practice relevant to MA 114. Admission only by consent of instructor. Laboratory, two hours per week per credit. Offered on a pass-fail basis only. Coreq: MA 114.

**MA 199 TOPICS IN MATHEMATICS. (3)**

Topics in mathematics to acquaint students in non-technical fields with ideas and methods of mathematics. Topics vary from semester to semester at the discretion of the instructor.

**MA 201 MATHEMATICS FOR ELEMENTARY TEACHERS. (3)**

Basic concepts of measurement, geometry, probability, and statistics. Recommended only for majors in early elementary and middle school education. Prereq: MA 109.

**MA 202 MATHEMATICAL PROBLEM SOLVING FOR ELEMENTARY TEACHERS. (3)**

Development of mathematical problem solving skills. Students will solve problems from such areas as algebra, geometry, probability, number theory, and logic. Credit not available on the basis of special examination. Prereq: A grade of "C" or better in MA 201. Also recommended: a course in logic (e.g. PHI 120) or a course in calculus (e.g. MA 123).

**MA 213 CALCULUS III. (4)**

MA 213 is a course in multivariate calculus. Topics include three-dimensional vectors calculus, partial derivatives, double and triple integrals, sequences, and infinite series. Lecture, three hours; recitation, two hours per week. Prereq: MA 114 or equivalent.

**MA 214 CALCULUS IV. (3)**

MA 214 is a course in ordinary differential equations. Emphasis is on first and second order equations and applications. The course includes series solutions of second order equations and Laplace transform methods. Prereq: MA 213 or equivalent.

**MA 261 INTRODUCTION TO NUMBER THEORY. (3)**

Topics from classical number theory, including discussions of mathematical induction, prime numbers, division algorithms, congruences, and quadratic reciprocity. Prereq: Consent of instructor.

**MA 310 MATHEMATICAL PROBLEM SOLVING FOR TEACHERS. (3)**

Heuristics of problem solving. Practice in solving problems from algebra, number theory, geometry, calculus, combinatorics and other areas. Primarily for middle and secondary school teachers. Prereq: MA 123 or MA 113.

**MA 320 INTRODUCTORY PROBABILITY. (3)**

Set theory; fundamental concepts of probability, including conditional and marginal probability; random variables and probability distributions (discrete and continuous); expected values and moments; moment-generating and characteristic functions; random experiments; distributions of random variables and functions of random variables; limit theorems. Prereq: MA 213 or equivalent. (Same as STA 320.)

**MA 321 INTRODUCTION TO NUMERICAL METHODS. (3)**

Floating point arithmetic. Numerical linear algebra; elimination with partial pivoting and scaling. Polynomial and piecewise polynomial interpolation. Least squares approximation. Numerical integration. Roots of nonlinear equations. Ordinary differential equations. Laboratory exercises using software packages available at computing center. Prereq: MA 213 and CS 221 or equivalent. Knowledge of a procedural computer language is required. (Same as CS 321.)

**MA 322 MATRIX ALGEBRA AND ITS APPLICATIONS. (3)**

Algebra of matrices, elementary theory of vector spaces and inner product spaces, the solution of simultaneous linear equations using Gaussian elimination and triangular factorization. Orthogonal projections, pseudo inverse and singular value decomposition, least squares approximation. Determinants, eigenvalues and eigenvectors, diagonalization. Prereq: MA 114.

**MA 330 HISTORY OF MATHEMATICS. (3)**

A survey of the development of mathematics. Topics may include: the Egyptians and Babylonians, mathematics of the Greek Classical Age, Euclid and the Alexandrian School, the Renaissance, Fermat and the beginning of calculus, the work of Newton and Leibnitz, nineteenth century geometry, analysis and set theory. Prereq: MA 114.

**MA 340 DISCRETE STRUCTURES IN COMPUTER SCIENCE. (3)**

Topics include permutations, combinations and partitions; inclusion-exclusion principle; generating functions and recurrence relations; elementary algorithms concerning graphs and trees; generation of random combinatorial and graphical examples; Boolean algebra, Boolean functions, switching circuits and mathematical logic; introduction to algebraic coding theory. Prereq: CS 245 and CS 270. Restricted to computer science, electrical engineering, mathematics and mathematical sciences majors. Others by permission. (Same as CS 340.)

**MA 341 TOPICS IN GEOMETRY. (3)**

Selected topics in geometry including Euclidean and some non-Euclidean geometries. Prereq: Consent of instructor.

- MA 351 ELEMENTARY TOPOLOGY I. (3)**  
A beginning course, with particular emphasis on point-set topology in Euclidean spaces. Prereq: MA 213 or consent of instructor.
- MA 352 ELEMENTARY TOPOLOGY II. (3)**  
A continuation of MA 351, to include a discussion of metric spaces, completeness, general topological spaces, compactness, connectedness. Prereq: MA 351 or consent of instructor.
- MA 361 ELEMENTARY MODERN ALGEBRA I. (3)**  
A beginning course, with particular emphasis on groups and rings. Prereq: MA 322 or consent of instructor.
- MA 362 ELEMENTARY MODERN ALGEBRA II. (3)**  
A continuation of MA 361 to include a discussion of fields and topics in linear algebra. Prereq: MA 361 or consent of instructor.
- MA 375 COMMUNICATING MATHEMATICS. (3)**  
A course intended to provide understanding of an experience with contemporary mathematical communication in a modern instructional setting. Primarily intended for, but not restricted to, prospective school and college teachers of mathematics, including students who may intend to enroll in a graduate program and work as a graduate teaching assistant while pursuing an advanced degree. May be used to satisfy the general studies communications requirement. May not be counted as an upper division mathematics course in mathematics degree programs. Lecture, one hour; laboratory, four hours per week. Prereq: MA 214, MA 322, at least one of (MA 351, MA 361, MA 471), and consent of instructor.
- MA 398, 399 INDEPENDENT WORK IN MATHEMATICS. (3 ea.)**  
Reading courses for upper division students of high standing. Prereq: Mathematics or mathematical sciences major and a standing of 3.0 in the department.
- MA 415G GRAPH THEORY. (3)**  
Theory of linear undirected graphs, including definitions and basic concepts, trees, connectivity, traversability, factorization, planarity and matrices. In addition, algorithm for finding spanning trees, testing connectivity, finding Euler trails, finding a maximum matching in a bipartite graph, and testing planarity will be presented at appropriate times. Applications of algorithms to operations research, genetics and other areas. About 55 percent of the course will be on general theory of graphs, 30 percent on algorithms and 15 percent on applications of these algorithms. Prereq: CS 101 or equivalent. (Same as CS 415G.)
- MA 416G PRINCIPLES OF OPERATIONS RESEARCH I. (3)**  
The course is an introduction to modern operations research and includes discussion of modeling, linear programming, dynamic programming, integer programming, scheduling and inventory problems, and network algorithms. Prereq: MA 213 or equivalent. (Same as CS 416G.)
- MA 417G PRINCIPLES OF OPERATIONS RESEARCH II. (3)**  
A continuation of MA 416 with topics selected from stochastic models, decision making under uncertainty, inventory models with random demand, waiting time models and decision problems. Prereq: CS/MA 416G and MA/STA 320, or consent of instructor. (Same as STA 417G.)
- MA 422 NUMERICAL SOLUTIONS OF EQUATIONS. (3)**  
Linear equations: Gaussian elimination, special linear systems, orthogonalization, eigenproblem, iterative methods. Nonlinear equations: solutions of equations in one variable, solutions of systems of nonlinear equations. Optimization. Prereq: CS/MA 321 and MA 322; or consent of instructor. (Same as CS 422.)
- MA 432G METHODS OF APPLIED MATHEMATICS I. (3)**  
Partial differentiation, Jacobians, implicit function theorem, uniform convergence of series, line and surface integrals. Green's and Stokes' theorems. Prereq: MA 214 or equivalent.
- MA 433G INTRODUCTION TO COMPLEX VARIABLES. (3)**  
Elementary complex variable theory with applications. Complex field, analytic functions, Cauchy theorem, power series, residue theory. Prereq: MA 214.
- MA 471G ADVANCED CALCULUS I. (3)**  
A careful and vigorous investigation of the calculus of functions of a single variable. Topics will include elementary topological properties of the real line, convergence limits, continuity, differentiation and integration. Prereq: MA 214 and MA 322.
- MA 472G ADVANCED CALCULUS II. (3)**  
A continuation of MA 471G to functions of several variables. A careful and rigorous investigation of the extensions of the concepts of the one variable calculus to n-dimensions. Prereq: MA 471G or consent of instructor.

- MA 481G DIFFERENTIAL EQUATIONS I. (3)**  
Brief review of linear differential equations and matrix algebra, eigenvalues and eigenvectors of matrices, systems of linear differential equations with constant coefficients, applications, Sturm separation and comparison theorems, Sturm-Liouville theory for second-order equations and applications. Prereq: MA 214 and MA 322.
- MA 485G FOURIER SERIES AND BOUNDARY VALUE PROBLEMS. (3)**  
An introductory treatment of Fourier series and its application to the solution of boundary value problems in the partial differential equations of physics and engineering. Orthogonal sets of functions, Fourier series and integrals, solution of boundary value problems, theory and application of Bessel functions and Legendre polynomials. Prereq: MA 432G or equivalent. (Same as EM 585.)
- MA 501, 502 SEMINAR IN SELECTED TOPICS. (3 ea.)**  
Various topics from the basic graduate courses. Designed as a course for teachers of lower division mathematics and usually offered in connection with a summer institute. May be repeated to a maximum of six credits. Prereq: Teaching experience in the field of mathematics and consent of instructor.
- MA 503 COMBINATORICS. (3)**  
General methods of combinatorial analysis with an emphasis on problem solving. Note: Designed for MAT(M) program. Not open for graduate credit to students in mathematics. Prereq: Consent of instructor.
- MA 506 METHODS OF THEORETICAL PHYSICS I. (3)**  
The course and its sequel (MA/PHY 507) are designed to develop, for first-year graduate students, familiarity with the mathematical tools useful in physics. Topics include curvilinear coordinates, infinite series, integrating and solving differential equations of physics, and methods of complex variables. Work with Green's functions, eigenvalues, matrices and the calculus of variations are included as a part of MA/PHY 506 and 507. Prereq: PHY 404G or equivalent. (Same as PHY 506.)
- MA 507 METHODS OF THEORETICAL PHYSICS II. (3)**  
Continuation of MA/PHY 506. Fourier and Laplace Transforms, the special functions (Bessel, Elliptic, Gamma, etc.) are described. Work with Green's functions, eigenvalues, matrices and the calculus of variations are included as a part of MA/PHY 506 and 507. Prereq: MA/PHY 506. (Same as PHY 507.)
- \*MA 515 MATHEMATICAL PROGRAMMING AND EXTENSIONS. (3)**  
Mathematical and computational aspects of linear programming, large scale structures, quadratic programming, complementary pivoting, introduction to nonlinear programming. Applications to engineering and economics. Additional topics selected in geometric programming, stochastic programming. Prereq: A course in linear algebra or consent of instructor. (Same as STA 515.)
- MA 522 MATRIX THEORY AND NUMERICAL LINEAR ALGEBRA I. (3)**  
Review of basic linear algebra from a constructive and geometric point of view. Factorizations of Gauss, Cholesky and Gram-Schmidt. Determinants. Linear least squares problems. Rounding error analysis. Stable methods for updating matrix factorizations and for linear programming. Introduction to Hermitian eigenvalue problems and the singular value decomposition via the QR algorithm and the Lanczos process. Method of conjugate gradients. Prereq: MA 322. (Same as CS 522.)
- MA 532 ORDINARY DIFFERENTIAL EQUATIONS. (3)**  
Successive approximations and elementary existence theorems for scalar and vector equations, qualitative behavior of solutions as functions of initial conditions and parameters, linear systems with constant and periodic coefficients, stability theorems for second order linear and nearly linear equations, second order boundary value problems and regular singular point theory. Prereq: MA 322 and either 432G or 471G.
- MA 533 PARTIAL DIFFERENTIAL EQUATIONS. (3)**  
Elementary existence theorems, equations of first order, classification of linear second order equations, the Cauchy and Dirichlet problems, potential theory, the heat and wave equations, Green's and Riemann functions, separation of variables, systems of equations. Prereq: MA 532 and MA 472G or equivalent.
- MA 537 NUMERICAL ANALYSIS. (3)**  
Floating point arithmetic. Direct methods for the solution of systems of linear algebraic equations. Polynomial and piecewise polynomial approximation, orthogonal polynomials. Numerical integration: Newton Cotes formulas and Gaussian quadrature. Basic methods for initial value problems for ordinary differential equations. The emphasis throughout is on the understanding and use of software packages for the solution of commonly occurring problems in science and engineering. Prereq: CS/MA 321 or equivalent or graduate standing or consent of instructor. Knowledge of a procedural computer language is required. (Same as CS/EGR 537.)

**MA 538 NUMERICAL ANALYSIS II. (3)**

A continuation of CS/MA 537. Roots of a nonlinear equation and minimization of a function of a single variable. Linear difference equations. Numerical methods for ordinary differential equations: initial value problems, and elementary techniques for two-point boundary value problems. Prereq: A grade of B or better in CS/MA 321 or CS/MA 537 or equivalent. (Same as CS 538.)

**MA 551 TOPOLOGY I. (3)**

Topological spaces, products, quotients, subspaces, connectedness, compactness, local compactness, separation axioms, convergence. Prereq: Consent of instructor.

**MA 561 MODERN ALGEBRA I. (3)**

Algebraic structures, quotient structures, substructures, product structures, groups, permutation groups, groups with operators, and the Jordan-Holder theorem. Prereq: Consent of instructor.

**MA 565 LINEAR ALGEBRA. (3)**

Review of finite dimensional linear algebra, the rank of a matrix, systems of linear equations, determinants, characteristic and minimal polynomials of a matrix, canonical forms for matrices, the simplicity of the ring of linear mappings of a finite dimensional vector space, the decomposition of a vector space relative to a group of linear mappings and selected topics of a more advanced nature. Prereq: MA 322 or consent of instructor.

**MA 570 MULTIVARIATE CALCULUS. (3)**

A self-contained course in n-dimensional analysis, including the general form of Stokes' theorem. Prereq: MA 432G or equivalent.

**MA 571 ANALYSIS I. (3)**

Sequences and series of real and complex numbers, sequences of functions. Riemann-Stieltjes integration, Lebesgue measure and integration. Prereq: MA 471G or consent of instructor.

**MA 611 INDEPENDENT WORK IN MATHEMATICS. (3-9)**

Reading course for graduate students in mathematics. May be repeated to a maximum of nine credits. Prereq: Major in mathematics, a standing of at least 3.0 and consent of instructor.

**\*MA 613 PROBLEMS SEMINAR IN OPERATIONS RESEARCH. (3)**

In this course the student is exposed to the art of applying the tools of operations research to real world problems. The seminar is generally conducted by a group of faculty members from the various disciplines to which operations research is applicable. Prereq: MA 617 and STA 525 or consent of instructor. (Same as EE/STA 619.)

**MA 615 CONVEX ANALYSIS AND OPTIMIZATION. (3)**

Convex sets and convex functions. Separation and Helly-type theorems. Duality theory and minimax theorems. Algorithmic procedures for constrained and unconstrained problems. May be repeated to a maximum of six credits. Prereq: MA 472G or consent of instructor.

**\*MA 616 NUMERICAL TECHNIQUES FOR NONLINEAR OPTIMIZATION. (3)**

Unconstrained optimization, Kuhn-Tucker conditions for nonlinear programs (constrained optimization). Solutions procedures: methods of feasible directions, penalty methods, approximation methods, the method of generalized Lagrangians. Discrete optimal control (dynamics formulation). Solutions methods for control problems: decomposition and structured problems. Prereq: MA 515 or consent of instructor.

**\*MA 617 MARKOVIAN DECISION PROBLEMS. (3)**

Control of discrete-time Markov processes by dynamic programming inventory theory. Computational approaches to control of Markov chains. State space methods: modeling of engineering and economic systems by linear stochastic difference equations. The discrete-time matrix Riccati equation, Kalman filtering. Optimal control of linear stochastic difference equations with complete or incomplete state information and with quadratic cost criterion. Prereq: STA 624.

**\*MA 618 COMBINATORICS AND NETWORKS. (3)**

Graphs, networks, min flow-max cut theorem and applications; transportation problems, shortest route algorithms, critical path analysis, multi-commodity networks, covering and packing problems; integer programming, branch-and-bounding techniques, cutting plane algorithms, computational complexity. Prereq: MA 515, can be taken concurrently with MA 515.

**MA 622 MATRIX THEORY AND NUMERICAL LINEAR ALGEBRA II. (3)**

Numerical solution of matrix eigenvalue problems and applications of eigenvalues. Normal forms of Jordan and Schur. Vector and matrix norms. Perturbation theory and bounds for eigenvalues. Stable matrices and Lyapunov theorems. Nonnegative matrices. Iterative methods for solving large sparse linear systems. (Same as CS 622.)

**MA 625 NUMERICAL METHODS FOR DIFFERENTIAL EQUATIONS. (3)**

Numerical solution techniques for boundary value problems for ordinary differential equations, and for parabolic and elliptic partial differential equations. Prereq: CS/MA/EGR 537 or consent of instructor.

**MA 628 APPLIED MATHEMATICS IN THE NATURAL SCIENCES II. (3)**

Continuation of MA/EM 527 with emphasis on special topics and techniques applied to partial differential equations that occur in various physical field theories. Field equations of continuum mechanics of solids and fluids are reviewed. The method of characteristics, elliptic functions and integrals, Legendre polynomials, Mathieu functions, integral equations and transforms, and the methods of potential theory are examples of selected topics studied in introductory applications. Intended for students in applied mathematics, science and engineering. Prereq: MA/EM 527. (Same as EM 628.)

**MA 630 MATHEMATICAL FOUNDATIONS OF STOCHASTIC PROCESSES AND CONTROL THEORY I. (3)**

A modern treatment of stochastic processes from the measure theoretic point of view with applications to control theory; the basic notions of probability theory, independence, conditional expectations, separable stochastic processes, martingales, Markov processes, second order stochastic processes. Prereq: MA 432G and 670.

**MA 631 MATHEMATICAL FOUNDATIONS OF STOCHASTIC PROCESSES AND CONTROL THEORY II. (3)**

A continuation of MA 630. Representation of stationary processes by stochastic integrals. Stochastic differential equations. Probability measures on function spaces. Absolute continuity of measures associated with stochastic processes. Weak convergence of probability measures on metric spaces. Prereq: MA 630.

**MA 632 ADVANCED DIFFERENTIAL EQUATIONS. (3)**

General existence and uniqueness theorems, linear systems, regular and singular eigenvalue problems, stability theory, nonlinear oscillation theory, asymptotic theory, equations with retarded argument. Prereq: MA 532 or consent of instructor.

**MA 633 THEORY OF PARTIAL DIFFERENTIAL EQUATIONS. (3)**

A continuation of MA 533. Topics may include hypoelliptic operators and interior regularity of solutions; P(D)-convexity and existence theorems; regularity up to the boundary; applications of the maximum principle; semi-group theory for evolution equations; perturbation methods; well-posed and improperly posed problems; equations with analytic coefficients; asymptotic behavior of solutions; nonlinear problems. Prereq: MA 533.

**MA 641, 642 DIFFERENTIAL GEOMETRY. (3 ea.)**

Tensor products, exterior algebra, differentiable maps, manifolds, geodesics, metric properties of curves in Euclidean fundamental forms, surfaces. Prereq: Consent of instructor.

**MA 651 TOPOLOGY II. (3)**

Embedding and metrization, compact spaces, uniform spaces and function spaces. Prereq: MA 551.

**MA 654 ALGEBRAIC TOPOLOGY I. (3)**

Homotopy and homology theories, complexes and applications. Prereq: MA 551, 561, 651 or equivalent.

**MA 655 ALGEBRAIC TOPOLOGY II. (3)**

Singular homology theory and applications, homology of products, singular and Čech cohomology with applications. Prereq: MA 654.

**MA 661 MODERN ALGEBRA II. (3)**

Rings, fields of quotients, rings of polynomials, formal power series, modules, exact sequences, groups of homomorphisms, natural isomorphisms, algebras and tensor algebras. Prereq: MA 561 or consent of instructor.

**MA 667 GROUP THEORY. (3)**

A study of homomorphisms for groups, finite groups, solvable groups, nilpotent groups, free groups, and abelian groups. Prereq: MA 661.

**MA 670 ANALYSIS II. (3)**

Continuation of MA 571. Absolutely continuous functions on the real line, Lebesgue spaces, beginning theory of Banach spaces including the Hahn-Banach, closed graph, and open mapping theorems. Prereq: MA 571 or consent of instructor.

**MA 671 FUNCTIONS OF A COMPLEX VARIABLE I. (3)**

Differentiation and integration, contour integration, poles and residues. Taylor and Laurent series, and conformal mapping. Prereq: MA 571, 670.

- MA 672 FUNCTIONS OF A COMPLEX VARIABLE II.** (3)  
A continuation of MA 671 to include the Riemann Mapping theorem, Dirichlet problem, multiple valued functions, Riemann surfaces and applications. Prereq: MA 671.
- MA 673 SEVERAL COMPLEX VARIABLES.** (3)  
Hartog's theorem, domains of holomorphy, pseudo-convexity, Cousin problems, differential forms, deRham's theorem, cohomology of domains of holomorphy, Levi's problem, Weierstrass preparation theorem, sheaves, Stein manifolds, entire functions of several variables. Prereq: MA 672.
- MA 678 MATHEMATICAL THEORY OF OPTIMAL CONTROL.** (3)  
An introduction to classical calculus of variations. Optimality conditions for control problems, the Pontryagin principle, Dynamic Programming, Applications to Aerospace and Economics. Prereq: Consent of instructor.
- MA 681 FUNCTIONAL ANALYSIS I.** (3)  
General theory of normed linear spaces including the Hahn-Banach separation theorems, principle of uniform boundedness and closed graph theorem. Dual spaces and representation theorems for linear functionals. Abstract measure theory and Riesz representation theorem for  $C(X)$ . Prereq: MA 670 or consent of instructor.
- MA 682 FUNCTIONAL ANALYSIS II.** (3)  
Weak and weak-star topologies, reflexive spaces, convexity in linear spaces, operators, adjoint operators, spectral theory and Fourier transforms. Prereq: MA 681.
- MA 715 SELECTED TOPICS IN OPTIMIZATION.** (3)  
Topics will be selected from the areas of mathematical control theory, integer programming, combinatorial optimization, large scale optimization, nonlinear programming, dynamic optimization, etc. May be repeated to a maximum of nine credits.
- MA 721 SELECTED TOPICS IN NUMERICAL ANALYSIS.** (3)  
Review of current research in numerical analysis. May be repeated to a maximum of nine credits. Prereq: Consent of instructor.
- MA 732 SELECTED TOPICS IN DIFFERENTIAL AND INTEGRAL EQUATIONS.** (3)  
Advanced topics in theory of differential (ordinary or partial) and integral equations such as topological dynamics, almost periodic solutions, stochastic differential equations, integro-differential and differential-difference equations, generalized functions as solutions, non-linear partial differential equations, singular integral equations.
- MA 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.
- MA 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.
- MA 751, 752 SELECTED TOPICS IN TOPOLOGY.** (3 ea.)  
Prereq: MA 651.
- MA 761 HOMOLOGICAL ALGEBRA.** (3)  
Homological algebra, modules, exact sequences, functors, homological dimension, extension problems. Prereq: Consent of instructor.
- MA 764, 765 SELECTED TOPICS IN ALGEBRA.** (3 ea.)  
Reports and discussion on recent advances in group theory, ring theory, and homological algebra. Prereq: MA 661 and consent of instructor.
- MA 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.
- MA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.
- MA 772 SELECTED TOPICS IN THE THEORY OF COMPLEX VARIABLES.** (3)  
Prereq: Consent of instructor.
- MA 773 SELECTED TOPICS IN ANALYSIS.** (3)  
May be repeated to a maximum of six credits. Prereq: Consent of instructor.
- MA 778 MATHEMATICAL SEMINAR.** (3)  
May be repeated once to a total of six credits. Prereq: Consent of instructor.

**MB Microbiology**

- MB 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams. (Same as MI 749.)
- MB 768 RESIDENCE CREDIT FOR MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours. (Same as MI 768.)
- MB 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (1-12)  
May be repeated indefinitely. (Same as MI 769.)

**MD College of Medicine**

- \*MD 810 PATIENTS, PHYSICIANS, AND SOCIETY I.** (5)  
In small groups, students will work with a preceptor to study twelve written clinical situations. Students will contemplate, investigate, comprehend, and discuss biological/clinical, psychological, social, economic, ethical, legal, and professional issues concerning the problem-based histories. Prereq: Admission to UK College of Medicine.
- MD 811 INTRODUCTION TO THE MEDICAL PROFESSION.** (6)  
The Introduction to the Medical Profession course will combine small group meetings, lecture, and practical experience in providing students with the basic skills necessary to successfully engage in clinical rotations. First year medical students will participate in four segments: observation period, interviewing and communication skills, physical examination and physical diagnosis, and clinical decision making sessions. Prereq: Admission to UK College of Medicine.
- \*MD 820 PATIENTS, PHYSICIANS, AND SOCIETY II.** (5)  
In this course, students will approach written clinical scenarios with initiative by researching, gathering, and selecting materials to produce resource packets within and for their tutorials. Students will be challenged with complex ethical, legal, social, psychological, economic and biological issues. Prereq: Admission to second year of medical curriculum. (Same as BSC 820.)
- MD 831 INTEGRATIVE COLLOQUIUM.** (2-4)  
This course will allow junior medical students, using the problem based learning approach, to explore medical cases that have multidimensional aspects involving not only the patient's disease but issues of ethics, societal problems, familial considerations, and economic issues which are relevant to the development of the truly complete physician. A series of approximately 7-8 problem cases will be presented in small groups with faculty mentors. They will study various aspects of a patient's condition allowing for consideration of family, community, physician and societal responsibilities. When possible, the students will be joined by patients with the problem being discussed. Issues may include situations involving alcoholism and substance abuse, AIDS, brain death and organ procurement. Medical problems which often have these associated issues will be used as the presenting problem. Laboratory, 40 hours per week per credit. Prereq: Promotion to third year medical school.
- MD 832 CLINICAL NEUROSCIENCES/NEUROLOGY.** (4)  
This course provides opportunity for third year medical students to recognize, treat, and understand the etiology and pathology of common neurologic disorders and emergencies. Laboratory, forty hours per week. Prereq: Admission to third year of medical curriculum.
- MD 833 CLINICAL NEUROSCIENCES/PSYCHIATRY.** (4)  
This course provides opportunity for third year medical students to recognize, treat, and understand the etiology and pathology of common psychiatric disorders and emergencies. Laboratory, forty hours per week. Prereq: Admission to third year of medical curriculum.
- MD 850 INTEGRATIVE STUDIES.** (4)  
This course is provided for senior medical students who are interns in the internal medicine residency program. The course focuses on the study of scientific, psychosocial, ethical, economic, preventive, political, legal, health policy, etc., aspects of contemporary medical practice. It is tutorial in form, involves problem-based-learning and the study of detailed, complex medical case histories. In interpreting these cases, students draw on the medical and scientific literature, computer data bases, the premedical and medical faculty, and on the expertise of nurses, hospital administrators, ethicists, and other University and community scholars and practitioners. Prereq: Three years of Medical School.

**ME Mechanical Engineering**

**ME 007, 008 THE ENGINEERING PROFESSION (Senior). (0)**  
Lectures on professional growth, conduct and ethics. Activities of the student branches of the corresponding professional societies. May be repeated.

**ME 101 ORIENTATION TO MECHANICAL ENGINEERING (Freshman and Transfer Students). (1)**  
Introduction to the profession of mechanical engineering: its history, practice, and methods of analysis.

**ME 105 BASIC ENGINEERING GRAPHICS. (2)**  
Basic Engineering Graphics involves the use of basic engineering drawing equipment with freehand sketching and use of a micro-computer graphics workstation in the study of orthographic projection, auxiliary view projection, section views, pictorial drawing, with introduction to dimensioning and tolerancing. Class, six hours.

**ME 151 MANUFACTURING ENGINEERING. (3)**  
A background course in the area of manufacturing processes and systems. Includes a study of machining operations, foundry mechanization, forging, sheet metal work, powder metal products, production molding and production machines and processes.

**ME 220 ENGINEERING THERMODYNAMICS I. (3)**  
Fundamental principles of thermodynamics. Prereq: PHY 231. Prereq or concur: MA 214.

**ME 310 ENGINEERING EXPERIMENTATION I. (3)**  
An instrumentation laboratory to provide the student with an understanding of the characteristics and application of instrumentation related to basic measurements in mechanical engineering. Design and planning of experiments. Uncertainty analysis. Principles and application of technical writing and information retrieval. Lecture, two hours; laboratory, two hours. Prereq: Engineering standing, CS 221 and ME 330.

**ME 311 ENGINEERING EXPERIMENTATION II. (3)**  
A laboratory to instruct the student in the performance of basic mechanical engineering components and systems. Performance of experiments, application of theory and reporting. Introduction to experimentation. Introduction to error analysis. Lecture, one hour; laboratory, four hours. Prereq: ME 310, 321, 325 and engineering standing.

**ME 321 ENGINEERING THERMODYNAMICS II. (3)**  
Gas mixtures, air-water vapor mixtures. Air conditioning system design. Principles and design of energy conversion devices, power and refrigeration cycles. Principles of combustion, chemical equilibrium, one-dimensional gas dynamics. Nozzle design. Continuation of ME 220. Prereq: ME 220, MA 214, and engineering standing.

**ME 325 ELEMENTS OF HEAT TRANSFER. (3)**  
Fundamental principles of conduction, convection, radiation heat transfer. Numerical methods for heat transfer problems. Design and applications of heat transfer equipment such as fins and heat exchangers. Prereq: ME 330, MA 214, CS 221 and engineering standing.

**\*ME 330 FLUID MECHANICS. (3)**  
Introduction to the physical properties of fluids, fluid statics. Equations of conservation of mass, momentum and energy for systems and control volumes. Dimensional analysis and similarity. Principles of inviscid and real fluid flows; flow through pipes and around bodies. Application and design of fluid handling systems. Prereq: Engineering standing, ME 220 or CME 200, CS 221 and MA 214. (Same as CME 330.)

**ME 340 INTRODUCTION TO MECHANICAL SYSTEMS. (3)**  
Modeling of mechanical, thermal, hydraulic and other phenomena from a systems viewpoint. Analysis of continuous-time models for free and forced response. Laplace transforms, transfer functions and block diagrams. Introduction to numerical simulation. Analysis of higher-order systems. Prereq: EM 313, CS 221, engineering standing.

**ME 344 MECHANICAL DESIGN. (3)**  
Fundamentals of design with methods of approximation. Introduction to optimum design considerations. Synthesis and problems on the design of various mechanical elements. Prereq: ME 151, EM 302, engineering standing; concur: EM 313.

**ME 346 MECHANICAL SYSTEMS DESIGN. (3)**  
A course using a modified case method to teach the principles involved in designing complete mechanical systems. A unique problem is chosen each semester. The system to be designed is usually one not presently in existence, but for which a need exists. The student is required to synthesize a general solution to a problem, apply analytical techniques to arrive at a more detailed solution, and finally prepare a report presenting by freehand sketches and written descriptions his solution to the problem. Lecture, one hour; laboratory, six hours. Prereq: ME 344 and engineering standing.

**ME 347 DYNAMIC ANALYSIS OF DESIGN PROBLEMS. (3)**  
A course emphasizing the role of analysis in design. Actual design objectives are met through the use of mathematical modeling techniques and the application of the principles of dynamics, kinematics and vibrations. Prereq: EM 313, engineering standing; concur: ME 344.

**ME 358 ECONOMIC ANALYSIS OF MECHANICAL SYSTEMS. (3)**  
Formulation of economic relationships. Familiarization with alternate mechanical systems and application of economic principles of selection of alternates. Prereq: ME 321, engineering standing or consent of instructor.

**ME 380 TOPICS IN MECHANICAL ENGINEERING (Variable topics). (3)**  
A lecture-recitation course on a topic of current interest. Modern developments in mechanical engineering will be stressed. Offered as a technical elective in mechanical engineering. May be repeated to a maximum of nine credits. Prereq: Variable, given when topic identified and engineering standing.

**ME 395 INDEPENDENT WORK IN MECHANICAL ENGINEERING. (1-6)**  
Special research and problems for individual students who wish to pursue independent investigations. May be repeated to a maximum of six credits. Prereq: Consent of department chairperson via permit.

**\*ME 406 COMPUTER-AIDED GRAPHICS AND DESIGN. (3)**  
Development of computer graphics and interactive graphics methods and applications to problem solving and design practices. Emphasis on graphics principles, data management, interactive programming, and integrated analysis/design. Prereq: ME 344 and CS 221.

**ME 407 ENGINEERING ETHICS. (1)**  
Review of the growth and development of the profession, engineering ethics, obligations to employers and peers, limits of professional responsibility, codes of ethics and enforcement, and case studies.

**ME 408 SAFETY ENGINEERING. (2)**  
Review of general safety hazards, system engineering safety, fault free analysis, reliability, accident reconstruction and investigation. Case studies will be included. Concur: ME 344.

**\*ME 412 SENIOR DESIGN PROJECT. (3)**  
A project concerned with the design of a complex system of current interest to mechanical engineers. Students will work in small groups and emphasis will be on original work. Lecture, one hour; laboratory, four hours per week. Prereq: ME 325, ME 401, ME 440 and Engineering standing.

**ME 440 DESIGN OF CONTROL SYSTEMS. (3)**  
Fundamentals of automatic control theory and design; feedback control systems; transducers, detectors and actuators; types of controllers. Control system design using root-locus, Nyquist and Bode methods; compensation. Introduction to modern control theory, nonlinearities and digital control. Prereq: ME 340 and ME 101.

**ME 480G HEATING, VENTILATING AND AIR-CONDITIONING. (3)**  
An introductory course emphasizing the engineering systems aspects of thermal environmental design. Principles and applications of building energy requirements and thermal comfort criteria. Prereq: ME 325 and Engineering standing or consent of instructor. (Same as AEN 480G.)

**ME 501 MECHANICAL DESIGN WITH FINITE ELEMENT METHODS. (3)**  
Mechanical design techniques based on the finite element method, using machine design background as the starting point. Techniques for modeling machine elements will be shown in relation to the basic FEM theory. Emphasis will be on quantifying loads, the resulting stress and deflection, and relating them to design allowables, leading to an acceptable design solution. Prereq or concur: ME 344.

**ME 505 MODELING OF MANUFACTURING PROCESSES AND MACHINES. (3)**  
A study of the major manufacturing processes and equipment. Emphasis on mathematical and computer models of these processes, as used in automated manufacturing and control of these processes. Lecture, two hours; laboratory, two hours. Prereq: EM 313 and EM 302. (Same as MFS 505.)

**ME 507 DESIGN FOR MANUFACTURING. (3)**  
The topics will include fundamentals of concurrent engineering, product life cycle, product specification, standardization, functional requirements and datum features, selection of materials and manufacturing processes, cost analysis, case studies on designing for quality, economy, manufacturability and productivity. Prereq: ME 344 and engineering standing. (Same as MFS 507.)

**ME 510 DYNAMICS AND DESIGN OF ROBOT MANIPULATORS. (3)**

Analysis of the design and operation of robotic systems. Emphasis on robot kinematics, dynamics, differential motion, manipulator Jacobian, motion trajectories, geometric modeling, force and vibration analyses. Various practical applications and real cases are investigated. Prereq: ME 340 or both EE 420G and EM 230. (Same as EM 510.)

**ME 512 MANUFACTURING SYSTEMS. (3)**

This course introduces students to fundamentals of design, planning and control of manufacturing systems aided by computers. Concepts of control hardware, NC programming languages, software aspects related to NC manufacturing, programmable controllers, performance modeling of automated manufacturing systems, group technology and flexible manufacturing systems, etc. will be addressed. Prereq: Engineering standing. (Same as MFS 512.)

**ME 530 GAS DYNAMICS. (3)**

Consideration of the mass, energy and force balances applied to compressible fluids. Isentropic flow, diabatic flow, flow with friction, wave phenomena and one-dimensional gas dynamics. Applications to duct flows and to jet and rocket propulsion engines. Prereq: ME 321, ME 330 and Engineering standing.

**ME 531 FLUID DYNAMICS I. (3)**

Stress at a point (introduced as a tensor of rank two). Equation of conservation of mass, rate of strain tensor, derivation of Navier-Stokes equation, source-sink flows, motion due to a doublet, vortex flow, two- and three-dimensional irrotational flow due to a moving cylinder with circulation, two-dimensional airfoils. Prereq: ME 330, MA 432G and Engineering standing.

**ME 542 KINEMATIC SYNTHESIS OF MECHANISMS. (3)**

Fundamentals in the analysis and synthesis of mechanisms including coupler curves, guided plane systems and linkage design. Prereq: ME 344, EM 313 and Engineering standing.

**ME 560 ENGINEERING OPTICS. (3)**

Fundamentals of geometrical and physical optics; applications as related to problems in engineering design and research; details of some optical measurement techniques; introduction to lasers and their applications to heat transfer and combustion research; inverse analytical techniques for determining optical properties of small particles from light scattering and extinction measurements. Prereq: Engineering standing.

**ME 563 BASIC COMBUSTION PHENOMENA. (3)**

Simultaneous application of fluid mechanics, heat and mass transfer, chemical kinetics and thermodynamics to combustion. Topics covered include chemical kinetics, chain and thermal explosions, detonation and deflagration, flammability limits, stirred reactors. Flame stabilization in high and low velocity streams, laminar and turbulent diffusion flames, droplet burning, and metal combustion. Prereq: ME 330 and Engineering standing; prereq or concur: ME 325.

**ME 566 DIRECT ENERGY CONVERSION PROCESSES. (3)**

Basic consideration of direct conversion of thermal and chemical energy to electrical energy. Analysis and design of thermoelectric, thermionic, photovoltaic, magnetohydrodynamic and electrochemical systems. Prereq: ME 325 and Engineering standing.

**ME 599 TOPICS IN MECHANICAL ENGINEERING (Subtitle required). (3)**

A detailed investigation of a topic of current significance in mechanical engineering such as: computer-aided manufacturing, special topics in robotics, and current topics in heat transfer. May be repeated under different subtitles to a maximum of nine credits. A particular topic may be offered at most twice under the ME 599 number. Prereq: Variable; given when topic is identified.

**PREREQUISITE FOR GRADUATE WORK:** Students desiring to take any of the following courses should have a thorough working knowledge of chemistry, physics and mathematics.

**ME 601 ADVANCED CAE APPLICATIONS. (3)**

This course will include development of theory for application to several topics in advanced engineering applications of computers in design. Typical topics include rolling element bearings, fluid film bearings, rotor dynamics, and elasto-plastic analysis. When appropriate, specialized computer programs will be introduced and utilized to illustrate the application of the theory and numerical techniques in the areas covered. Prereq: ME 501.

**ME 602 DYNAMICS OF DISTRIBUTED MECHANICAL SYSTEMS. (3)**

Applications of small-oscillation shell theory to continuous mechanical systems modeled by shells, plates, rings, arches, membranes, beams, etc. Study of natural frequencies, modeshapes, forced-vibration characteristics, system dampings, dynamic influence function, combination of subsystems, active and passive vibration controls and dampings. Prereq: ME 540 or EM 513, or consent of instructor.

**ME 604 DYNAMICS OF ROTATING MACHINERY. (3)**

Review of dynamic characteristics unique to high speed rotating shafts. Equations of motion for a rotor, including gyroscopic effects. Computational methods, including finite element. Effects of bearings and nonlinearities, stability. Application to design situations. Prereq: EM 313 and ME 501.

**ME 606 SEMINAR AND PROJECT IN MANUFACTURING SYSTEMS ENGINEERING. (3)**

A project course for manufacturing systems. Course consists of seminar presentations by outside professionals and faculty and a course project on a realistic manufacturing systems assignment. Lecture, two hours; laboratory, two hours. (Same as EE/MFS 606.)

**ME 607 ANALYSIS OF METAL CUTTING PROCESSES. (3)**

Advanced study of metal cutting involving the mechanics of metal cutting including cutting forces, tool-wear/tool-life and temperature analysis, surface finish and integrity, chip control, machinability assessments and advances in cutting tool technology. Prereq: ME 505. (Same as MFS/MSE 607).

**ME 608 NONTRADITIONAL MANUFACTURING PROCESSES. (3)**

This course introduces students to fundamentals of nontraditional manufacturing processes. Theory and implementation of the nontraditional manufacturing processes, such as laser cutting and welding, electro discharge machining, abrasive waterjet machining, rapid prototyping, etc., will be addressed. Prereq: ME 505 or consent of instructor. (Same as MFS 608.)

**ME 610 ENGINEERING ACOUSTICS. (3)**

A comprehensive study of wave propagation in fluids; derivation of the scalar wave equation and a study of its elementary solutions for time harmonic and transient waves in one, two and three dimensions. Radiation and scattering of waves at fluid and solid boundaries. Integral equation solution of the scalar velocity wave potential; numerical methods. Prereq or concur: MA 432G.

**ME 611 BOUNDARY ELEMENT METHODS IN ENGINEERING. (3)**

Introduction of boundary element methods for use in solving common engineering equations, such as the Laplace equation, the Poisson equation, the wave equation, and the diffusion equation. Both the theoretical and numerical aspects of the boundary element technique are presented. Application areas include heat conduction, potential flow problems, acoustic wave propagation, general diffusion, and stress analysis. Prereq: EGR 537 or consent of instructor. (Same as EGR 611.)

**ME 620 ADVANCED ENGINEERING THERMODYNAMICS I. (3)**

Critical treatment of the laws of thermodynamics, relations among thermodynamic properties; stability of systems; thermodynamic processes; selected special topics. Prereq: ME 321.

**ME 625 ADVANCED HEAT CONDUCTION. (3)**

Comprehensive study of heat conduction, derivation of governing equations; discussion of the various boundary conditions; review of classical heat conduction solutions; discussion of current problems, methods of solution and engineering applications of heat conduction. Prereq or concur: MA 432G.

**ME 626 ADVANCED HEAT CONVECTION. (3)**

Comprehensive study of heat convection; derivation of equations of convection of mass, momentum, and energy; boundary layer equations; classical solutions of laminar convection problems; turbulent convection; analogies between momentum and energy. Prereq: ME 325, MA 432G or concurrent.

**ME 627 RADIATION HEAT TRANSFER. (3)**

Principles of thermal radiation, the determination of radiation properties, and the analysis of radiation heat transfer. Results of recent radiation researches are included in the discussions. Prereq: ME 325, MA 432G or concurrent.

**ME 628 BOILING AND CONDENSATION. (3)**

Phase-change heat transfer including boiling and condensation. Phenomenological treatment of boiling using hydrodynamic instability. Theory of two-phase flow and its application to forced flow boiling. Film and dropwise condensation. Prereq: ME 325.

**ME 631 FLUID DYNAMICS II. (3)**

A continuation of ME 531 with emphasis on viscous flow. Exact and approximate solutions, boundary layer theory. Jets, wakes, rotating systems, compressible boundary layer and hydrodynamic stability. Prereq: ME 531 or consent of instructor.

**ME 634 TURBULENT FLOWS. (3)**  
Physical and analytical description of turbulent flows, isotropic turbulence, boundary layers and shear flows, free turbulence in jets and wakes. Measurement techniques. Prereq: ME 529 or ME 531.

**ME 640 ADVANCED ANALYSIS AND SIMULATION OF DYNAMIC SYSTEMS. (3)**  
An extension of ME 540 emphasizing advanced techniques. The concept of random processes in mechanical engineering problems; nonparametric and parametric models. The use of correlation, spectral analysis and digital filtering in data analysis and model building. Prereq: ME 540.

**ME 647 SYSTEM OPTIMIZATION I. (3)**  
A course in the theory and application of optimization techniques with emphasis on large engineering systems. Prereq: CS 221, one mathematics course beyond MA 214.

**ME 690 ADVANCED ALGORITHMS FOR COMPUTATIONAL FLUID DYNAMICS. (4)**  
Theory and implementation of main algorithms widely used for solving multi-dimensional partial differential equations arising in engineering applications such as fluid dynamics, heat and mass transfer, semiconductor simulation, etc. Numerical solution of steady and time-dependent linear partial differential equations on rectangular domains via finite difference techniques. Linearization methods for treatment of nonlinear problems. Numerical grid generation for transforming irregular domains into rectangular computational grids. Prereq: MA 537, or consent of instructor, and competence with a high-level programming language.

**ME 699 TOPICS IN MECHANICAL ENGINEERING (Subtitle required). (3)**  
A detailed investigation of a topic of current significance in mechanical engineering. May be repeated to a maximum of nine credits under different subtitles. A particular topic may be offered at most twice under the ME 699 number. Prereq: Variable; given when topic is identified.

**ME 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**ME 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**ME 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**ME 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

**ME 780 SPECIAL PROBLEMS IN MECHANICAL ENGINEERING. (3)**  
This course consists of individual work in one of the various fields of mechanical engineering. May be repeated three times for a maximum of 12 credits. Prereq: Approval of instructor.

**ME 790 RESEARCH IN MECHANICAL ENGINEERING. (1-9)**  
Work may be taken in any field of mechanical engineering, subject to the approval of the director of graduate studies. May be used to satisfy pre-qualifying examination residency credit. May be repeated to a maximum of 18 hours.

## MED Medicine

**MED 815 FIRST YEAR ELECTIVE, MEDICINE. (1-3)**  
With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Medicine. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**MED 825 SECOND-YEAR ELECTIVE, MEDICINE. (1-4)**  
With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Medicine. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**MED 835 THIRD-YEAR ELECTIVE, MEDICINE. (1-6)**  
Elective offerings in basic medical sciences and clinical medicine; will vary in length from 25-150 hours and will carry one to six hours credit. Electives will be chosen with the advice and approval of faculty advisor and Curriculum Committee. Prereq: Admission to the third year, College of Medicine.

**MED 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**  
With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

### Approved electives:

**MED 850 CLINICAL ENDOCRINOLOGY AND METABOLISM, ADULT**

**MED 851 GASTROINTESTINAL DISEASE, UK AND VAH**

**MED 852 DERMATOLOGY-SECTION 1**

**MED 856 NEPHROLOGY, BONE AND MINERAL METABOLISM**

**MED 857 PULMONARY MEDICINE**

**MED 858 CARDIOLOGY—UK**

**MED 860 INFECTIOUS DISEASES**

**MED 862 CARDIOLOGY-VAH**

**MED 863 RESEARCH IN MEDICINE**

**MED 870 ACTING INTERNSHIP IN MEDICINE**

**MED 871 CLINICAL CLERKSHIP IN MEDICINE**

**MED 872 FOURTH YEAR REMEDIAL CLINICAL CLERKSHIP**

**MED 873 MEDICAL SPECIALTIES AND GENERAL MEDICINE CLINICS**

**MED 874 STUDENT HEALTH SERVICE**

**MED 876 HEMATOLOGY-ONCOLOGY, UK**

**MED 877 HEMATOLOGY-ONCOLOGY, VAH**

**MED 879 GENERAL MEDICAL CONSULTING SERVICE**

**MED 880 GERIATRIC MEDICINE**

**MED 881 ALLERGY-MEDICINE**

**MED 890 INTERNAL MEDICINE OFF-SITE**

## MFS Manufacturing Systems Engineering

**MFS 505 MODELING OF MANUFACTURING PROCESSES AND MACHINES. (3)**  
A study of the major manufacturing processes and equipment. Emphasis on mathematical and computer models of these processes, as used in automated manufacturing and control of these processes. Lecture, two hours; laboratory; two hours. Prereq: EM 313 and EM 302. (Same as ME 505.)

**MFS 507 DESIGN FOR MANUFACTURING. (3)**  
The topics will include fundamentals of concurrent engineering, product life cycle, product specification, standardization, functional requirements and datum features, selection of materials and manufacturing processes, cost analysis, case studies on designing for quality, economy, manufacturability and productivity. Prereq: ME 344 and engineering standing. (Same as ME 507.)

**MFS 512 MANUFACTURING SYSTEMS. (3)**  
This course introduces students to fundamentals of design, planning and control of manufacturing systems aided by computers. Concepts of control hardware, NC programming languages, software aspects related to NC manufacturing, programmable controllers, performance modeling of automated manufacturing systems, group technology and flexible manufacturing systems, etc. will be addressed. Prereq: Engineering standing. (Same as ME 512.)

**\*MFS 563 SIMULATION OF INDUSTRIAL PRODUCTION SYSTEMS.****(3)**

Discrete event simulation and its application to performance analysis of industrial production systems. Topics include concepts for characterizing production systems, approaches to structuring simulation models, instruction in a simulation language, and techniques for comparing alternative system designs and control strategies. Applications to manufacturing, commercial and mining production systems are considered. Prereq: CS 221 or 270, STA 281 or 381. (Same as MNG 563.)

**#MFS 599 TOPICS IN MANUFACTURING SYSTEMS ENGINEERING (Subtitle required).****(3)**

A detailed investigation of a topic of current significance in manufacturing systems engineering such as: computer-aided manufacturing, special topics in robotics, and lean/agile manufacturing. May be repeated under different subtitles to a maximum of six credits. A particular topic may be offered at most twice under the MFS 599 number. Prereq: Variable; given when topic is identified.

**MFS 605 SYSTEMS FOR FACTORY INFORMATION AND CONTROL.****(3)**

Systems approach to manufacturing. Hardware and software for real time control and reporting. Sensor and actuators, controllers, networks, databases, hierarchical and distributed control, CAD/CAM systems, flexible manufacturing systems, group technology, modeling and simulation of factory operations. Lecture, two hours; laboratory, two hours. Prereq: MFS 505. (Same as EE 605.)

**MFS 606 SEMINAR AND PROJECT IN MANUFACTURING SYSTEMS ENGINEERING.****(3)**

A project course for manufacturing systems. Course consists of seminar presentations by outside professionals and faculty and a course project on a realistic manufacturing systems assignment. Lecture, two hours; laboratory, two hours. (Same as EE/ME 606.)

**MFS 607 ANALYSIS OF METAL CUTTING PROCESSES.****(3)**

Advanced study of metal cutting involving the mechanics of metal cutting including cutting forces, tool-wear/tool-life and temperature analysis, surface finish and integrity, chip control, machinability assessments and advances in cutting tool technology. Prereq: ME 505. (Same as ME/MSE 607.)

**MFS 608 NONTRADITIONAL MANUFACTURING PROCESSES.****(3)**

This course introduces students to fundamentals of nontraditional manufacturing processes. Theory and implementation of the nontraditional manufacturing processes, such as laser cutting and welding, electro discharge machining, abrasive waterjet machining, rapid prototyping, etc., will be addressed. Prereq: ME 505 or consent of instructor. (Same as ME 608.)

**MFS 611 ORGANIZATIONAL BEHAVIOR.****(3)**

A critical examination of behavior and performance within organizations and between organizations. Special attention is paid to the problem of performance at the individual, group, and formal organizational level. Prereq: Graduate School standing. (Same as MGT 611.)

**#MFS 699 TOPICS IN MANUFACTURING SYSTEMS ENGINEERING (Subtitle required).****(1-3)**

A detailed investigation of a topic of current significance in manufacturing systems engineering such as: computer-aided manufacturing, special topics in robotics, and lean/agile manufacturing. May be repeated under different subtitles to a maximum of six credits. A particular topic may be offered at most twice under the MFS 699 number. Prereq: Variable; given when topic is identified.

**#MFS 748 MASTER'S THESIS RESEARCH.****(0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**MFS 768 RESIDENCE CREDIT FOR MASTER'S DEGREE.****(1-6)**

May be repeated to a maximum of 12 hours.

**MFS 780 SPECIAL PROBLEMS IN MANUFACTURING SYSTEMS ENGINEERING.****(3)**

Course consists of specialized individual work in manufacturing systems engineering. Laboratory, nine hours. May be repeated to a maximum of nine credits. Prereq: Approval of instructor.

**#MFS 784 RESEARCH PROJECT IN MANUFACTURING SYSTEMS ENGINEERING.****(3)**

Individual study related to a special research project supervised by the student's advisor. A final written report on the project is required. This course is open only to and required by students pursuing the M.S. in MFS degree with a non-thesis option (Plan B). The course cannot satisfy part of the required thirty hours of course work for Plan B. Prereq: Approval of student's advisor.

**MGT****Management****MGT 301 BUSINESS MANAGEMENT.****(3)**

A study of planning, organizing and controlling; an interdisciplinary approach; actual decision-making cases. Prereq: STA 291, ECO 201, 202 and ACC 202, or consent of instructor.

**MGT 320 SURVEY OF PERSONNEL AND INDUSTRIAL RELATIONS.****(3)**

Survey of the field of personnel and industrial relations. Introduction of the topics of manpower planning, selection, placement, training, compensation, administration, labor-management relationships, hours of work, and health and safety. Prereq: MGT 301 or consent of instructor.

**MGT 340 ETHICAL AND REGULATORY ENVIRONMENT.****(3)**

This course focuses on ethical principles, the nature of the capitalist-collectivist continuum, government influence on business, and the responsibility of business to society. Topics to be considered include major approaches to ethical reasoning, antitrust law, social regulation, and the economic and social theories that undergird the concept of the social responsibility of business. Prereq: Junior standing or consent of instructor.

**MGT 341 BUSINESS LAW I.****(3)**

An introduction to the United States legal system and its application to the business community. Topics to be considered include: contracts, agency, commercial paper, and real property. Prereq: Junior standing or consent of instructor.

**MGT 395 INDEPENDENT STUDY IN MANAGEMENT.****(1-6)**

Course designed to accommodate students' independent exploration of specific topics within management. Course must be under the supervision of an instructor. May be repeated to a maximum of six credits. Prereq: GPA of 3.0, upper division status, approval of instructor and chairperson.

**MGT 410 ANALYSIS OF ORGANIZATIONAL BEHAVIOR.****(3)**

The behavior of business organizations and their participants is analyzed in the contemporary language of social psychology, systems, and models. Various theories of the firm are reviewed and evaluated. The interdependence of economic, social and behavioral factors is stressed. Prereq: MGT 301 or consent of instructor.

**MGT 422 WAGE AND SALARY ADMINISTRATION.****(3)**

Analysis of theory and practice in the administration of compensation. Practices and issues related to establishing a position structure, determining rates of pay, making individual pay decisions, administering benefits, and controlling compensation. Prereq: MGT 320.

**MGT 423 MANAGING EMPLOYEE RELATIONS.****(3)**

Analysis of theory and practices in managing relationships with employees. The emphasis is on organizational conflict, employee commitment, and problems in union and nonunion situations from a managerial perspective. Prereq: MGT 320, MGT 410, ECO 481G or consent of instructor.

**MGT 430 SERVICES MARKETING MANAGEMENT.****(3)**

This course addresses marketing and management issues and problems faced by service organizations. Marketing and management concepts are broadened and applied to the service organizations. Topics related to service quality, the marketing mix, and service delivery are covered. Prereq: MKT 300, MGT 301. (Same as MKT 430.)

**MGT 441 BUSINESS LAW II.****(3)**

A survey of selected business law topics to include: corporations, partnerships, secured transactions, sales, and bankruptcy. Prereq: MGT 340 or 341, or consent of instructor.

**MGT 450 DECISION ANALYSIS.****(3)**

The purpose of this course is to provide students with methodologies of problem solving by developing (a) their analytical maturity, (b) their ability to identify problem-generated alternative actions, and (c) their ability to choose among alternative courses of actions. Prereq: Senior standing in College of Business and Economics and DIS 300. (Same as DIS 450.)

**MGT 491 SMALL BUSINESS MANAGEMENT.****(3)**

An examination of the problems and decisions inherent in the establishment, financing, and management of small business firms. An experiential exercise, involving a consulting assignment to an operating small business in the area, is a central component of the course. Not to be taken on a pass-fail basis. Prereq: MKT 300, MGT 301, MGT 340, FIN 300 or consent of instructor.



**MGT 492 ENTREPRENEURSHIP AND VENTURE CREATION. (3)**

An examination of the role of the entrepreneur in society and analysis of the considerations inherent in starting a business. Topics include market and financial feasibility analysis, selection of a legal form of organization, estimating resource requirements, and site selection. Prereq: Senior standing and MKT 300, MGT 301, MGT 340 or MGT 341 and FIN 300.

**MGT 499 STRATEGIC MANAGEMENT. (3)**

Formulation and evaluation of strategy for single business and multiple business companies. Prereq: MKT 300, MGT 301, MGT 340, FIN 300 and senior standing.

**MGT 608 COMPARATIVE INTERNATIONAL MANAGEMENT. (3)**

A comparison of management concepts and practices in different countries and the role of management in economic development; an interdisciplinary approach emphasizing the impact of sociological-cultural factors, legal-political factors and education on management development. Prereq: MGT 301 or consent of instructor.

**MGT 611 ORGANIZATIONAL BEHAVIOR. (3)**

A critical examination of behavior and performance within organizations and between organizations. Special attention is paid to the problem of performance at the individual, group, and formal organizational level. Prereq: Graduate School standing. (Same as MFS 611.)

**MGT 620 PERSONNEL AND INDUSTRIAL RELATIONS. (3)**

Critical examination of theory, research, and managerial practice in the management of human resources. Particular attention is paid to the processes of human resource planning, staffing, compensation, and the management of employee relations. Prereq: MGT 611, ECO 610, ACC 628, MGT 650, MKT 600, ECO 611, FIN 600, MGT 651.

**MGT 624 MANAGEMENT OF INFORMATION RESOURCES. (3)**

The course is designed to prepare students to understand and analyze major issues related to the management of information resources, evaluate the current state of information resources management within an organization, and participate in the management of such resources. Prereq: DIS 620 or consent of instructor. (Same as DIS 624.)

**MGT 640 LEGAL AND REGULATORY ENVIRONMENT. (3)**

The purposes of this course are: 1) to establish an introductory understanding of the nature, dimensions, and impact of government regulation of business, 2) to explore, in summary fashion, the rudiments of the capitalist-collectivist continuum, 3) to alert the student to ethical dilemmas in the decision process, and 4) to exercise the student's skills in analysis, writing, and speaking. Prereq: Graduate standing; MGT 611, ECO 610, ACC 628, MGT 650, MKT 600, ECO 611, FIN 600, MGT 651.

**MGT 695 INDIVIDUAL WORK IN MANAGEMENT. (1-6)**

Students confer individually with the instructor. May be repeated to a maximum of six credits. Prereq: Consent of the instructor.

**MGT 697 TOP MANAGEMENT LEADERSHIP IN THE CONTEMPORARY BUSINESS ENVIRONMENT. (3)**

Political, historical, and philosophical perspectives on the meaning and processes of top management leadership. Applications of leadership perspective to the development of organizational culture, ethics and values, stakeholder relations, business-government relations, and competitiveness. Prereq: Third semester MBA standing.

**MGT 699 BUSINESS POLICY AND STRATEGY II. (3)**

Strategic issues associated with multi-industry, multi-national, multi-business and start-up management; strategy implementation and institutionalization; planning systems. Prereq: MGT 698 or the equivalent.

**MGT 700 ADMINISTRATIVE SCIENCE. (3)**

Primary emphasis upon the identification and investigation of the schools of thought concerning the field of administration. Analysis of various theory bases for purposes of integration and generalization will also make up a major portion of the course. Prereq: MGT 301 or consent of instructor.

**MGT 711 ORGANIZATIONS AND EXTERNAL SYSTEMS. (3)**

Systems analysis is used to examine organizations from two perspectives: (1) intra-organizational linkages among goals, technical subsystems and structural subsystems, and (2) organizational linkages with institutions, parties and cultures in its environment. Prereq: Consent of instructor.

**MGT 712 ORGANIZATIONS AND INDIVIDUAL BEHAVIOR. (3)**

Examination of current theory and empirical research regarding the behavior of individuals within organizations. Topics are divided into three phases: major behavioral processes, applied models of individual choice behavior, and specific areas of individual choice and decision.

**MGT 713 SEMINAR IN ADVANCED ORGANIZATION THEORY. (3)**

Seminar will examine broad range of organization theory and research from a multiple paradigm perspective. Interpretive and critique views and research literature will be among those examined. Prereq: MGT 700 and MGT 711, or equivalent and consent of instructor.

**MGT 714 SEMINAR IN MANAGEMENT THEORY AND POLICY. (3)**

A broad range of literature on organization strategy and structure is examined. Conceptual frameworks and research relating to the Business Policy decision processes are reviewed and critiqued. Prereq: Permission of instructor.

**MGT 763 RESEARCH, DESIGN AND ANALYSIS. (3)**

This course deals with the design and analysis of business research. Emphasizes the practical application of analysis of variance and correlational techniques to problems in business research. Focus will be on design, implementation, and interpretation of research. Prereq: MGT/MKT/FIN 762. (Same as MKT/FIN 763.)

**MGT 780 SPECIAL TOPICS IN MANAGEMENT (Subtitle Required). (3)**

Analysis of a specialized topic in management. May be repeated to a maximum of 12 credits when taken under different subtitles. Prereq: Consent of instructor.

**MGT 781 INDEPENDENT WORK IN MANAGEMENT. (1-6)**

Designed for advanced students who undertake research problems to be conducted in regular consultation with the instructor. May be repeated to a total of six credit hours. Prereq: Consent of instructor.

**MI Microbiology and Immunology**

**MI 494G IMMUNOBIOLOGY. (3)**

A survey of theories and mechanisms of immunity, including: nature of antigens and antibodies, antigen-antibody reactions, immunocompetent cells, immunogenetics, allergic reactions, tumor immunology and transplantation immunology. Prereq: BCH 401G (may be taken concurrently) and BIO 108 or BIO 276, or BIO 476G, or consent of instructor. (Same as BIO 494G.)

**MI 585 PATHOGENIC MICROBIOLOGY. (3)**

Human and animal pathogenic microorganisms, especially their morphological, cultural, and pathogenic properties. Prereq: BIO 208 or 276 or 476G, and CHE 107. (Same as BIO 585.)

**MI 586 LABORATORY IN PATHOGENIC MICROBIOLOGY. (2)**

Laboratory studies on human and animal pathogenic bacteria, especially their morphological, cultural, and pathogenic properties. Laboratory, four hours per week. Prereq or concur: BIO 585. (Same as BIO 586.)

**\*MI 590 CELLULAR AND MOLECULAR PHYSIOLOGY. (4)**

This course will focus on the cellular and molecular physiology of inter- and intracellular communication. In particular, it will provide an overview of established and emerging intracellular signaling mechanisms which utilize i) cyclic nucleotides (cAMP; cGMP), ii) calcium (phosphatidylinositol metabolism: cyclic ADP-ribose), iii) transmembrane ion fluxes (voltage- and receptor-operated channels), iv) tyrosine kinases, and v) nuclear transcription factors. The material will be presented in a number of formats including didactic lecture and group discussions of selected readings. Prereq: PGY 412G, PGY 502 or consent of instructor. (Same as PGY 590.)

**MI 595 IMMUNOBIOLOGY LABORATORY. (2)**

Laboratory in immunology and serology. Preparation, standardization, and uses of biological products; serology. Laboratory; four hours. Prereq: BIO/MI 494G or concurrently; or consent of instructor. (Same as BIO 595.)

**MI 598 CLINICAL MICROBIOLOGY. (3)**

An introduction to the concepts of clinical microbiology through a survey of the microbial diseases of man using an organ system approach. Prereq: BIO 208 and 209, BIO 476G recommended, CHE 230 or 236, or consent of instructor. (Same as PAT 598.)

**MI 601 SPECIAL TOPICS IN MOLECULAR AND CELLULAR GENETICS. (1)**

Each semester five distinguished scientists visit the UK campus to deliver a series of three formal lectures each and participate in numerous informal contacts with graduate students. The emphasis is on the presentation of the most current advances (often unpublished) in selected topics in molecular and cellular genetics. May be repeated to a maximum of six credits. (Same as AGR/BCH/BIO/PPA 601.)

**#MI 604 EXPERIMENTAL GENETICS. (2)**

This is an introductory genetics course designed to expose the first year graduate student to contemporary methods and concepts of genetic analysis. Where possible, model systems will be presented as paradigms to illustrate important concepts. This course is designed for first year Graduate Students who have had a typical undergraduate Biology curriculum. Prereq: Undergraduate Biochemistry or consent of instructor.

**MI 611 BIOPATHOLOGY. (3)**

The course will examine the mechanisms by which various biological, chemical and physical agents injure susceptible hosts and the complex biochemical and immunological reactions which occur in response to injury. The host defense mechanisms will be illustrated by an analysis of selected human diseases and animal model systems with particular emphasis on the events at the molecular and cellular level. Prereq: BCH 502 or concurrent, BIO/MI 494G or equivalents and consent of instructor. (Same as BIO 611.)

**MI 615 MOLECULAR BIOLOGY. (3)**

An integrative and functional approach to the regulatory aspects of DNA, RNA and proteins in procaryotic and eucaryotic cells. Lectures and discussions with readings in original literature. Prereq: A course in genetics (e.g. BIO 404G) and a course in nucleic acids and elementary molecular biology (e.g. BCH 502) or consent of instructor. (Same as BCH/BIO 615.)

**MI 618 MOLECULAR NEUROBIOLOGY. (4)**

This course provides knowledge base and analytical skills in the field of molecular neurobiology. An in-depth introduction to current technologies, their rationale and limitations, will be the focus to address normal brain function and neuropathological conditions. Prereq: BCH 501, 502, NEU 605, or consent of instructor. (Same as ANA/BIO/PGY 618.)

**MI 685 ADVANCED IMMUNOBIOLOGY. (4)**

An introductory level graduate course surveying current trends in immunology including the organization and structure of cells relevant to immunity, immunochemistry, types of immune responses, cellular immunology, immunogenetics and immunopathology. Prereq: BCH 401G, or BCH 501 or 502 or equivalent, or consent of instructor. (Same as BIO 685.)

**MI 707 CONTEMPORARY TOPICS IN IMMUNOLOGY. (2)**

This course will deal with controversial and evolving areas of immunology. Lectures in a given topic will be accompanied by student discussion of contemporary literature. Prereq: MI 685 or equivalent or consent of instructor. (Same as BIO 707.)

**MI 710 SPECIAL TOPICS IN MICROBIOLOGY. (2)**

A variety of topics relating to modern molecular and cell biology. Prereq: Consent of instructor.

**MI 720 MICROBIAL STRUCTURE AND FUNCTION. (4)**

Molecular basis of structure and function in unicellular microbes. Molecular genetic and structural approaches to the analysis of bacterial architecture growth, division, and differentiation. Prereq: Consent of instructor, BCH 501, BCH 502, and BIO 476G or equivalent. (Same as BIO 720 and OBI 720.)

**MI 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**MI 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams. (Same as MB 749.)

**MI 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours. (Same as MB 768.)

**MI 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1-12)**

May be repeated indefinitely. (Same as MB 769.)

**MI 772 SEMINAR IN MICROBIOLOGY. (0-1)**

Review of current literature in microbiology; presentation of papers on work in progress in the department or on assigned topics; reports on meetings of national and international scientific and professional societies and symposia. Required of all graduate students. Two hours per week. May be repeated nine times for a maximum of 10 credits. (Same as BIO 772.)

**MI 798 RESEARCH IN MICROBIOLOGY. (1-9)**

May be repeated to a maximum of 24 credits. Prereq: Consent of instructor. (Same as BIO 798.)

**MI 815 FIRST-YEAR ELECTIVE, MEDICAL MICROBIOLOGY AND IMMUNOLOGY. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Medical Microbiology and Immunology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**MI 825 SECOND-YEAR ELECTIVE, MEDICAL MICROBIOLOGY AND IMMUNOLOGY. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Medical Microbiology and Immunology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**MI 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**MKT Marketing****MKT 300 MARKETING MANAGEMENT. (3)**

The literature and problems in the retail distribution of consumers' goods, wholesale distribution of consumers' goods, industrial goods, sales organizations, sales promotion and advertising, and price policies. Prereq: ECO 202 or consent of instructor.

**\*MKT 310 CONSUMER BEHAVIOR. (3)**

The application of psychology, sociology, and anthropology to marketing. Includes such topics as consumer decision process, communications, interpersonal behavior, innovation. Prereq: MKT 300.

**MKT 320 RETAIL AND DISTRIBUTION MANAGEMENT. (3)**

Analysis of the functions, structure, policies, and performance of distribution channels and institutions. The course objective is to provide students with an understanding of concepts and decision making tools useful in managing manufacturer-retailer relationships and distribution costs at both the channel and retail level. The course is also concerned with the legal and socio-economic impact of distribution trends and practices. Prereq: MKT 300.

**MKT 340 INTRODUCTORY MARKETING RESEARCH. (3)**

Managerial applications of research in marketing decision making. The course objective is to provide students with expertise in defining information needs, selecting information sources and organizing information in decision-making contexts. Application of major concepts will be illustrated in marketing policy areas. Prereq: MKT 300, ECO 391.

**MKT 390 SPECIAL TOPICS IN MARKETING (Subtitle required). (1-3)**

Readings, projects, lecture and/or discussion to illuminate current topics of special interest or concern in marketing. May be repeated to a maximum of six credits. May not be repeated under the same title. A particular topic may be offered at most twice under the MKT 390 number. Prereq: Consent of instructor.

**MKT 395 INDIVIDUAL WORK IN MARKETING. (1-6)**

Student develops a specific program with instructor. One or more papers is typically expected. May be repeated to a maximum of six credits. Prereq: GPA of 3.0 in major, approval of instructor and chairperson.

**MKT 400 PROMOTION MANAGEMENT. (3)**

The objectives of the Promotion Management course are to develop awareness and understanding of the role and functions of promotion within firms and within society and to explicitly attempt to develop student thinking skills, i.e., problem identification, problem analysis, and problem solving, in the area of promotion. Prereq: MKT 300 and MKT 310 or permission of instructor.

**\*MKT 410 PERSONAL SELLING. (3)**

A detailed exposure to personal selling techniques. Emphasis placed on sales process, especially planning and delivery of sales presentations. Selected sales management topics include recruiting, training, motivating and evaluating sales people, as well as ethical and legal issues. Prereq: MKT 300 and marketing majors only.

**MKT 420 CONTEMPORARY MARKETING PROBLEMS. (3)**

An examination of selected areas in the field of marketing with a focus on contemporary problems. Emphasis will be placed on individual work by students. Prereq: MKT 300 and senior standing.

**MKT 430 SERVICES MARKETING MANAGEMENT. (3)**

This course addresses marketing and management issues and problems faced by service organizations. Marketing and management concepts are broadened and applied to the service organizations. Topics related to service quality, the marketing mix, and service delivery are covered. Prereq: MKT 300, MGT 301. (Same as MGT 430.)

**MKT 435 INTERNATIONAL MARKETING. (3)**

The primary objectives of this course are to: 1) familiarize the student with selected strategic marketing issues in a multinational environment, 2) examine alternative ways by which a firm can expand internationally, and 3) help the student develop a systematic approach for dealing with global and international marketing issues. Prereq: MKT 300.

**MKT 450 MARKETING STRATEGY AND PLANNING. (3)**

An examination of and participation in analytical processes for managerial marketing decisions. Topics will include such problem areas as product planning, distribution systems, advertising strategies, information systems, pricing decisions and buying behavior. Prereq: MKT 300 and two other marketing courses.

**MKT 600 MARKETING MANAGEMENT. (3)**

This course is designed to provide students with an understanding of: the role of marketing function in an organization; the types of marketing decisions and analytical procedures involved in making each decision; the overall marketing planning process; and, the impact of the social, economic, and legal environment on marketing decisions. Prereq: Completion of first semester of MBA program, graduate standing, MGT 611, ECO 610, ACC 628, MGT 650.

**MKT 601 MARKETING RESEARCH. (3)**

MKT 601 entails a vigorous examination of research methodology applicable to marketing situations. Emphasis is placed on 1) experimental design, 2) survey design and administration, and 3) analytical procedures. Practical application of marketing research is stressed. Legal and social issues are also examined. Prereq: MKT 600, MGT 650, and MGT 651.

**MKT 621 PRODUCT MANAGEMENT. (3)**

Examines the analytical, decision making, and planning concepts and tools available to market/product/brand managers. Specific decisions to be addressed include: product policy formulation, the selection of product market strategies, new product development, product-line modifications and deletions, and organizational implications. Prereq: Completion of first year of MBA program or permission of instructor.

**MKT 622 SALES MANAGEMENT. (3)**

MKT 622 entails a comprehensive examination of the planning, implementing, and control of personal contact programs designed to achieve the sales objectives of the firm. Managerial decision-making is emphasized through the application of lecture material, readings, and case studies. Prereq: Completion of first year of MBA program or permission of instructor.

**MKT 623 MARKETING IN SERVICE AND NONPROFIT ORGANIZATIONS. (3)**

The purpose of the course is to broaden and apply the conceptual system of marketing to the marketing problems of service and nonprofit organizations. Concepts such as marketing mix, marketing segmentation, market positioning, channels of distribution and others will be applied to the problems of service and nonprofit organizations. Prereq: MKT 600 or permission of the instructor.

**MKT 624 INTERNATIONAL MARKETING MANAGEMENT. (3)**

Examines the broad implications for marketing strategy and decision making of the firm in an international context. Addresses comprehensive survey of firm entry strategies, marketing mix decisions, product policies, and environmental factors in a global context. Context-based problems such as implicit barriers to entry through distribution channel management will also be addressed. Prereq: MKT 600 or permission of instructor.

**MKT 695 INDIVIDUAL WORK IN MARKETING. (1-6)**

Students confer individually with the instructor. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**MKT 700 SEMINAR IN MARKETING MANAGEMENT. (3)**

A doctoral seminar directed toward the basic decision areas of marketing management. Emphasis is on traditional, classic, and contemporary literature that presents important conceptualizations of marketing practices and empirical research in marketing management. Prereq: Consent of instructor.

**MKT 710 SEMINAR IN CONSUMER BEHAVIOR. (3)**

The seminar is specifically designed for the needs of doctoral students in marketing in that it emphasizes empirical research, theory and methodology as they relate to consumer behavior. The objectives of the seminar are (1) to familiarize the students with the literature of consumer behavior, (2) to stimulate critical thinking about existing research, and (3) to evaluate existing theories, conceptualizations, and models of buyer behavior. Prereq: Consent of instructor.

**MKT 720 SEMINAR IN MARKETING THEORY. (3)**

A survey, analysis and evaluation of the current research in marketing theory. Detailed attention is given to problems of determining the meaning and boundaries of marketing theory. Emphasis is placed on introducing the student to the substantive content of marketing theories and their methodologies. Prereq: MKT 600 or consent of instructor.

**MKT 763 RESEARCH, DESIGN AND ANALYSIS. (3)**

This course deals with the design and analysis of business research. Emphasizes the practical application of analysis of variance and correlational techniques to problems in business research. Focus will be on design, implementation, and interpretation of research. Prereq: MGT/MKT/FIN 762. (Same as MGT/FIN 763.)

**MKT 781 INDEPENDENT WORK IN MARKETING. (1-6)**

Designed for advanced students who undertake research problems to be conducted in regular consultation with the instructor. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**MNG Mining Engineering**

**MNG 101 INTRODUCTION TO MINING ENGINEERING. (2)**

Orientation to the mining engineering profession; introduction to key mining engineering activities and functions; mining methods and equipment; health and safety subsystems.

**MNG 211 SURVEYING. (4)**

A comprehensive course in the art and science of surveying as applied to civil and mining engineering, including the use and care of surveying instruments; measurement of horizontal and vertical distances, angles and directions; collection of ground and underground data for the design and layout of roads, buildings, various mineral workings and other structures; and some aspects of the precise determination of position and direction for survey control. Lecture, three hours; laboratory, three hours per week. Prereq: CE 106, CE 121 or MNG 102, MA 114. (Same as CE 211.)

**MNG 222 MINE LAW AND SAFETY. (3)**

Mine laws, including safety regulations and interpretations for engineers and supervisors. Prereq: MNG 102.

**MNG 264 UNDERGROUND MINING OPERATIONS. (2)**

A study of the principal underground mining methods practiced in coal and hard rock mines; method classification and selection; support and equipment requirements; general mine planning, sequence of development, cycle of operations, production estimates, and method application and variations. Prereq: MNG 101.

**MNG 301 MINERALS PROCESSING. (3)**

Petrographic structure of ore and coal deposits, sampling theory, and particle motion in fluid streams. Unit operations for processing particulate materials; breaking, screening, laundering, froth flotation and clarification. Flowsheets, process selection and plant performance. Prereq: PHY 232.

**MNG 302 MINERALS PROCESSING LABORATORY. (1)**

Application of the principles studied in MNG 301. Laboratory, two hours. Prereq or concur: MNG 301.

**\*MNG 303 DEFORMABLE SOLIDS LABORATORY. (1)**

Experimental studies of the mechanical properties of materials and structural elements. Laboratory, four hours per week for three-fourths of the semester. Prereq or concur: EM 302.

**MNG 312 COMPUTER METHODS IN MINING ENGINEERING. (3)**

Use of microprocessors for data acquisition, process control, planar digitizing and plotting. Remote accessing of standard libraries of mining engineering and statistical packages. Modeling of mine systems. Prereq: CS 221.

**\*MNG 332 MINE PLANT MACHINERY. (3)**

Theory and practice of mine haulage, hoisting, drainage, pumping and compressed air as power. Application of engineering principles to the mineral industries. Prereq: MNG 101, PHY 231. Concur: EM 221.

**MNG 341 MINE VENTILATION. (3)**

Hazards of dust and gaseous contamination of mine atmosphere, air dilution requirements, flow distribution in mine network, computer analysis of the ventilation network, natural ventilation and fans. Lecture, two hours; laboratory, three hours. Prereq: PHY 231, CE 341 and engineering standing.

**MNG 363 SURFACE MINING OPERATIONS. (3)**

Optimization of open pit geometry. Classification of surface mining methods. Surface mining development for metalliferous ore bodies and coal deposits. Drilling, blasting, ground excavation and loading. Mineral transport systems. Maintenance scheduling. Prereq: MNG 332.

**MNG 371 SEMINAR. (1)**

Oral presentation of a student-developed technical paper appropriate to mining engineering. Review of speaking skills, organization and time management abilities, and use of audio-visual aids. Lecture, two hours per week. Prereq: Engineering Standing.

**MNG 374 MINE VALUATION AND INVESTMENT ANALYSIS. (3)**

Economic evaluation methods and applications to economic decision problems encountered in the mining industry, including the mine valuation problem. Prereq: MNG 264; and MNG 301 or concurrent.

**MNG 395 INDEPENDENT WORK IN MINING ENGINEERING. (1-6)**

Individual work on some selected problem in the field of mining engineering. May be repeated for a maximum of six credits. Prereq: Consent of department chairperson and the instructor.

**MNG 431 MINE SYSTEMS ENGINEERING. (3)**

Aspects of industrial and geological engineering for mine systems engineering design. Course consists of reserve engineering, presystems modeling and interfacing systems to reserves. Prereq: STA 381, MNG 332.

**MNG 490G EXPLOSIVES AND BLASTING ENGINEERING. (3)**

Types of commercial explosives, explosive properties; systems of initiation, charging methods, design of benches, design of blasting rounds; explosives applications in mining and other fields; damage control; and safe blasting practices. Prereq: Engineering standing or consent of instructor.

**MNG 511 MINE POWER SYSTEM DESIGN. (3)**

A study of mine power distribution systems, major power system components, and techniques of power system analysis. Topics include per-unit analysis; symmetrical component analysis; grounding, including ground-bed design, ground-resistor sizing, and ground wire monitoring; cable and transformer sizing; and load-flow analysis. Course may not be used to satisfy degree requirements in electrical engineering if credit is earned in EE 538. Prereq: EE 306 or equivalent, and engineering standing.

**MNG 551 ROCK MECHANICS. (4)**

Determination of the physical properties of rocks, rock mass classification, stress around mine openings, strain and displacement of the rock mass, rock reinforcement and support, stress interaction and subsidence, strata control. Lecture, three hours; laboratory, three hours per week. Prereq: EM 302, EM 303, GLY 240 and Engineering standing; or consent of instructor.

**MNG 561 MINE CONSTRUCTION ENGINEERING I. (3)**

Development of underground capital openings (shafts, chambers, tunnels, and drifts) in mines. Design and construction under normal conditions. Organization and management of construction operations. Prereq: MNG 551.

**\*MNG 563 SIMULATION OF INDUSTRIAL PRODUCTION SYSTEMS. (3)**

Discrete event simulation and its application to performance analysis of industrial production systems. Topics include concepts for characterizing production systems, approaches to structuring simulation models, instruction in a simulation language, and techniques for comparing alternative system designs and control strategies. Applications to manufacturing, commercial and mining production systems are considered. Prereq: CS 221 or 270, STA 281 or 381. (Same as MFS 563.)

**MNG 572 ADVANCED COAL PREPARATION. (3)**

Study of economic and environmental factors in cleaning a specific coal, laboratory tests for process selection, laboratory testing of alternative procedures leading to design of plant. Lecture, two hours; laboratory, three hours per week. Prereq: MNG 301 and Engineering standing.

**MNG 575 COAL PREPARATION DESIGN. (3)**

Design a coal preparation plant by integrating unit operations preceded by certain back-up laboratory experiments. Cost sensitivity analysis of competing design schemes will be determined on a selected coal. Lecture: two hours; laboratory: three hours per week. Prereq: MNG 301 or equivalent.

**MNG 581 GEOSTATISTICS. (3)**

The geostatistics approach for estimating the spatial distribution of rock and mineral properties. Topics include treatment of the spatial distribution of ore grade as regionalized variables, covariance stationary processes, variograms, volume/variance relations, ordinary kriging, block grade distributions, and nonlinear kriging approaches. Prereq: STA 381.

**MNG 591 MINE DESIGN PROJECT I. (1)**

Students will undertake a design project consisting of reserve analysis on a given mine property. They will calculate minable reserves and analyze mining and quality properties of coal. Each student will write a report supported by maps and will present it orally before a group of peers and invited experts. Lecture, one hour; laboratory, one hour per week. Prereq: MNG 332.

**MNG 592 MINE DESIGN PROJECT II. (2)**

Each student will undertake one or more major design projects such as the overall design of a mining system, including design of major components of the system and an economic evaluation. Each student will write one or more individual reports, which will also be presented orally before a group of peers and invited experts. Lecture, one hour; laboratory, two hours per week. Prereq: MNG 341, MNG 551, MNG 591.

**MNG 599 TOPIC IN MINING ENGINEERING. (2-3)**

A detailed investigation of a topic of current significance in mining engineering. May be repeated to a maximum of six credits, but only three credits can be earned under the same title. A particular topic may be offered at most twice under the MNG 599 number. Prereq: Engineering standing and consent of instructor.

**#MNG 611 MINE POWER SYSTEM PROTECTION. (3)**

A study of components and methods for providing protection to mine electrical systems. Review topics include power distribution arrangements, per-unit system, and symmetrical components. Course topics include sources of transients and faults, protective equipment, phase overcurrent relaying, and ground fault protection. Lecture, two and one-half hours; lab, one and one-half hours per week. Prereq: MNG 511.

**MNG 632 MINE PLANT MACHINERY II. (3)**

Analysis of major bulk handling media, including rail haulage, conveyor belt haulage, hoisting, and off-highway trucks. Use of available computer software for evaluation, selection, and design of haulage equipment by mathematical modeling and simulation. Encumbered space in mining, velocity-clearance curves, and optimal sizing of mobile handlers. Prereq: MNG 592 or consent of instructor.

**MNG 634 ADVANCED MINE ENGINEERING. (3)**

Procedures and methods of obtaining data and analyzing mine systems for efficient development and exploitation of a mining property. Course includes applications of operation research techniques. Prereq: CE 555, CS/MA/STA 482G.

**MNG 637 ROCK SLOPE STABILITY AND DESIGN. (3)**

Design and stability analysis of rock slopes using analytical, empirical, and numerical approaches, engineering geological data, groundwater pressure, blasting, and remedial measures. Prereq: MNG 551.

**MNG 641 ADVANCED MINE VENTILATION. (3)**

Planning, designing and redesigning the ventilation systems using computers; data acquisition (ventilation survey); non-steady state flow in mine openings; influence of the ventilation conditions upon the dynamics of the methane concentration; automation of the ventilation system. Lecture, two hours; laboratory, two hours. Prereq: MNG 341.

**MNG 661 MINE CONSTRUCTION ENGINEERING II. (3)**

Advanced analysis of underground capital openings in mines with emphasis on linings. Design under adverse geological conditions and unusual technological requirements. Special and unique construction methods and equipment. Prereq: MNG 561.

**MNG 681 GEOSTATISTICS II. (3)**

A second course in geostatistics for mine planning and geotechnical applications. Topics include co-regionalized variables and cokriging, non-parametric geostatistics (indicator, probability, and soft kriging), loss functions and optimum predictors for ore selection decisions, conditional simulation—techniques and applications. Prereq: MNG 581.

**MNG 690 ADVANCED MINERAL BENEFICIATION ENGINEERING. (3)**

State of the art techniques in mineral beneficiation and their application in coal and mineral preparation industry. Prereq: MNG 301 and MNG 572.

**MNG 691 SIMULATION OF MINERAL PROCESSING CIRCUITS.** (3)  
Flowsheet modeling and analysis for coal preparation and ore dressing plants. Topics include unit models for comminution, gravity separation, and froth flotation; relevant techniques for solving systems of nonlinear equations; convergence acceleration techniques; sequential modular, simultaneous modular, and equation-solving flow-sheeting frameworks; flowgraph techniques for analysis of certain classes of mineral processing circuits. Prereq: MNG 575.

**MNG 699 TOPICS IN MINING ENGINEERING (Subtitle Required).** (3)  
A detailed investigation of a topic of current interest in mining engineering. May be repeated to a maximum of six credits, but only three credits may be earned under the same subtitle. A particular topic may be offered only twice under the MNG 699 number. Prereq: Consent of instructor.

**MNG 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**MNG 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**MNG 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.

**MNG 769 RESIDENCE CREDIT FOR DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.

**MNG 771 SEMINAR IN MINING ENGINEERING.** (1)  
Review of current research in specific areas of mining engineering. Required of all graduate students. Prereq: Graduate classification.

**MNG 780 SPECIAL PROBLEMS IN MINING ENGINEERING.** (1-6)  
Individual work on some selected design problems in one area of mining engineering. May be repeated to a maximum of six credits. Prereq: Approval of the chairperson of the department.

**MNG 790 SPECIAL RESEARCH PROBLEMS IN MINING ENGINEERING.** (1-9)  
Individual work on some selected problems in one of the various fields of mining engineering. Laboratory and field measurements, six hours. May be repeated to a maximum of nine credits. Prereq: Approval of the Director of Graduate Studies.

## MS Military Science

### (ARMY ROTC)

#### Basic Courses

**MS 103 ROLE OF THE U.S. ARMY.** (2)  
A course examining the U.S. Army as an institution, specifically looking at the roles and relationships of the Army within our democracy. Course also provides a look at the Army officer and unique aspects of the military profession.

**MS 104 INTRODUCTION TO LEADERSHIP.** (2)  
This course is designed to acquaint the student with the fundamental skills necessary to be a leader, both in military and civilian context. Course also covers basic military map reading skills.

**MS 203 AMERICAN MILITARY HISTORY.** (2)  
Study of the development of the U.S. from a military perspective. Pre-parallel development of technology and warfare; and emphasis on the evaluation of military leadership from the historically tested principles of warfare from the Civil War to the present.

**MS 204 EFFECTIVE MILITARY COMMUNICATIONS.** (2)  
This course provides instruction and practical experience in the art of speaking and writing in the Army style. Students will demonstrate competency through a series of oral presentations and writing assignments. Small unit tactics and map reading skills will also be used in the implementation of the oral presentations.

#### Advanced Courses

**MS 301 LEADERSHIP AND MANAGEMENT I.** (3)  
Course of study in development of basic skills required to function as a manager; study of leadership styles, group dynamics, communications, motivation and military instruction methods; and school of the soldier and exercise of command. Prereq: MS 201, 202 graduate or undergraduate student (male or female), successful completion of basic course or basic camp, physically fit to pursue program; consent of PMS.

**MS 302 ADVANCED TACTICS.** (3)  
Small unit tactics and communications, organization and mission of combat arms units; leadership and the exercise of command. Prereq: MS 201, 202, graduate or undergraduate student (male or female), successful completion of basic course or basic camp, physically fit to pursue program; consent of PMS.

**MS 341 LEADERSHIP AND MANAGEMENT II.** (3)  
An advanced study of logistics, operations, military administrations, personnel management, military justice, world change and military implications, service orientation and leadership training. Prereq: MS 301, 302.

**MS 342 COMMAND MANAGEMENT.** (3)  
An advanced study of logistics, operations, military administration, personnel management, military justice, world change and military implications, service orientation and leadership training. Prereq: MS 301, 302.

**MS 350 MILITARY SCIENCE LABORATORY.** (1)  
A hands-on practicum which exposes the student to the military skills required for basic technical and tactical competence as an Army officer. The course affords the student opportunities to develop and refine his/her leadership style and abilities under differing constraints and environments. Laboratory, two hours per week and two week-end exercises. May be repeated to a maximum of four credits. Concur: MS 301, 302, 341, or 342.

**MS 395 INDEPENDENT STUDY IN LEADERSHIP.** (1-2)  
Advanced study in leadership. Students are under guidance and confer individually with faculty on approved topic(s). A written report or paper is expected and will be filed in the chairperson's office. May be repeated to a maximum of four credits. Prereq: Completion of MS 302 and approval of PMS.

## MSC Modern Studies Curriculum

**MSC 105 MINI-COLLEGE I: (TWO SUBTITLES REQUIRED).** (1-5)  
A course for first semester freshmen enrolling in a mini-college. Students may enroll in up to nine (9) hours of A&S mini-college credit concurrently, as required by the mini-college. Prereq: Enrollment in a designated UK mini-college.

**MSC 106 MINI-COLLEGE II: (TWO SUBTITLES REQUIRED).** (1-5)  
A course for second semester freshmen enrolling in a mini-college. Students may enroll in up to nine (9) hours of A&S mini-college credit concurrently, as required by the mini-college. Prereq: Enrollment in a designated UK mini-college.

**MSC 107 NATURAL SCIENCE I.** (4)  
A multidisciplinary course on the scientific view of the origin, nature, and evolution of the universe. The two-semester sequence explores the relationships among astronomy, biology, chemistry, geology, and physics in historical, cultural, and environmental contexts. This course emphasizes aspects of physics, astronomy, and chemistry. Lecture, three hours; laboratory/practicum/field trips, three hours per week. Prereq: Enrollment in a UK mini-college.

**MSC 108 NATURAL SCIENCE II.** (4)  
A multidisciplinary course on the scientific view of the origin, nature, and evolution of the universe. The two-semester sequence explores the relationships among astronomy, biology, chemistry, geology, and physics in historical, cultural, and environmental contexts. This course emphasizes aspects of geology and biology. Lecture, three hours; laboratory/practicum/field trips, three hours per week. Prereq: Enrollment in a UK mini-college.

**MSC 205 MINI-COLLEGE IIIA: (TWO SUBTITLES REQUIRED).** (1-5)  
A course for sophomores enrolling in a mini-college. Students may enroll in up to nine (9) hours of A&S mini-college credit concurrently, as required by the mini-college. Prereq: Enrollment in a designated UK mini-college.

**MSC 206 MINI-COLLEGE IVA:  
(TWO SUBTITLES REQUIRED). (1-5)**  
A course for sophomores enrolling in a mini-college. Students may enroll in up to nine (9) hours of A&S mini-college credit concurrently, as required by the mini-college. Prereq: Enrollment in a designated UK mini-college.

**\*MSC 301 MINI-COLLEGE IIIB:  
(TWO SUBTITLES REQUIRED). (1-5)**  
A course for sophomores enrolling in a mini-college. Students may enroll in up to nine (9) hours of A&S mini-college credit concurrently, as required by the mini-college. Prereq: Enrollment in a designated UK mini-college.

**\*MSC 302 MINI-COLLEGE IVB:  
(TWO SUBTITLES REQUIRED). (1-5)**  
A course for sophomores enrolling in a mini-college. Students may enroll in up to nine (9) hours of A&S mini-college credit concurrently, as required by the mini-college. Prereq: Enrollment in a designated UK mini-college.

## MSE Materials Science and Engineering

**MSE 101 MATERIALS ENGINEERING. (1)**  
An introduction to the materials engineering profession. Professional growth, conduct, ethics and organizations. Introduction to the techniques of materials engineering.

**MSE 102 METALS TECHNOLOGY. (1)**  
A laboratory course introducing students to basic materials characterization laboratory techniques. Laboratory, three hours per week.

**MSE 201 MATERIALS SCIENCE. (3)**  
Microscopic and macroscopic structure as related to the properties of materials with engineering applications. Prereq or concur: MA 114 and freshman chemistry.

**MSE 212 ELECTRONIC PROPERTIES OF MATERIALS. (3)**  
Modern ideas on the engineering properties of solids, crystallographic properties; relationship of properties to structure and electronic properties of materials. Prereq: PHY 232 and 242, MA 214 concurrent.

**MSE 361 STRUCTURE AND PROPERTIES OF MATERIALS I. (4)**  
The principles of phase diagrams of materials; dependence of physical, mechanical and electrical properties on microstructure of materials. Solidification, deformation and softening processes in materials. Lecture, three hours; laboratory, three hours per week.

**MSE 362 STRUCTURE AND PROPERTIES OF MATERIALS II. (4)**  
Diffusion in materials, aging processes; the iron-carbon system, environmental degradation of materials. Lecture, three hours; laboratory, three hours per week. Prereq: MSE 361 and engineering standing.

**MSE 395 INDEPENDENT WORK  
IN MATERIALS ENGINEERING. (1-3)**  
Research for undergraduate departmental students. May be repeated to a maximum of 12 credits. Prereq: Department major and approval of chairperson.

**MSE 421 SOLIDIFICATION AND CASTING. (4)**  
Ferrous and nonferrous foundry practice. Application of engineering principles to the design and production of castings. Lecture; three hours; laboratory, three hours. Prereq: MSE 201, PHY 232.

**MSE 450 TRANSPORT PHENOMENA  
FOR MATERIALS ENGINEERS. (3)**  
The fundamentals of momentum and heat transfer are developed. Emphasis is placed on the solution of problems of interest to materials engineers. Exact and approximate solutions are described to a wide variety of examples. Prereq: CME 210.

**MSE 451 MATERIALS THERMODYNAMICS. (3)**  
Solution thermodynamics; partial molal quantities; ideal and non-ideal solutions; application of thermodynamics to phase equilibria; heterogeneous equilibria; free energy-composition relationships; temperature-pressure relationship. Prereq: CME 210.

**MSE 480 MATERIALS DESIGN. (3)**  
A capstone engineering design experience involving analysis, with some treatments of engineering economics of real processes, design of materials, fabrication problems and techniques, and prediction of model material systems.

**MSE 506 MECHANICS OF COMPOSITE MATERIALS. (3)**  
A study of structural advantages of composite materials over conventional materials, considering high strength-to-weight and stiffness-to-weight ratios. Fiber reinforced, laminated and particulate materials are analyzed. Response of composite structures to static and dynamic loads, thermal and environmental effects, and failure criteria are studied. Prereq: EM 302, engineering standing or consent of instructor. (Same as EM 506.)

**MSE 512 ELECTRONIC MATERIALS AND PROCESSING. (3)**  
Methods to produce and process electronic materials: solidification of electronic materials, stress-strain considerations in processing, defect control, diffusion of dopants, oxidation and methods of structural, electronic and chemical characterization. Prereq: Engineering standing or graduate level.

**MSE 531 POWDER METALLURGY. (3)**  
Study of the principles of powder metallurgy relating to alloys of unusual compositions, metal and nonmetal combinations, porous and laminated products, composite metals, and high-melting alloys. Prereq: Consent of instructor.

**MSE 535 MECHANICAL PROPERTIES OF MATERIALS. (3)**  
Introductory elasticity and plasticity theory; crystallographic nature of slip and twinning; fracture. Prereq: MSE 201, EM 302 and engineering standing or consent of instructor.

**MSE 536 CERAMIC ENGINEERING (3)**  
The nature of ceramic materials. The forming and thermal treatment of ceramic products. Consideration of the various properties usually encountered and required of ceramic materials inclusive of cements. Lecture and recitation, three hours. Prereq: Consent of instructor.

**MSE 538 DEFORMATION PROCESSING. (4)**  
Solidification of molten alloys; fundamentals of metal working; application of metal working theories to forging, rolling, extrusion, drawing and sheet forming. Lecture, three hours; laboratory, three hours per week. Prereq: Engineering standing.

**MSE 542 EXTRACTIVE METALLURGY. (4)**  
The principles and processes employed in the preparation, treatment and production of various metals of economic or strategic importance; process economics. Lecture, three hours; laboratory, three hours per week. Prereq: CHE 440G or CHE 444G or MSE 451.

**MSE 550 CORROSION. (3)**  
The fundamental principles of corrosion control and the basic mechanisms related to a better understanding of the causes of corrosion. The application of principles to practical situations. Prereq: CHE 107; MSE 201.

**MSE 552 POLYMERIC MATERIALS. (3)**  
Relating properties to structure; properties of polymer materials; mechanical, electrical and thermal properties of amorphous and crystalline polymers, molding and fabrication, polymers as additives, biomedical application, selection of polymers, design. Prereq: CHE 230 or CHE 236, or consent of instructor. (Same as CME 552.)

**MSE 554 CHEMICAL AND PHYSICAL  
PROCESSING OF POLYMER SYSTEMS. (3)**  
Theory related to the chemical and physical processing of polymer systems, polymer chemistry, non-Newtonian flow behavior, stress and strain tensors, polymer processing operations and technology. Prereq: CHE 232 and CME 425, or consent of instructor. (Same as CME 554.)

**MSE 556 INTRODUCTION TO COMPOSITE MATERIALS. (4)**  
Applications, materials selection and design of composite materials. Relation between properties of constituent materials and those of composite. Processing methods for materials and for some structures. Lab focuses on preparation and testing of composite materials and their constituents. Lecture, three hours; laboratory, three hours per week. Prereq: MA 214, CHE 236, PHY 232, MSE 201, or consent of instructor. (Same as EM 556.)

**MSE 558 PRINCIPLES OF POLYMER  
CHARACTERIZATION AND ANALYSIS. (3)**  
A lecture course exploring the fundamental chemical and physical aspects of a range of characterization methods as applied to polymeric systems; the primary objective will be the development of a broad understanding of the various tools available for polymer characterization both on the molecular level and as bulk materials. Prereq: CME 320, ME 330, or consent of instructor. (Same as CME 558.)

**MSE 561 ELECTRIC AND MAGNETIC  
PROPERTIES OF MATERIALS. (3)**  
Study of dielectric and magnetic materials. Topics include dielectric relaxation, conduction and breakdown mechanisms, liquid crystals, ferroelectrics, magnetic resonance and relaxation, measurement techniques. Prereq: MSE 212 and PHY 361 or EE 461G or consent of instructor. (Same as EE 561.)

**MSE 566 HYBRID MICROELECTRONICS. (3)**

The purpose of this course is to study design, material selection, and fabrication of hybrid microelectronic circuits. Students will learn the general features of thick film, thin film, ceramic substrate, surface mount, and multichip module technologies. Both fabrication and electrical properties of circuit elements will be emphasized. Prereq: Engineering standing or consent of instructor. (Same as EE 566.)

**MSE 568 FIBER OPTICS. (3)**

The course presents theory and practice related to (a) fiber optic cable and their fabrication, (b) fiber optic transmitters and detectors, (c) fiber optic communication systems and (d) fiber optic remote sensors. Prereq: EE 468G. (Same as EE 568.)

**MSE 569 ELECTRONIC PACKAGING SYSTEMS AND MANUFACTURING PROCESSES. (3)**

Study of packaging systems which interconnect, support, power, cool, protect, and maintain electronic components. The course will address systems at the chip, board, and product levels. Topics include design, properties, materials, manufacture, and performance of various packaging systems. Laboratory will provide familiarity with design software and production equipment and processes. Prereq: EE 211 or EE 305 or EE 307. (Same as EE 569.)

**MSE 580 MATERIAL SELECTION AND FAILURE ANALYSIS. (3)**

A review of common engineering materials, their potential failure mechanisms and corresponding technology developed to avoid these failures. This course illustrates applications of current technology to practical industrial problems and is designed for engineers of all disciplines. Prereq: MSE 201 and EM 302.

**MSE 599 TOPICS IN MATERIALS SCIENCE AND ENGINEERING (Subtitle required). (2-3)**

A detailed investigation of a topic of current significance in materials science and engineering such as biomedical synthetics, electronic properties of materials, advances in metal working, history of material technology, quantitative metallography. Theory of dislocations, scanning electron microscopy. May be repeated to a maximum of six credits, but only three credits can be earned under the same title. A particular topic may be offered at most twice under the MSE 599 number. Prereq: Variable; given when topic identified.

**PREREQUISITE FOR GRADUATE WORK:** Students desiring to take any of the following courses should have a thorough working knowledge of chemistry, physics and mathematics.

**MSE 607 ANALYSIS OF METAL CUTTING PROCESSES. (3)**

Advanced study of metal cutting involving the mechanics of metal cutting including cutting forces, tool-wear/tool-life and temperature analysis, surface finish and integrity, chip control, machinability assessments and advances in cutting tool technology. Prereq: ME 505. (Same as ME/MFS 607.)

**MSE 632 ADVANCED MATERIALS SCIENCE. (3)**

Classification of solids, atomic structure and bonding, relation of structure to properties, deformation behavior and failure. Prereq: Consent of instructor.

**MSE 635 ADVANCED MECHANICAL METALLURGY. (3)**

Theory of dislocations in crystals and their role in strength, plasticity, work hardening and fracture of crystalline solids. Prereq: Consent of instructor.

**MSE 636 DISLOCATION THEORY. (3)**

Fundamentals of elastic theory of dislocations and the kinematics of dislocation motion: straight dislocations, curved dislocation, self-energies, interactions with other crystal defects, dislocation multiplication. Prereq: MSE 535 or EM 531 or equivalent.

**MSE 650 ADVANCED MATERIALS THERMODYNAMICS. (3)**

Study of reactions of materials with chemical environments. Introduction to irreversible thermodynamics. Emphasis on current literature. Prereq: Consent of instructor.

**MSE 659 ADVANCED PHASE DIAGRAMS. (3)**

Review of thermodynamic fundamentals and application to binary pressure-temperature-composition diagrams. Construction and interpretation of ternary temperature-composition diagrams. Review and discussion of important ternary diagrams. Prereq: MSE 451 or equivalent.

**MSE 661 ADVANCED PHYSICAL METALLURGY I. (3)**

Study of the theory of phase transformations in metallic systems. Analysis of rate controlling processes for nucleation and growth controlled phase changes and for order-disorder reactions. Prereq: MSE 362 and 412 or consent of instructor.

**MSE 662 ADVANCED PHYSICAL METALLURGY II. (3)**

Solidification theory and mechanisms. Diffusion in solids. Prereq: MSE 661 or consent of instructor.

**MSE 665 CRYSTALLOGRAPHY AND X-RAY ANALYSIS. (4)**

Elements of crystallography, nature of X-rays, diffraction by crystal lattice, the structure factor and crystal structure determinations in crystal lattices, X-ray camera and diffractometer techniques and application of these to determination of phase diagrams, preferred orientation and residual stresses. Lecture, three hours; laboratory, three hours. Prereq: MSE 361.

**MSE 666 DIFFRACTION METHODS IN MATERIALS SCIENCE. (4)**

Application of thin foil electron transmission methods to the study of the defect structure in crystalline solids, theory of electron diffraction contrast phenomena, sample preparation, X-ray theory and methods applied to the study of deformation characteristics, order-disorder transformations, and crystal structure analysis. Lecture, two hours; laboratory, six hours. Prereq: MSE 665.

**MSE 699 ADVANCED TOPICS IN MATERIALS SCIENCE AND ENGINEERING (Subtitle required). (3)**

A detailed investigation of an advanced topic of current significance in materials science and engineering such as (1) nanometer materials, (2) structures of superconductors and (3) materials characterization under high rates of deformation. May be repeated under different subtitles to a maximum of nine credits, but only three credits can be earned under the same title. A particular topic may be offered at most twice under the MSE 699 number. Prereq: Variable, given when topic is identified.

**MSE 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**MSE 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**MSE 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**MSE 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**MSE 771 SEMINAR. (0)**

Review of current literature in the field of metallurgical engineering and presentation of papers thereon. Presentation of talks on departmental research. Group and panel discussions. Required of all graduate students every semester. Lecture, one hour per week.

**MSE 781 SPECIAL PROBLEMS, LITERATURE AND LABORATORY. (1-3)**

Literature research and planning of research programs; shop problems and technical writing, including a term paper, are required. Consultation and lecture by appointment. May be repeated to a maximum of nine credits.

**MSE 782 SPECIAL PROBLEMS, LITERATURE AND LABORATORY. (3)**

A continuation of MSE 781. Laboratory, six hours; consultation and lecture by appointment. May be repeated to a maximum of nine credits.

**MSE 790 RESEARCH IN MATERIALS SCIENCE. (3-9)**

Active research (experiments, library work, theory) toward Ph.D. degree. May be repeated indefinitely.

**MUC Music – Class Instruction****MUC 150 CLASS INSTRUCTION IN PIANO. (1)**

A beginning course in the fundamentals of playing the piano. Lecture, two hours. Prereq: For music majors; other students by consent of instructor.

**MUC 151 CLASS INSTRUCTION IN PIANO. (1)**

A beginning course in the fundamentals of playing the piano. For music majors; other students by consent of instructor. Lecture, two hours. Prereq: MUC 150.

**MUC 152 CLASS INSTRUCTION IN PIANO. (1)**

A course in the fundamentals of playing the piano. For music majors; others by consent of instructor. Lecture, two hours. Prereq: MUC 151.

**MUC 153 CLASS INSTRUCTION IN PIANO. (1)**

A course in the fundamentals of playing the piano. For music majors; others by consent of instructor. May be repeated to a maximum of two credits with consent of instructor. Instruction, two hours. Prereq: MUC 152.

**MUC 155 VOICE CLASS FOR NON-MUSIC MAJORS. (1)**

Applied voice group instruction for non-music majors with emphasis on basic breathing and vocal technique, elements of music notation, and diction. May be repeated to a maximum of two credits. Laboratory, two hours per week. Prereq: Consent of instructor.

**MUC 157 CLASS INSTRUCTION IN PERCUSSION INSTRUMENTS. (1)**

A beginning course in the fundamentals of playing and teaching percussion instruments. Instruction, three hours. Prereq: For music majors only; others by consent of instructor.

**MUC 158 CLASS INSTRUCTION IN WOODWIND INSTRUMENTS. (1)**

A beginning course in the fundamentals of playing and teaching woodwind instruments. May be repeated to a maximum of two credits. Prereq: For music majors; others by consent of instructor.

**MUC 161 CLASS INSTRUCTION IN STRING INSTRUMENTS. (1)**

A beginning course in the fundamentals of playing and teaching violin, viola, cello and string bass. May be repeated to a maximum of two credits. Prereq: For music majors; others by permission of instructor. For nonstring majors who take this course for two semesters, it must be taken sequentially beginning in the fall semester.

**MUC 163 CLASS INSTRUCTION IN BRASS INSTRUMENTS. (1)**

A beginning course in the fundamentals of playing and teaching brass instruments. Lecture, three hours per week. May be repeated to a maximum of two credits. Prereq: For music majors; others by consent of instructor.

**MUC 164 CLASS INSTRUCTION IN GUITAR. (1)**

A beginning course in the fundamentals of playing the folk guitar. For nonmusic majors, music majors, or classroom teachers. Two hours laboratory per week. May be repeated to a maximum of two credits. Prereq: Consent of instructor.

**MUC 374 JAZZ PIANO. (2)**

A study of the basic elements of jazz piano with reference to its use in improvisation. Topics of concentration will include listening, analysis, and practical keyboard application, in addition to a study of the historical perspective and important styles. Prereq: MUS 272 and MUS 273, or consent of instructor.

**CHAMBER MUSIC ENSEMBLES**

**MUC 170 STRING ENSEMBLE. (1)**

The study of string instrument chamber music through performance. May be repeated to a maximum of eight credits. Laboratory, two hours. Prereq: Consent of instructor.

**MUC 171 BRASS ENSEMBLE. (1)**

The study of brass instrument chamber music through performance. May be repeated to a maximum of eight credits. Laboratory, two hours. Prereq: Consent of instructor.

**MUC 172 WOODWIND ENSEMBLE. (1)**

The study of woodwind instrument chamber music through performance. May be repeated to a maximum of eight credits. Laboratory, two hours. Prereq: Consent of instructor.

**MUC 173 PERCUSSION ENSEMBLE. (1)**

The study of percussion instrument chamber music through performance. May be repeated to a maximum of eight credits. Laboratory, two hours. Prereq: Consent of instructor.

**MUC 174 UNIVERSITY CHORALE. (1)**

An auditioned choral ensemble for the study of choral literature through performance. Class will meet for five hourly rehearsals per week. May be repeated to a maximum of eight credits. Prereq: Audition and consent of instructor.

**MUC 176 PIANO ENSEMBLE. (1)**

Study of piano ensemble chamber music through performance. May be repeated to a maximum of eight credits. Laboratory, two hours. Prereq: Consent of instructor.

**MUC 177 GUITAR ENSEMBLE. (1)**

The study of guitar ensemble music through performance. May be repeated to a maximum of eight credits. Laboratory, two hours. Prereq: Consent of instructor.

**LARGE MUSICAL ORGANIZATIONS**

**MUC 175 JAZZ ENSEMBLE. (1)**

Study of jazz through performance. May be repeated to a maximum of eight credits. Laboratory, three hours. Prereq: Consent of instructor.

**MUC 187 CONCERT BAND. (1)**

A large concert band primarily for the general student desiring continuation of instrumental music experience. Laboratory, three hours. May be repeated to a maximum of four credits. Prereq: Consent of instructor.

**MUC 188 SYMPHONIC BAND. (1)**

A select band engaged in preparation and performance of a variety of music composed for this medium. May be repeated to a maximum of four credits. Laboratory, four hours. Prereq: Audition and consent of instructor.

**MUC 189 WIND ENSEMBLE. (1)**

The University's select band for performance of challenging literature in the wind repertoire. May be repeated to a maximum of eight credits. Prereq: Audition and consent of instructor.

**MUC 190 MARCHING BAND. (1)**

Preparation for and performance at University athletic functions, primarily football games. May be repeated to a maximum of four credits. Prereq: Audition and consent of instructor.

**MUC 191 ORCHESTRA. (1)**

Students who have demonstrated the required ability are given an opportunity to study and perform standard orchestral literature. May be repeated seven times for a total of eight credits. Prereq: Audition and consent of instructor.

**MUC 192 UNIVERSITY CHORISTERS. (1)**

Ordinarily for music majors only. Three one-hour meetings per week. May be repeated seven times for a total of eight credits. Prereq: Audition and consent of instructor.

**MUC 196 OPERA WORKSHOP. (1)**

Study of the principles and techniques of opera production through class presentation of scenes and complete works. May be repeated to a maximum of four credits. Prereq: Consent of instructor.

**MUC 570 ADVANCED CHAMBER MUSIC ENSEMBLE. (1)**

Study of chamber music through performance. May be repeated to a maximum of six credits. Laboratory, two hours. Prereq: Consent of instructor.

**MUC 596 OPERA WORKSHOP. (1-3)**

Study of the principles and techniques of opera production and direction through class presentation of scenes and complete works. May be repeated to a maximum of six hours. Prereq: Consent of instructor.

**MUC 675 JAZZ ENSEMBLE. (1)**

Study of jazz through performance. Laboratory, two hours per week. May be repeated to a maximum of six credits. Prereq: Audition and consent of instructor.

**MUC 689 WIND ENSEMBLE. (1)**

The University's select band for performance of challenging literature in the wind repertoire. Laboratory, three hours per week. May be repeated to a maximum of six credits. Prereq: Audition and consent of instructor.

**MUC 691 ORCHESTRA. (1)**

Students who have demonstrated the required ability are given an opportunity to study and perform standard orchestral literature. Laboratory, five hours per week. May be repeated to a maximum of six credits. Prereq: Audition and consent of instructor.

**MUC 692 UNIVERSITY CHORISTERS. (1)**

The course offers students the opportunity to learn and perform the best choral literature in the repertoire. Laboratory, three hours per week. May be repeated to a maximum of six credits. Prereq: Audition and consent of instructor.



**MUP Music – Performance Courses**

**(Special Fee)**

**NOTE:** Students enrolled in MUP courses for two or more credit hours may be required to attend performance classes as well as lessons. See individual course syllabus for more information.

**Prereq:** Satisfactory audition and/or approval of instructor.

<b>Undergraduate Courses Numbered 100-499 (1-3)</b>	<b>Graduate Courses Numbered 500 and above (1-4)</b>
<b>Piano</b> MUP 101, 201, 301, 401,	501, 601, 701
<b>Voice</b> MUP 102, 202, 302, 402,	502, 602, 702
<b>Organ</b> MUP 103, 203, 303, 403,	503, 603, 703
<b>Violin</b> MUP 104, 204, 304, 404,	504, 604, 704
<b>Viola</b> MUP 105, 205, 305, 405,	505, 605, 705
<b>Cello</b> MUP 106, 206, 306, 406,	506, 606, 706
<b>String Bass</b> MUP 107, 207, 307, 407,	507, 607
<b>Flute</b> MUP 108, 208, 308, 408,	508, 608, 708
<b>Oboe</b> MUP 109, 209, 309, 409,	509, 609, 709
<b>Clarinet</b> MUP 110, 210, 310, 410,	510, 610, 710
<b>Bassoon</b> MUP 111, 211, 311, 411,	511, 611, 711
<b>Trumpet</b> MUP 112, 212, 312, 412,	512, 612, 712
<b>French Horn</b> MUP 113, 213, 313, 413,	513, 613, 713
<b>Trombone</b> MUP 114, 214, 314, 414,	514, 614, 714
<b>Euphonium</b> MUP 115, 215, 315, 415,	515, 615
<b>Tuba</b> MUP 116, 216, 316, 416,	516, 616, 716
<b>Saxophone (alto)</b> MUP 117, 217, 317, 417,	517, 617, 717
<b>Percussion</b> MUP 118, 218, 318, 418,	518, 618, 718
<b>Harp*</b> MUP 119, 219, 319, 419,	519, 619
<b>Harpsichord</b> MUP 120, 220, 320, 420,	520, 620
<b>English Horn</b> MUP 321,	521
<b>Historical Instruments*</b> MUP 322, 422,	522, 622

**Classical Guitar**

MUP 123, 223, 323, 423,

523, 623

\*Consult the School of Music before enrolling.

**MUP 330 VOCAL COACHING FOR SINGERS. (1-3)**

A course to prepare the vocal student for performance in concert, recital, and opera. Materials to be covered include style, performance practices, diction, interpretation, and audition preparation. Course will include preparation of operative as well as art song literature. Repertoire suitable for the individual student will be assigned by the voice teacher and prepared in this course by the vocal coach only after the music has been technically prepared by student's individual voice teacher. May be repeated to a maximum of six credits. Prereq: Permission of vocal instructor.

**MUP 430 VOCAL COACHING FOR SINGERS. (1-3)**

A course to prepare the vocal student for performance in concert, recital, and opera. Materials to be covered include style, performance practices, diction, interpretation, and audition preparation. Course will include preparation of operative as well as art song literature. Repertoire suitable for the individual student will be assigned by the voice teacher and prepared in this course by the vocal coach only after the music has been technically prepared by student's individual voice teacher. May be repeated to a maximum of six credits. Prereq: Permission of vocal instructor.

**MUP 530 VOCAL COACHING FOR SINGERS. (1-3)**

A course to prepare the vocal student for performance in concert, recital, and opera. Materials to be covered include style, performance practices, diction, interpretation, and audition preparation. Course will include preparation of operatic as well as art song literature appropriate to designated course level. May be repeated to a maximum of six credits. Prereq: Permission of vocal/opera instructors.

**MUP 558 CONDUCTING. (1-4)**

Private instruction in advanced conducting. Prereq: MUS 358 or MUS 364 or MUS 365 or consent of instructor.

**MUP 630 VOCAL COACHING FOR SINGERS. (1-3)**

A course to prepare the vocal student for performance in concert, recital, and opera. Materials to be covered include style, performance practices, diction, interpretation, and audition preparation. Course will include preparation of operatic as well as art song literature appropriate to designated course level. May be repeated to a maximum of six credits. Prereq: Permission of vocal/opera instructors.

**MUP 658 CONDUCTING. (1-4)**

Private instruction in advanced conducting. Prereq: MUS 358 or MUS 364 or MUS 365, or consent of instructor.

**MUP 730 VOCAL COACHING FOR SINGERS. (1-3)**

A course to prepare the vocal student for performance in concert, recital, and opera. Materials to be covered include style, performance practices, diction, interpretation, and audition preparation. Course will include preparation of operatic as well as art song literature appropriate to designated course level. This course may only be taken after all applied vocal lesson requirements have been met. Prereq: Permission of vocal/opera instructors.

**#MUP 758 CONDUCTING. (1-4)**

Private instruction in advanced conducting. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**One-Hour Credit**

The following may register for one-hour credit performance courses:

1. Music majors electing a secondary instrument or a major instrument credit by direction of the adviser to fulfill degree performance requirements.
2. Students from other divisions of the University desiring elective credit but only upon approval of the School of Music.

Students in one-hour credit performance courses for secondary instrument credit may be taught in studio groups of four or less. Each undergraduate one-hour course may be repeated twice for credit. Each graduate one-hour course may be repeated three times for credit.

**Two-Hour Credit**

The following may register for two-hour credit performance courses:

1. Music majors in the Music Education or B.A. in Music degree programs;
2. Music minors;
3. Graduate students by direction of the adviser.

Each undergraduate two-hour course may be repeated twice for credit. Each graduate two-hour course may be repeated three times for credit.

**Three-Hour Credit**

The following may register for three-hour credit performance courses:

1. Music majors in the B.M. or M.M. in performance degree programs;
2. D.M.A. students by direction of the adviser.

Each undergraduate three-hour course may be repeated twice for credit. Each graduate three-hour course may be repeated three times for credit. Not offered during the summer session.

**Four-Hour Credit**

Only graduate students in the music performance programs may register for four-hour courses. These courses are available only at the 600- and 700-levels. Doctoral students only may register for 700-level courses. Four-hour credit courses may be repeated three times for credit. Not offered during the summer session.

**MUS Music – Other Music Courses**

**MUS001 RECITAL ATTENDANCE. (0)**

The course will consist of attendance at recitals. Each freshman and sophomore student must attend a minimum of 16 concerts per semester (for a total of four semesters), to be chosen from faculty recitals, senior or graduate recitals, concerts by UK ensembles, Tuesday noon student recitals, Chamber Music series, Central Kentucky Concert and Lecture Association, and Gallery Series. One-hour lab per week. Grade: P or F.

**MUS 100 INTRODUCTION TO MUSIC. (3)**

A study of the elements of music as they apply to the listening experience; designed for the nonmusic major with no prior knowledge of music. Emphasis will be placed upon developing an awareness and understanding of musical styles from the Renaissance to the present. Music majors may not use this course to fulfill either General Studies, University Studies, or music history requirements.

**MUS 120 FOREIGN LANGUAGE VOCAL DICTION. (1)**

A study of diction factors in Italian, German, and French vocal music. Lecture, two hours. May be repeated to a maximum of three hours. Prereq: Consent of instructor.

**MUS 140 MUSIC ACOUSTICS. (3)**

An introduction to certain physical laws governing sound, sources of sound and mediums through which sound travels. Included are acoustical explanations of how musical instruments produce sounds and their characteristic timbres. (Same as PHY 140.)

**MUS 170 THEORY I – ELEMENTARY AURAL THEORY. (2)**

Development of aural responsiveness to all elements of music, and of sightsinging techniques as an aid to music comprehension and performance. Prereq: Satisfactory completion of Theory Placement Exam; prereq or concur: MUS 171.

**MUS 171 THEORY I – ELEMENTARY WRITTEN THEORY. (2)**

The acquisition of harmonic vocabulary and development of part-writing techniques, elementary counterpoint, free composition, and analysis. Prereq: Satisfactory completion of Theory Placement Examination.

**MUS 172 THEORY I – ELEMENTARY AURAL THEORY. (2)**

Development of aural responsiveness to all elements of music, and of sightsinging techniques as an aid to music comprehension and performance. Prereq: MUS 170; prereq or concur: MUS 173

**MUS 173 THEORY I – ELEMENTARY WRITTEN THEORY. (2)**

The continuation of the work of MUS 171. Lecture, three hours. Prereq: MUS 171.

**MUS 174 THEORY FOR NONMUSIC MAJORS. (3)**

An introduction to the basic materials of musical organization, focusing on music reading, rudiments of notation, pitch, scale, tonal, and rhythmic organization, melodic construction, simple harmonic vocabulary, and beginning aural training. Individual composition and improvisation exercises are used to approach much of this material. Ability to read music is not a prerequisite.

**MUS 201 MUSIC IN WESTERN CULTURE TO 1700. (3)**

Music from Ancient Greece to the end of the 17th century, as seen against a background of artistic, cultural, religious, and political change in Western Europe. Music majors may not use this course to fulfill either the University Studies or music history requirements.

**MUS 202 MUSIC IN WESTERN CULTURE, 1700-PRESENT. (3)**

A survey of music from 1700 (Vivaldi, Bach, Handel) to the present, in the context of artistic, cultural, political, and social changes in the Western cultural community. Music majors may not use this course to fulfill either University Studies or degree requirements.

**MUS 203 HISTORY OF MUSIC. (3)**

A survey of the history of music from ancient times through the Renaissance (up to approximately 1600). Required of all music majors. Prereq: Music majors—sophomore standing; nonmusic majors— consent of instructor.

**MUS 206 AMERICAN MUSIC. (3)**

A history of music in America from c. 1620 to the present. Will require listening to recordings, reading the primary text and suggested readings in books, periodicals and documents. Students should become aware of important names, places, events and styles in music as well as important historical trends and movements.

**MUS 220 SYMPHONIC MUSIC. (3)**

A survey of the symphonic repertoire from the Classical through the Contemporary Periods. Emphasis will include the development of listening skills and an awareness of musical styles. Music majors may not use this course to fulfill University Studies or degree requirements.

**MUS 221 SURVEY OF VOCAL MUSIC: OPERA, ART SONG, CHORAL MUSIC. (3)**

A survey of vocal genres: opera from the Baroque; the Art Song from the Renaissance; and choral music from the Baroque to the present. Significant attention will be given to texts set and to poets and playwrights. Music majors may not use this course to fulfill University Studies or major requirements.

**MUS 222 HISTORY AND SOCIOLOGY OF ROCK MUSIC. (3)**

A listening survey course, with a chronological approach, covering the years 1950-present. Emphasis will be on both the music and the sociological climate reflected and advocated by the music.

**MUS 260 TEACHING MUSIC IN THE ELEMENTARY GRADES I. (2)**

Together with MUS 261, this course is designed to develop musicianship, skills, and techniques teachers need to direct musical activities effectively in the elementary classroom. Music fundamentals and teaching materials are introduced through active participation in musical activities. Focus is on the music education in the lower elementary grades. For nonmusic majors or classroom teachers. Lecture, one hour; laboratory, two hours per week.

**MUS 261 TEACHING MUSIC IN THE ELEMENTARY GRADES II. (2)**

Continuation of MUS 260. Focus is on the music education in the upper elementary grades. This course must be taken immediately following completion of MUS 260. For nonmusic majors or classroom teachers. Lecture, one hour; laboratory, two hours per week. Prereq: MUS 260.

**MUS 262 VOCAL MUSIC METHODS AND MATERIALS SEMINAR I. (2)**

Fundamentals of singing, posture, breathing, diction. Reading of choral literature suitable for the junior and senior high school chorus. Beginning conducting. Accompanying. Lecture, two hours; laboratory, one hour. Prereq: MUS 172, 173 or consent of instructor.

**MUS 263 INSTRUMENTAL MUSIC METHODS AND MATERIALS SEMINAR I. (2)**

Study of the history and philosophy of music education in the public schools and a study of the methods and materials in teaching instrumental music in the elementary schools. Laboratory band and orchestra experience with secondary instruments. Observations in the public schools with emphasis on the elementary and junior high school levels. Lecture, two hours; laboratory, one hour. Prereq: MUS 172, 173 or consent of instructor.

**MUS 264 VOCAL MUSIC METHODS****AND MATERIALS SEMINAR II. (2)**

Warm-up exercises, vocalizing, sight-reading in the chorus. Vocal styles. Reading and conducting choral literature suitable for the junior and senior high school chorus. Analyzing vocal problems. The teenage voice, including the boy's changing voice. Lecture, two hours; laboratory, one hour. Prereq: MUS 262.

**MUS 265 INSTRUMENTAL MUSIC METHODS****AND MATERIALS SEMINAR II. (2)**

A study of the organization and administration of the school instrumental program. Overview of methods and materials and the beginning of repertoire study for school bands and orchestras. Continuation of observations and visitations. Continuation of laboratory band and orchestra experiences. Study of the fundamentals of conducting. Lecture, two hours; laboratory, one hour. Prereq: MUS 263.

**MUS 270 THEORY II – AURAL THEORY. (2)**

Development of aural responsiveness to all elements of music, and of sightsinging techniques as an aid to music comprehension and performance. Prereq: MUS 172; prereq or concur: MUS 271.

**MUS 271 THEORY II – WRITTEN THEORY. (2)**

A continuation of the acquisition of harmonic vocabulary and development of part-writing techniques, elementary counterpoint, free composition, and analysis. Prereq: MUS 171, 173.

**MUS 272 THEORY II – AURAL THEORY. (2)**

Development of aural responsiveness to all elements of music, and of sightsinging techniques as an aid to music comprehension and performance. Prereq: MUS 270; prereq or concur: MUS 273.

**MUS 273 THEORY II – WRITTEN THEORY. (2)**

The continuation of the work of MUS 271. Three class hours per week. Prereq: MUS 271.

**MUS 300 HISTORY OF JAZZ. (3)**

A listening survey course covering the chronological evolution of jazz from its West African and European roots, through its germination in America, to the present. Emphasis will be on the various styles and functions of jazz, particularly as they have been affected by changing social-cultural patterns during the twentieth century.

**MUS 301 APPALACHIAN MUSIC. (3)**

A survey of musical genre and styles in the Southern Appalachian region. Vocal and instrumental, sacred and secular materials will be covered, together with the interchanges between black and white contributions. Prereq: MUS 100 or consent of instructor.

**MUS 302 HISTORY OF MUSIC. (3)**

A survey of the history of music from the Baroque through the Classical periods (approximately 1600-1827). Required of all music majors. Prereq: For music majors, junior standing; nonmusic majors, consent of instructor.

**MUS 303 HISTORY OF MUSIC. (3)**

A survey of the history of music from the Romantic period to the present (approximately 1827 to the present). Required of all music majors. Prereq: Music majors, junior standing; nonmusic majors, consent of instructor.

**MUS 325 SHAKESPEARE AND MUSIC. (3)**

The study of music inspired by the plays of Shakespeare, Shakespeare's use of music in his plays, and an overview of music in Elizabethan times. The course is designed for non-majors.

**MUS 330 MUSIC IN THE WORLD (Subtitle required). (3)**

This course examines the music of a chosen country or region of the world. The study of the historical, stylistic, theoretical, and functional aspects of the music will be related to the socio-historical, philosophical and other cultural aspects of the people in that country or region. Prereq: Junior standing or permission of the instructor.

**MUS 350 MUSIC EDUCATION WORKSHOP. (1-2)**

Intensive study of specialized methods and materials in one of the following areas of music education: elementary and general music; piano; orchestra, band; jazz or choral. May be repeated to a maximum of four credits. Prereq: Consent of instructor.

**MUS 358 CONDUCTING I. (2)**

A study of the technique and practice of fundamentals of conducting. Prereq: Junior standing in music.

**MUS 360 GENERAL MUSIC I. (3)**

A study of the philosophy, the curriculum, and the process involved in promoting musical development of children in the elementary, middle, and high school environment. A field experience is required. Prereq: Junior standing in music.

**MUS 361 GENERAL MUSIC II. (3)**

Methods, materials and techniques of teaching general music with emphasis on activities for the early childhood and elementary children. A field experience is required. Prereq: MUS 360.

**MUS 362 VOCAL MUSIC METHODS AND MATERIALS SEMINAR III. (2)**

The large chorus. Organizational details, rehearsal procedures, public performances. Techniques of vocal production applied to the total choral teaching situation. Interpretation, balance, blend and intonation. Conducting. Accompanying. Prereq: MUS 262, 264.

**MUS 363 INSTRUMENTAL MUSIC METHODS AND MATERIALS SEMINAR III. (2)**

A continuation of MUS 263 and 265. A more intensive study of the rehearsal techniques used with high school bands and orchestras. Laboratory band and orchestra for conducting techniques and secondary instrument playing. Marching band techniques and procedures. Current trends in instrumental music education. Study of literature for all instrumental ensembles. Continued observation in the public schools with emphasis on high school bands and orchestras. Prereq: MUS 263, 265.

**MUS 365 INSTRUMENTAL MUSIC METHODS AND MATERIALS SEMINAR IV. (2)**

A summary of the administrative procedure for the high school band and orchestra director. Advanced conducting with emphasis on rehearsal procedures using advanced music for the high school ensemble. Assignment to public school instrumental teacher for teaching participation. Lecture, two hours; laboratory, one hour. Prereq: MUS 263, 265, 363.

**MUS 366 MARCHING BAND TECHNIQUES. (2)**

A study of contemporary marching band techniques, styles, and trends with emphasis on drill writing and arranging for the marching band. Two hours lecture per week; one hour laboratory per week. Prereq: Consent of instructor.

**MUS 370 THEORY III – ADVANCED HARMONY AND COUNTERPOINT. (2)**

A study of the 19th century harmonic idioms through projects in analysis and composition. Lecture, three hours. Prereq: MUS 273.

**MUS 371 INSTRUMENTATION AND ARRANGING. (2)**

A basic course in instrumentation and arranging for typical school instrumental and vocal ensembles. Prereq: MUS 273.

**MUS 372 MUSICAL ANALYSIS. (2)**

A study of musical style through structural, harmonic and melodic analyses. Prereq: MUS 273.

**MUS 373 FUNDAMENTALS OF JAZZ THEORY. (2)**

A study of the basic theoretical elements of jazz with reference to their use in improvisation. Topics of study will include harmonic, rhythmic, and melodic structure, keyboard application, and a study of styles and improvisation. Prereq: MUS 272 and 273, or consent of instructor.

**MUS 390 TOPICS IN MUSIC HISTORY (Subtitle required). (3)**

Studies of a specific composer, genre, school of composers, or a topic crossing the traditional boundaries of music history. May be repeated to a maximum of six credits when identified by different course subtitles. Prereq: MUS 203, 302, and 303, or consent of instructor.

**MUS 395 INDEPENDENT WORK IN MUSIC. (1-3)**

May be repeated to a maximum of six credits. Prereq: Major in music and a standing of 3.0 or consent of instructor.

**MUS 400G MUSIC HISTORY REVIEW. (3)**

A review of music history from the Medieval period through the twentieth century. May not be used to satisfy major requirements for Bachelors degrees in the College of Fine Arts. Prereq: Provisional graduate standing.

**MUS 470G REVIEW OF HARMONY. (1)**

A review of common practice diatonic and chromatic harmony, through written work and analysis. May not be used to satisfy major requirements for Bachelors degrees in the College of Fine Arts. Lecture, two hours per week. Prereq: Provisional graduate standing.

**MUS 471G REVIEW OF AURAL SKILLS. (1)**  
A review and continued development of basic listening skills, and the ability to comprehend aurally harmonic function within a tonal framework and musical structures, both micro-structures and macro-structures. May not be used to satisfy major requirements for Bachelors degrees in the College of Fine Arts. Lecture, two hours per week. Prereq: Provisional graduate standing.

**MUS 501 MUSIC OF THE RENAISSANCE. (3)**  
A survey of vocal and instrumental music of the 15th and 16th centuries. Prereq: MUS 203 or consent of instructor.

**MUS 502 MUSIC OF THE BAROQUE ERA. (3)**  
The history of vocal and instrumental music in the Baroque style from 1600 to 1750. Prereq: MUS 302 or consent of instructor.

**MUS 503 MUSIC OF THE CLASSIC PERIOD. (3)**  
The development of music in the Classic style from the early 18th century to 1800. Prereq: MUS 302 or consent of instructor.

**MUS 504 MUSIC OF THE 19th CENTURY. (3)**  
A study of master works of music composed in the 19th century. Prereq: MUS 303 or consent of instructor.

**MUS 505 MUSIC OF THE 20th CENTURY. (3)**  
A stylistic study of representative compositions of the 20th century. Prereq: MUS 303 or consent of instructor.

**MUS 506 HISTORY OF AMERICAN MUSIC. (3)**  
A study of music in America from Colonial times to ca. 1920. Prereq: MUS 302 and 303 or consent of instructor.

**MUS 520 VOCAL SOLO LITERATURE. (3)**  
A stylistic study of solo vocal music from the Baroque to the present. Prereq: MUS 302 and 303 or consent of instructor.

**MUS 521 ORGAN LITERATURE. (3)**  
A course of study designed to give the organ student a practical knowledge of the development of the organ, its construction, the standard literature, and teaching materials. Prereq: MUS 302 and 303 or consent of instructor.

**MUS 522 PIANO LITERATURE TO 1830. (3)**  
An historical and analytical study of music for piano to 1830, including discussion of the development of the instrument and the emergence of the idiomatic piano writing. Prereq: MUS 302 or consent of instructor.

**MUS 523 PIANO LITERATURE SINCE 1830. (3)**  
A historical and analytical study of music written for the piano from the inception of the Romantic period to the present, from the parallel perspectives of changes in the approach to the instrument and stylistic developments as they are reflected in piano writing. Prereq: MUS 303 or permission of instructor.

**MUS 530 COLLEGIUM MUSICUM. (1-3)**  
The study and realization of performance practices in music from antiquity to the present. The number of credits granted will be determined by the involvement of the student, varying from rehearsal/performance (normally one hour credit) to detailed musicological research (to three hours credit). May be repeated to a maximum of nine credits. Prereq: Consent of instructor including determination of credit hour(s) to be granted per semester.

**MUS 540 APPLICATIONS OF MUSIC TECHNOLOGY. (3)**  
Applications of music technology hardware and software, including but not limited to MIDI systems, sequencing, notation software, and MIDI code. Emphasis will be on use of technology as tools for creativity and productivity. Content will be continually updated. No prior computer or MIDI experience assumed; space preference given to music majors. Prereq: Nonmusic majors must obtain permission of instructor; ability to read music required.

**MUS 550 TOPICS IN MUSIC EDUCATION (Subtitle required). (1-3)**  
In-depth study of a designated topic, special issue, philosophy, or methodology of music education. May be repeated to a maximum of nine credits when identified by different course subtitles. Prereq: Junior standing in music.

**MUS 560 ORFF SCHULWERK. (1-3)**  
The study of the philosophy and the pedagogy of the Orff Schulwerk method through movement, discussion, performance, improvisation, composition, and demonstration. Number of credits awarded will depend on total number of hours of participation and the amount of work in musical arrangement, orchestration, and composition. May be repeated to a maximum of six credits. Prereq: Junior standing in music or approval of instructor.

**MUS 561 ORFF CERTIFICATION: LEVEL I, II, OR III. (2)**  
An intensive and systematic study of the philosophy and the pedagogy of the Orff Schulwerk method based on the curriculum recommended by the American Orff Schulwerk Association. The three main components are ensemble, recorder, and movement. Participants must demonstrate competency in orchestration, recorder, and pedagogy in order to obtain certification. Lecture, two hours; laboratory, two hours per week. May be repeated in sequence to a maximum of six credits. Prereq: Junior standing in music or approval of instructor.

**MUS 563 MUSIC IN EARLY CHILDHOOD. (3)**  
A comprehensive study of the musical growth and development of preschool and early elementary school children. Application of research findings in child development and music education to designing the environment, learning materials, and musical activities for young children through lectures, class discussions, demonstrations and field experiences in an early childhood laboratory. Lecture, two hours; laboratory, two hours per week. Prereq: MUS 261, or MUS 360 or approval of instructor.

**MUS 566 PIANO PEDAGOGY. (3)**  
Investigation of techniques and materials for teaching piano in groups and to individual students, both children and adults. Prereq: Consent of instructor.

**MUS 570 ORCHESTRATION. (2)**  
This course includes a study of the individual instruments of the orchestra and band with practice in scoring for these instruments. Prereq: MUS 371.

**MUS 571 ORCHESTRATION. (2)**  
A continuation of MUS 570. Prereq: MUS 570.

**MUS 572 COUNTERPOINT. (3)**  
A study of 16th century contrapuntal techniques and of contrapuntal influences in common-practice music. Prereq: MUS 273 or equivalent.

**MUS 573 COUNTERPOINT. (3)**  
A study of 18th century contrapuntal techniques and of contrapuntal influences in Romantic and 20th century music. Prereq: MUS 273 or equivalent.

**MUS 574 COMPOSITION. (2)**  
A basic course in original composition and orchestration. Prereq: MUS 371.

**MUS 575 COMPOSITION. (2)**  
A continuation of MUS 574. Prereq: MUS 574.

**MUS 578 ANALYSIS AND STYLE SURVEY. (3)**  
Studies in analytical terminology and methodology; survey of major stylistic practices of Western music. Prereq: MUS 372 or equivalent.

**MUS 600 RESEARCH I. (3)**  
A course designed to acquaint students with basic techniques and tools used in music education research.

**MUS 601 FOUNDATIONS IN MUSIC EDUCATION. (3)**  
An historical survey of thought concerning the place and significance of music in the education of the individual and the group.

**MUS 618 RESEARCH METHODS. (3)**  
A survey of basic research techniques and materials in musicology and theory. Prereq: A reading knowledge of French or German.

**MUS 620 ADVANCED VOCAL REPERTORY (Subtitle required). (3)**  
An intensive study of the stylistic and interpretive characteristics of solo vocal literature of a specified repertory. May be repeated as desired with different subtitles. Prereq: Graduate standing or consent of instructor.

**MUS 622 SYMPHONIC LITERATURE. (3)**  
An intensive study of orchestral literature from the classical period to the present. Prereq: Graduate standing in music or consent of instructor.

**MUS 623 OPERA LITERATURE. (3)**  
The development of opera as an art form, and analysis of representative operas from various areas. Prereq: Graduate standing in music or consent of instructor.

**MUS 624 CHAMBER MUSIC LITERATURE. (3)**  
An intensive study of the development of instrumental chamber music. Prereq: Graduate standing in music or consent of instructor.

**#MUS 625 CHORAL LITERATURE. (3)**  
An intensive study of choral literature from the Renaissance period to the present. Prereq: Graduate standing or consent of instructor.

**MUS 630 BAROQUE PERFORMANCE PRACTICES. (3)**

An introduction to the problems, methods, bibliography, and discography of performance practices of the Baroque era, with particular emphasis on vocal and instrumental music of France, Germany, and Italy. Prereq: MUS 502 or consent of instructor.

**MUS 650 MUSIC EDUCATION WORKSHOP. (1-4)**

Intensive study of advanced methods and materials in one of the following areas of music education: elementary and general music, the school orchestra, the school band, choral music. May be repeated once for a total of two, three or four credits.

**MUS 660 ADVANCED MUSIC EDUCATION METHODS AND MATERIALS (Subtitle required). (3)**

An in-depth study and analysis of the methodology and materials and their development in music education. May be repeated to a maximum of 12 credits when identified by different course subtitles. Prereq: Graduate standing or consent of instructor.

**MUS 664 MUSIC AND SPECIAL LEARNERS. (3)**

This course is directed toward developing competencies and understandings relating to non-music and music educational objectives in therapy and education. Prereq: Consent of instructor.

**MUS 665 PHYSIOLOGY AND FUNCTIONING OF THE SINGING VOICE. (3)**

Detailed study of vocal physiology and acoustics of the singing voice. Major historical sources and recent scientific research form the basis of the course. Designed for professional voice teachers and music educators who work with singers. Prior study of acoustics recommended.

**MUS 667 MATERIALS, TECHNIQUES AND LITERATURE OF VOICE TRAINING. (3)**

Survey of currently published books, anthologies, and other materials for voice teaching. Various approaches to teaching vocal technique will be examined; other pertinent literature explored. Prereq: MUS 665.

**MUS 670 MUSICAL STYLE I. (3)**

Concentrated study of stylistic aspects, and of analytical methodologies suited to these aspects, in music of antiquity through 1600. Prereq: MUS 578 or equivalent.

**MUS 671 MUSICAL STYLE II. (3)**

Concentrated study of stylistic aspects, and of analytical methodologies suited to these aspects, in music of the Baroque and Classical periods. Prereq: MUS 578 or equivalent.

**MUS 672 MUSICAL STYLE III. (3)**

Concentrated study of stylistic aspects, and of analytical methodologies suited to these aspects, in music from 1820 to Bartok, Stravinsky and Schoenberg. Prereq: MUS 578 or equivalent.

**MUS 673 ADVANCED COMPOSITION. (2)**

May be repeated to a maximum of six credits. Prereq: MUS 575.

**MUS 674 PEDAGOGY OF THEORY. (3)**

Examination of the resources and techniques of teaching undergraduate music theory (aural and written components). Extensive review of the textbook literature, study of the application of contrasting theoretical approaches, and the examination of relevant Computer Assisted Instruction materials. Requirements to include practice teaching and observation of undergraduate music theory classes (MUS 171-173; 271-273; 170-172; 270-272). Prereq: MUS 578 or equivalent.

**MUS 676 ADVANCED ANALYTICAL TECHNIQUES. (3)**

Study of the most significant approaches to music analysis of the 20th century, including Schenkerian analysis, Forte set theory, and others. Prereq: MUS 578 or equivalent.

**MUS 677 CONTEMPORARY MUSIC IDIOMS. (3)**

Survey, with intensive study of representative works, of musical trends since 1935. Prereq: MUS 578 or 671 or 672.

**MUS 678 HISTORY OF THEORY. (3)**

A survey of theoretical ideas from the Greeks through 19th century English and German theorists. Prereq: MUS 578 or equivalent.

**MUS 680 BAND HISTORY AND LITERATURE. (3)**

A study of the heritage of the wind band through its leaders and literature, from its earliest roots to the present, with emphasis on the period from 1950 to the present. Prereq: Consent of instructor.

**MUS 681 ADVANCED REHEARSAL TECHNIQUES - BAND. (3)**

The development of effective rehearsal skills in the secondary school and university band settings, with emphasis on performance orientation, the development of aural concepts and advanced rehearsal analysis and techniques. Prereq: MUS 365, teaching experience or permission of instructor.

**MUS 684 ADVANCED STRING METHODS AND MATERIALS. (3)**

The study of string pedagogy through historical perspectives as it relates to the individual instruments as well as to class instruction. Prereq: Graduate standing in music or approval of instructor.

**MUS 690 TOPICS IN MUSICOLOGY (Subtitle required). (3)**

Investigation of critical and historical problems in musicology; intensive study of a specific composer, genre, or school of composers. May be repeated to a maximum of six credits when identified by different course subtitles. Prereq: Graduate standing and consent of instructor.

**MUS 695 INDEPENDENT WORK IN MUSIC. (1-3)**

Study of an individually selected topic relevant to a student's academic development. For work in musicology, theory, music education, or vocal literature, students should enroll in the designated independent work courses listed separately. May be repeated to a maximum of six credits. Prereq: Graduate standing in music and consent of instructor.

**MUS 700 MEDIEVAL NOTATION. (3)**

The study and transcription of the notation of medieval music from the earliest plainchant sources to mannered notation of the late Ars Nova in Italy and France. Lecture, three hours; laboratory, one hour. Prereq: Consent of instructor.

**MUS 701 RENAISSANCE NOTATION. (3)**

he study and transcription of the notation of Renaissance polyphony from the time of the Burgundian school through Palestrina and contemporaries, and of the various keyboard and lute tablatures of the 16th and 17th centuries. Lecture, three hours; laboratory, one hour. Prereq: Consent of instructor.

**MUS 702 SEMINAR IN MUSICOLOGY. (3)**

Study and research in specific musicological problems. May be repeated to a maximum of nine hours. Prereq: Consent of instructor.

**MUS 704 MUSIC TECHNOLOGIES. (3)**

An introduction to the principles of musical sound combined with an introduction to synthesizers and computer applications in music. Prereq: Graduate standing in music.

**MUS 705 RESEARCH II. (3)**

A course designed to lead the student in music education to do experimental research in the area of music education. Prereq: MUS 600.

**MUS 706 MUSIC LEARNING AND BEHAVIOR. (3)**

This course is intended for graduate students in music education with the major focus of the class involved in learning behavioral principles, learning observational categories pertaining to classroom reinforcement and role playing and practicing techniques to be employed later in the classroom. Prereq: Graduate standing in music.

**MUS 707 TESTS AND MEASUREMENTS IN MUSIC. (3)**

This course is designed to provide students with knowledge in measurements and evaluation in the field of music education and research. Topics include principles of measurement, administration and evaluation of published standardized and teacher-made tests, interpretation of test results, and test construction. Prereq: MUS 600.

**MUS 719 INDEPENDENT WORK IN MUSICOLOGY. (1-3)**

May be repeated to a maximum of six hours. Prereq: Four to six hours of graduate credit in the area of specialization and consent of instructor.

**MUS 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**MUS 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**MUS 762 MUSIC IN HIGHER EDUCATION. (3)**

Historical and comparative studies in the teaching and administration of music in colleges and universities. Includes case studies in administration, music in European higher education and the relationship of music to all other elements of the academic program. Prereq: MUS 751.

## 1997-1998 Course Descriptions – M

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- MUS 766 SEMINAR IN MUSIC EDUCATION. (3)**  
Advanced professional study in the theory and practice of music education. May be repeated to a maximum of six credits. Prereq: Consent of instructor.
- MUS 767 INDEPENDENT WORK IN MUSIC EDUCATION. (1-3)**  
May be repeated to a maximum of six hours. Prereq: Four to six hours of graduate credit in area of specialization and consent of instructor.
- MUS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.
- MUS 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

- MUS 770 PSYCHOLOGY OF MUSIC. (3)**  
A study of the processes of musical thinking and the effects of music on human behavior.
- MUS 772 SEMINAR IN THEORY. (3)**  
Individual and group study of theoretical problems and areas of inquiry. May be repeated to a maximum of nine credits. Prereq: Graduate standing in Theory, or consent of instructor.
- MUS 780 DIRECTED RESEARCH IN VOCAL LITERATURE. (1-3)**  
Individual directed research. Elective course for master's degree students. Required for doctoral voice majors; topics assigned at discretion of instructor in proportion to credits undertaken. May be repeated to a maximum of 12 credits. Prereq: MUS 618 and MUS 620 or permission of instructor.
- MUS 799 INDEPENDENT WORK IN MUSIC THEORY. (1-3)**  
May be repeated to a maximum of six hours. Prereq: Four to six hours of credit in area of specialization and consent of instructor.

## NEU Neurology

### NEU 605 PRINCIPLES OF NEUROBIOLOGY. (4)

The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of neurobiology. Areas covered will include neuronal and glial cell biology, neurotransmitters, signaling mechanisms, neuroanatomy, and neuronal development. The course is designed to provide a brief overview of each of the areas and introduce students to current research questions. The course will consist of lectures and informal presentations in a 'Journal Club' format. The course will be interdisciplinary and will be of interest to graduate students in anatomy, biology, biochemistry, immunology, pharmacy, pharmacology, physiology, psychology and toxicology and to neurology and neurosurgery residents. Prereq: Introductory biochemistry course, or equivalent, and/or consent of instructor. (Same as ANA/BCH/PGY/PHA 605.)

### NEU 606 MECHANISMS OF NEUROLOGIC DISEASE. (4)

The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of current problems and controversies in neurobiology and clinical neurology. The course will cover a variety of illnesses including epilepsy, neurodegenerative diseases, stroke, psychiatric illness, pain, diseases of immune origin, motor dysfunction and inherited disorders. Prereq: ANA/BCH/NEU/PGY/PHA 605 or consent of instructor. (Same as ANA/PHA 606.)

### NEU 815 FIRST-YEAR ELECTIVE, NEUROLOGY. (1-3)

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Neurology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

### NEU 825 SECOND-YEAR ELECTIVE, NEUROLOGY. (1-4)

With the advice and approval of his or her adviser, the second-year student may choose approved electives offered by the Department of Neurology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

### NEU 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth-year College of Medicine and/or permission of the Student Progress and Promotions Committee.

#### Approved electives:

#### NEU 850 ACTING INTERNSHIP IN NEUROLOGY

#### NEU 851 CLINICAL CLERKSHIP IN NEUROLOGY

#### NEU 852 RESEARCH IN NEUROLOGY

#### NEU 853 NEUROLOGY CONSULTATION

#### NEU 854 CLINICAL NEUROPHYSIOLOGY (EEG, EMG, AND EVOKED POTENTIALS)

#### NEU 855 ROTATION IN GERIATRIC NEUROLOGY

## NFS Nutrition and Food Science

### NFS 101 HUMAN NUTRITION AND WELLNESS. (3)

Food composition, digestion, absorption and metabolism as related to selection of nutrients essential for human life, growth, reproduction, lactation, wellness and physical activity. Not open to NFS majors except hospitality management students.

### NFS 204 PRINCIPLES OF FOOD PREPARATION. (3)

Basic physical and chemical principles involved in preparation of foods in the Basic Four food groups. Skills, sanitation standards, and economics involved in preparation of foods of quality and maximum nutrient content. Lecture, one hour; laboratory, four hours.

### NFS 212 INTRODUCTORY NUTRITION. (3)

An elementary study of the principles of nutrition and the application of these principles to providing adequate nutrition to humans. The chemical and physiological approach to nutrition is emphasized. Credit may not be earned for both NFS 101 and 212. Prereq: BIO 104; CHE 106 or 107. May be taken concurrently.

### NFS 240 NUTRITION AND PHYSICAL FITNESS. (3)

Course focuses on the interrelationship between nutrition and physical fitness. The intent is to provide the student with the information necessary to formulate an individualized plan for the achievement and maintenance of adequate nutrition and physical fitness. Weight control will be discussed in this content. Team-taught by nutrition faculty and health, physical education and recreation faculty. Lecture, two hours; laboratory, two hours. (Same as HPR 240.)

### NFS 301 INTRODUCTION TO THE DIETETICS PROFESSION. (3)

An orientation to the dietetics profession, including ethics, education requirements, roles and responsibilities in various employment opportunities. Basic skills needed by the dietician are reviewed, with emphasis on communications, nutritional care, medical terminology and food service management. Lecture, two hours; laboratory, two hours per week.

### NFS 304 EXPERIMENTAL FOODS. (3)

Chemical and physical properties of food and the changes resulting from processing and preparation. Experimental study of variations in ingredients and preparation methods on food quality. Design, execute and report an independent research project. Lecture, one hour; laboratory discussion, one hour; laboratory, three hours per week. Prereq: NFS 204 and CHE 236.

### NFS 311 NUTRITIONAL BIOCHEMISTRY. (3)

An introductory study of the biochemical basis of nutrition—the physiochemical properties of nutrients and other essential biochemicals and their role in physiological and metabolic processes. Prereq: CHE 236 or NFS 310; PGY 206 may be taken concurrently or consent of instructor.

### NFS 312 NUTRITION IN THE LIFE CYCLE. (2)

A study of the physiological changes occurring in the life cycle with associated nutrient needs. The course focuses on nutrient needs in pregnancy through the life span to geriatrics. Prereq: NFS 212.

### NFS 314 DIETETICS: COUNSELING AND COMMUNICATION. (2)

Development of competency in collection and interpretation and food/diet related data. Strategies and techniques for promoting change in nutrition behaviors will be included. Laboratory, four hours per week. Prereq: NFS 212.

### NFS 340 INSTITUTIONAL PURCHASING. (3)

Fundamental principles and purchasing techniques for the selection of food and nonfood items in a food service system. Prereq: ECO 201 or 202.

### NFS 342 QUANTITY FOOD PRODUCTION. (5)

Introduction to the production and service of food in quantity includes production techniques and controls, safety and sanitation, menu planning and service. Lecture, three hours; laboratory, 4.5 hours. Prereq: NFS 204.

### NFS 344 FOOD SERVICE ACCOUNTING. (3)

Application of accounting principles to food service in the cafeteria, lunchroom, tea-room, restaurant, residence hall, hospital and other institutions. Lecture, one hour; laboratory, four hours. Prereq: NFS 340; ECO 201 or ECO 202.

### NFS 346 BASIC MANAGEMENT PRINCIPLES OF FOOD SERVICE. (3)

An introduction to the principles, theories, and functions of management as related to food service. Major emphasis of the course is utilization of human resources. Prereq: NFS 342 or consent of instructor.

### NFS 408G SEMINAR IN FOOD AND NUTRITION. (1)

Investigation of recent research in food and nutrition. May be repeated to a maximum of three credits. Nutritional sciences graduate students may not enroll for graduate credit. Prereq: Senior standing or consent of instructor.

### NFS 503 COMMUNITY NUTRITION. (3)

A study in assessing community nutrition program needs, program implementation, and evaluation. Course content focuses on community nutrition education programs in health clinics, wellness centers, schools, government institutions, voluntary agencies, mass media, etc. Prereq: NFS 312.

### NFS 510 ADVANCED NUTRITION. (3)

Application of biochemistry, physiology and nutrition to the understanding of the utilization and function of nutrients in the body as related to the structure, function and metabolic needs of cells/organ systems. Dietetic students must take NFS 511 concurrently with NFS 510. Prereq: NFS 311 or BCH 401G or equivalent.

### NFS 511 THERAPEUTIC NUTRITION. (3)

Changes in nutrient metabolism related to biochemical and physiological alterations in disease conditions and development of therapeutic diets. Prereq: NFS 311, NFS 312, and concurrent enrollment in NFS 510.

**NFS 513 ADVANCED THERAPEUTIC NUTRITION. (2)**  
 Study of selected topics in advanced therapeutic nutrition, including trauma, enteral and total parenteral nutrition. Content includes case study evaluations, nutritional therapies for disease conditions and current reports/research in the field. Prereq: NFS 511.

**NFS 516 MATERNAL AND CHILD NUTRITION. (3)**  
 Food selection for optimal nutrition during pregnancy and lactation and for infant and child development through preadolescence. Cultural, social, and psychological aspects of food selection and dietary patterns, as they relate to mental and physical development. Prereq: NFS 312 or consent of instructor.

**NFS 542 FOOD SERVICE EQUIPMENT AND LAYOUT. (3)**  
 Layout and design of efficient food service facilities in restaurants, hotels, and institutions; selection, operation and maintenance of equipment. Field trips. Lecture, two hours; laboratory, two hours per week. Prereq: NFS 342.

**NFS 546 INSTITUTION ORGANIZATION AND MANAGEMENT. (3)**  
 Principles of institution organization, types of institution service, personnel and financial management. Legal aspects of institution management. Personal and professional qualifications of an institution manager. Prereq: NFS 340, 342, 346 or equivalent.

**NFS 548 INSTITUTION ADMINISTRATION. (3)**  
 Application of scientific principles are developed in various aspects of food service management. May be repeated to a maximum of nine credits. Prereq: NFS 344, NFS 546 or consent of instructor.

**NFS 580 DIETETICS PRE-PROFESSIONAL PRACTICE. (1-6)**  
 Pre-professional experiences are designed to allow students to apply knowledge and skills in assessing, planning, implementing, and evaluating nutrition care in various health delivery systems. Student experience will include opportunities to link theory and practice while developing the skills and attitudes essential to practice in the dietetics profession. Placement of experiential settings must have the approval of the appropriate Director of Dietetics in Nutrition and Food Science. A minimum of 60 supervised practice hours will constitute one semester credit hour with prior approval. (NFS students may not receive graduate credits toward a degree for practicum experiences.) May be repeated to a maximum of six credits. Prereq: Consent of instructor and senior or graduate status.

**NFS 590 FIELD WORK IN NUTRITION. (1)**  
 Nutrition problems at different age levels, correlated with surveys and experimental studies to show the relation between diet selection and its physical and mental effects. Lecture and laboratory. May be repeated to a maximum of four credits. Prereq: NFS 503, or consent of instructor.

**NFS 591 SPECIAL PROBLEMS IN FOODS AND NUTRITION. (1-3)**  
 Intensive work on a specific phase of the field. Senior or graduate standing. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**NFS 594 SPECIAL PROBLEMS IN INSTITUTION MANAGEMENT. (1-3)**  
 Intensive work on specific problems. Senior or graduate standing. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**NFS 603 ADVANCED COMMUNITY NUTRITION. (3)**  
 Study of nutrition surveys and of bases for judging community nutrition. Emphasis is placed upon economic, geographic, social and educational causes of malnutrition. Experience is given in development of nutrition programs. May be repeated to a maximum of six credits. Prereq: NFS 503.

**NFS 610 HUMAN NUTRITION: ASSESSMENT. (3)**  
 Assessment of dietary, anthropometric and biochemical parameters of nutritional status in health and disease. Lecture, two hours; laboratory, three hours per week. Prereq: NFS 510, NFS 511 or equivalent.

**NFS 680 NUTRITION AND AGING. (2)**  
 Emphasis on current research in nutrition and aging, nutrition needs of the elderly and nutrition-related diseases associated with aging. Prereq: NFS 510 and 511 or equivalent.

**NFS 685 MINERAL METABOLISM. (2)**  
 An in-depth review of the function, requirement deficiency and toxicity of mineral elements in nutrition. Emphasis on the interactions between elements and current literature will be made. Prereq: ASC 378 or NFS 510 or equivalent. BCH 502 or equivalent or consent of instructor. (Same as ASC 685.)

**NFS 748 MASTER'S THESIS RESEARCH. (0)**  
 Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**NFS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
 May be repeated to a maximum of 12 hours.

**NFS 770 SEMINAR IN NUTRITION AND FOOD SCIENCE. (1)**  
 Selected topics in nutrition and/or food science. May be repeated to a maximum of three credits.

**NFS 772 CURRENT TOPICS IN HUMAN NUTRITION AND FOOD SCIENCE. (2)**  
 A study of topics in vitamins, minerals, proteins, carbohydrates and lipids as they relate to human nutrition and food science. Current symposia and reviews in human foods, nutrients, digestion, absorption, metabolism and excretion will be discussed. May be repeated to a maximum of six credits. Prereq: NFS 771 and one year graduate standing or permission of instructor.

**NFS 781 SPECIAL PROBLEMS IN FOODS AND NUTRITION. (1-3)**  
 Independent advanced work on a specific problem. May be repeated to a maximum of six credits.

**NFS 784 SPECIAL PROBLEMS IN INSTITUTION MANAGEMENT. (1-3)**  
 Independent, advanced work. May be repeated to a maximum of six credits.

**NFS 800 NUTRITION IN THE LIFE CYCLE: PRACTICUM. (1)**  
 Course content will provide an introductory supervised practice for Coordinated Program dietetic students. Experiences include nutrition services provided at various stages in the life cycle, including pregnancy, infancy, preschool, elementary and high school, and geriatric. Laboratory, three hours per week. Prereq: Admission to Coordinated Program, NFS 212, CHE 236; concur: enrollment in NFS 312.

**NFS 808 COMMUNITY NUTRITION: PRACTICUM. (2)**  
 Supervised practice in community nutrition. Experiences include public and private agencies/organizations that provide food and nutrition services and nutrition education for various socioeconomic groups. Laboratory, six hours per week. Prereq: Admission to Coordinated Program; concur: enrollment in NFS 503.

**NFS 810 THERAPEUTIC NUTRITION: PRACTICUM. (3)**  
 Supervised practice in health care facilities. Course focuses on patient assessment, diet planning, care plan implementation, and nutritional evaluation. Laboratory, nine hours per week. Prereq: Admission to Coordinated Program; concur: enrollment in NFS 513.

**NFS 812 FOOD SERVICE SYSTEMS: PRACTICUM. (3)**  
 Supervised practice in food service management in a variety of food service operations. Experience may include participation in management functions including procurement, production, financial and human resource management, marketing, and training. Laboratory, nine hours per week. Prereq: Admission to Coordinated Program; concur: enrollment in NFS 346.

**NFS 814 ADVANCED FOOD SERVICE SYSTEMS PRACTICUM. (5)**  
 In-depth application of food service management principles in a food service operation. Provides variety of experiences in operations, financial, and managerial aspects of food services. Experiences based on performance requirements established by the American Dietetic Association for the entry level generalist dietitian. Clinical, 15 hours per week. Prereq: Admission to Coordinated Program and NFS 813; concur: NFS 816, NFS 818.

**NFS 816 ADVANCED THERAPEUTIC NUTRITION PRACTICUM. (5)**  
 In-depth clinical application of the principles of dietetics in a hospital setting. Focuses on the team concept of patient care. Provides a variety of dietetic practice experiences with opportunity to test and evaluate results. Experiences based on performance requirements established by the American Dietetics Association for the entry level generalist dietitian. Clinical, 15 hours per week. Prereq: Admission to Coordinated Program and NFS 811; concur: NFS 814, NFS 818.

**NFS 818 EVALUATION OF DIETETIC PRACTICES. (2)**  
 Evaluation of supervised practices in dietetics. Includes the development of attitudes and values for the professional dietitian. Formal presentations of case studies developed during supervised practices in the field. Presentation and discussion of current journal literature related to professional practice. Lecture, one hour; clinical, three hours per week. Prereq: Admission to Coordinated Program; concur: NFS 814, NFS 816.



## NRC Natural Resource Conservation and Management

### NRC 301 RESOURCE MANAGEMENT AND CONSERVATION. (3)

An intermediate course in management and conservation of natural resources, with an emphasis on terrestrial resources. A case study approach will be used to study current natural resource issues. Prereq: FOR 100.

### NRC 320 DATA COLLECTION TECHNIQUE. (3)

A field-oriented course taught as a three week summer camp at the Robinson Forest. Emphasis is placed on methodologies for data collection necessary to evaluate a variety of ecosystems on forest land, agricultural land and surface mined land. Students will become familiar with sampling instrumentation, collection, preservation, analysis and data interpretation. Lecture, 10 hours; laboratory, 30 hours per week for three weeks. Prereq: BIO 150, 151, 152, 153; CHE 105.

### NRC 350 SOCIAL IMPACT ASSESSMENT. (3)

Applications of social impact assessment methods in context of natural resource conservation and management and environmental policy. Methods to assess economic, demographic, service, fiscal, and social impacts. Prereq: FOR 100, SOC 260, consent of instructor.

### #NRC 359 GLOBAL POSITIONING SYSTEMS (GPS). (1)

Introduction to the concepts and applications of global positioning systems (GPS) for field mapping. Students will develop skills to collect, calibrate and analyze data collected with GPS equipment. Lectures are supplemented with field exercises in the use of GPS equipment. Lecture, two hours per week for five weeks; laboratory, four hours per week for three weeks. Prereq: Permission of instructor. (Same as LA 859.)

### NRC 385 SEMINAR IN NATURAL RESOURCE CONSERVATION AND MANAGEMENT. (1)

Reports and discussions of selected topics in natural resource conservation and management. Students will select topics for independent investigation and class presentations. Prereq: NRC 301.

### NRC 395 INDEPENDENT STUDY IN NATURAL RESOURCES. (1-6)

Study and independent work on selected problems related to conservation and management of natural resources. May be repeated to a maximum of six credits. Prereq: Consent of appropriate instructor.

### NRC 399 EXPERIENTIAL EDUCATION IN NATURAL RESOURCES. (1-6)

A field-based learning experience in natural resources under the supervision of a faculty member. May be repeated to a maximum of six credits. Prereq: Consent of instructor and department chair, and completion of a departmental learning contract.

### #NRC 420G TAXONOMY OF VASCULAR PLANTS. (4)

A survey of the identifying characteristics and evolutionary relationships among groups of vascular plants, concentrating on important families in the temperate flora of eastern North America. Students will gain experience in species identification and in the use of important tools and references of field botany. Lecture, three hours; laboratory, three hours; plus two Saturday field trips. Prereq: BIO 150, 151, 152 and 153; or one course in introductory botany; or consent of instructor.

### NRC 450G BIOGEOCHEMISTRY. (3)

A course emphasizing the physical, chemical, and biochemical make-up of soil/water systems and the information required to predict chemical fate in the environment. Emphasis is placed on the relationships describing mineral solubility, sorption and exchange reactions, redox reactions, volatility, and biochemical cycling. Prereq: CHE 105, 107, 115; two semesters of college biology. (Same as AGR 450G.)

### NRC 471 SENIOR PROBLEM IN NATURAL RESOURCES. (3)

This course is designed to provide students with the opportunity to apply the skills and information acquired in previous courses to a real world natural resource problem. The class will focus on a single current natural resource conflict in Kentucky and will research the issue in depth, using a variety of techniques, including library research, interviews, and data collection and analysis. In addition to research and problem-solving skills, written and oral skills will be emphasized. Lecture, one hour; laboratory, four hours per week. Prereq: NRC 301, NRC 385, and senior standing.

### \*NRC 477G LAND TREATMENT OF WASTE. (3)

Resource management with emphasis on principles and methods of soil application of wastes (agricultural, industrial, and municipal). Topics include chemical and biological systems; soil and plant management; development, monitoring, and record keeping. Prereq: PLS 366. (Same as AGR 477G.)

### NRC 555 GEOGRAPHIC INFORMATION SYSTEMS AND LANDSCAPE ANALYSIS. (3)

An introduction to the concepts and methods of compilation, management, analysis, and display of spatially-referenced data. Lectures will be complemented with computer based laboratory exercises. Lecture, two hours; laboratory, four hours per week. Prereq: Fourth/fifth year LA major, upper division or graduate student, or permission of instructor. (Same as LA 855/SOC 555.)

### \*NRC 556 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND LANDSCAPE ANALYSIS. (3)

Advance concepts in data base analysis, model development, and ancillary functions in geographic information systems. Lecture, two hours; laboratory, four hours per week. Prereq: LA 855, LAAR major, upper division, graduate student, or permission of instructor. (Same as LA 956/SOC 556.)

## NS Nutritional Sciences

### NS 651 TOPICS IN NUTRITIONAL SCIENCES I. (2)

Faculty from different disciplines will provide in-depth coverage of selected topics in nutritional sciences as related to health and disease, e.g. nutrition and gastrointestinal diseases, diabetes, cancer, cardiovascular disease. Prereq or concur: Six credit hours from ASC 681, 683, 687, ASC/NFS 685, NFS 610, CNU 601 or consent of instructor.

### NS 652 TOPICS IN NUTRITIONAL SCIENCES II. (2)

Faculty from different disciplines will provide in-depth coverage of selected topics in nutritional sciences as related to health and biological functions (e.g. nutrition and exercise, stress, and environmental interactions). Prereq or concur: Six credit hours from ASC 681, 683, 687, ASC/NFS 685, NFS 610, CNU 601 or consent of instructor.

### NS 680 LABORATORY METHODS IN NUTRITIONAL SCIENCES. (4)

The use of laboratory techniques and instrumentation in the solution of fundamental problems of nutrition. Lecture, one hour; laboratory, six hours. (Same as ASC 680.)

### NS 749 DISSERTATION RESEARCH. (0)

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

### NS 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)

May be repeated indefinitely.

### NS 771 GRADUATE SEMINAR IN NUTRITIONAL SCIENCES. (0-1)

Reports and discussion on recent research and current literature in nutritional sciences. May be repeated to a maximum of eight credits. Prereq: Graduate standing and consent of instructor for non-NS students enrolled for one credit.

### NS 790 RESEARCH IN NUTRITIONAL SCIENCES. (0-6)

Research work involving original investigation. May be repeated to a maximum of 18 credits. Prereq: Consent of graduate advisor.

## NUR Nursing

### NUR 440 WOMEN AND MENTAL HEALTH. (3)

An examination of historical and current factors affecting women's mental health across the life span. Emphasis is placed on identification of hidden biases; treatment and social control issues; and policy implications. Selected mental health problems are examined in-depth. (Same as HSE 440.)

### NUR 510 OLDER WOMEN AND THEIR HEALTH. (3)

This course is designed to increase the awareness and understanding of the relationships among gender, health status and the aging process among older women. Such issues as changing social and cultural mores, public policies and utilization of health care resources are discussed as they impact women. Prereq: Upper division or graduate standing. (Same as HSE 510.)

### NUR 520 SPECIAL TOPICS IN NURSING (Subtitle required). (2-4)

Exploration of selected topics or issues in nursing. Directed by a faculty member with expertise in the topic under study. Lecture, 0-4 hours; laboratory, 0-12 hours per week. May be repeated with different topics to a maximum of nine credits. Prereq: Variable, specified when topic identified.

**NUR 600 ADVANCED NURSING PRACTICE: ROLES AND ISSUES. (3)**

This course provides an opportunity for students to explore theory, concepts, and research related to advanced practice roles and functions; and examine historical and contemporary problems and issues from local, state, regional and national perspectives. Prereq: Admission to graduate program in nursing or consent of instructor.

**NUR 610 CONCEPTS AND THEORIES IN NURSING. (2)**

Study of formulation of concepts and theories in nursing and the testing of existing theories in clinical practice. Prereq: Admission to graduate program in nursing.

**NUR 612 NURSING RESEARCH METHODS. (3)**

Provides for the development of skills needed to understand and evaluate nursing research, to identify problems in nursing which may be studied, and to formulate a study proposal. Prereq: Admission to graduate program in nursing.

**NUR 613 RESEARCH APPLICATIONS IN NURSING. (3)**

This course provides an opportunity for application of selected aspects of the research process to a clinical nursing problem. Students work individually or in small groups. The specific nature of the research effort is negotiated with the faculty advisor and is under the direction of that advisor. A written scholarly report is the final product. May be repeated to a maximum of six credits. Prereq: NUR 612.

**NUR 614 PRACTICUM IN CLINICAL NURSING I. (4)**

Conceptual frameworks, theories, and research findings are applied in clinical practice. The testing of theoretical concepts related to nursing management of clients in an area of clinical concentration is emphasized. Collaborative practice with other disciplines is an expectation. Prereq: Kentucky licensure and relevant post-baccalaureate experience, NUR 610; prereq or coreq: NUR 700, 710, 715 or 720.)

**NUR 615 PRACTICUM IN CLINICAL NURSING II. (5)**

Advanced knowledge, research, leadership, and clinical skills are integrated in managing nursing care with individuals, families, and groups or communities. Evaluation strategies to promote change and resolve problems in nursing care delivery are analyzed. Multidisciplinary strategies to promote and resolve problems in health care delivery are emphasized. Prereq: NUR 614, 701, 711, 716, 717 or 720.

**NUR 619 TEACHING IN NURSING. (3)**

Introduction to basic concepts and skills required to teach nursing in associate degree or baccalaureate nursing programs. This is a course on purposes and processes for writing objectives in nursing, teaching nursing in the classroom and in clinical areas, test item construction, and evaluation of clinical performance. Some attention is given to overall faculty responsibilities and to time management. Prereq: Enrollment in graduate program in nursing.

**NUR 620 PROBLEMS IN CLINICAL NURSING. (2-6)**

This course provides opportunity for the study of nursing problems in particular clinical areas and for the further development of techniques of nursing intervention. Ratio of discussion/laboratory hours will vary according to designated clinical problems. May be repeated to a maximum of 12 credits. Prereq: Admission in graduate program in nursing or consent of instructor.

**NUR 623 PRACTICUM IN CLINICAL NURSING INSTRUCTION. (3)**

Under faculty guidance, students will have practice in the teaching of nursing in settings appropriate to their career goals. Prereq: NUR 619.

**NUR 624 PEDIATRIC HEALTH SCREENING AND HEALTH PROMOTION. (2)**

Using a developmental approach the focus will be on appropriate biopsychosocial health screening for children birth through adolescence and their families. Health promotion education is also a focus of the course. Emphasis is placed on differentiating normal findings from those requiring follow-up or referral. Prereq: Enrollment in the PNP component of the MSN program or consent of instructor.

**NUR 628 POPULATION FOCUSED PRACTICE IN THE COMMUNITY. (2)**

An examination of historical and contemporary public health problems from a population focused approach. Analysis of concepts, theories from public health and community health nursing will be emphasized. Prereq: Admission to graduate program in nursing or consent of instructor.

**NUR 650 ADVANCED PHYSICAL AND HEALTH ASSESSMENT. (2-4)**

A variable credit lecture and laboratory course on the principles and techniques of obtaining a comprehensive health assessment in the context of psychological and physiological developmental parameters. Emphasis is on differentiating between normal and abnormal findings in children, young and middle adults, and the elderly. The pathophysiology of each body system is included for greater distinction between the normal and abnormal. Lecture, one to two hours; laboratory, 3 to 12 hours per week. Prereq: Admission to graduate program in nursing or consent of instructor.

**NUR 651 DIAGNOSTIC LABORATORY PROCEDURES. (2)**

This course provides an overview of common laboratory procedures utilized in the primary care setting. Theory and practice in the principles and techniques of performing selected procedures. Lecture, one hour; laboratory, three hours per week. Prereq: Admission to graduate program in nursing or consent of instructor.

**#NUR 652 PHARMACOLOGIC APPLICATIONS IN PRIMARY CARE. (3)**

This course is designed to prepare nurse practitioners, nurse midwives, and other health professionals for prescribing drugs within their scope of practice. Basic pharmacologic principles and the pharmacologic actions of the major drug classes will be discussed in relation to physiologic systems with emphasis on the application of these agents to primary care, nurse midwifery practice, and other health professions. Prereq: Graduate level pathophysiology course and consent of instructor.

**NUR 654 COMMON HEALTH PROBLEMS OF YOUNG, MIDDLE, AND OLDER ADULTS I. (3)**

Focus is on the primary care nurse practitioner's role in the recognition and management of selected acute, chronic, and emergent health problems related to the basic human needs of the young, middle and older adult commonly encountered in ambulatory care, home health, and nursing home facilities. Problems related to elimination, eye, skin, sight, psychosocial needs, endocrine, cardiovascular, respiratory, and female reproductive systems are presented. Emphasis is on the role of the nurse practitioner as a collaborative member of the health care team. Prereq: NUR 650.

**NUR 655 COMMON HEALTH PROBLEMS OF YOUNG, MIDDLE, AND OLDER ADULTS II. (3)**

This is a sequential course to NUR 654 in which there is discussion of additional selected acute, chronic, and emergent health problems related to the basic human needs of adults of all ages managed by the nurse practitioner in ambulatory care settings, home health agencies and nursing home facilities. Emphasis is on analysis of the role of the nurse practitioner as a collaborative member of the health care team. Problems related to minor emergencies, abuse, family planning, pregnancy, hemotologic, gastrointestinal, male genitourinary, and neurologic systems are discussed. Prereq: NUR 650.

**NUR 656 HEALTH PROBLEMS OF THE PEDIATRIC CLIENT. (2)**

Focus is on the primary care nurse practitioner's role in the recognition and management of selected acute, chronic and emergent health problems related to the basic human needs of the pediatric client from birth through adolescence commonly encountered in ambulatory care, home health, and nursing home facilities. Emphasis is on the role of the nurse practitioner as a collaborative member of the health team and as a supportive resource for parents. Prereq: NUR 650.

**NUR 657 HEALTH ISSUES OF THE CHILD AND ADOLESCENT CLIENT. (2)**

The focus is on helping the primary pediatric practitioner assess and manage acute, chronic, developmental, and behavioral health problems of the child and adolescent in primary care. Emphasis is on identification of appropriate assessment and management of problems in collaboration with other health care providers and the use of the nurse practitioner as a resource for families. Prereq: NUR 656.

**NUR 662 CLINICAL NURSING PRACTICE IN EXPANDED ROLES I. (1-4)**

Clinical practicum focusing on assessment of health status of individuals, families, and/or aggregates; identification of needs and planning for care with emphasis on prevention and health maintenance. Laboratory, three to 12 hours per week. May be repeated to a maximum of four credits. Prereq: Kentucky licensure and relevant post-baccalaureate experience; NUR 654; prereq or coreq: NUR 740 or NUR 741.

**NUR 663 MANAGEMENT OF CLINICAL NURSING PRACTICE I. (4)**

Clinical practicum with a management preceptor for the purposes of assessing health care needs of aggregates, designing programs to meet the identified needs, and planning for change. Prereq: Kentucky licensure and relevant post-baccalaureate experience; NUR 730.

**NUR 668 PSYCHOTHERAPEUTICS FOR ADVANCED NURSING PRACTICE. (3)**

This course provides advanced background in psychotherapeutics for psychiatric/mental health nurse practitioners. Psychiatric disorders and their pharmacotherapy are addressed with emphasis on indications for use, mechanisms of action, side effects, pharmacokinetics and nursing management problems. Prereq: Graduate standing in nursing or permission of instructor. (Same as PHR 668.)

**NUR 672 CLINICAL NURSING PRACTICE IN EXPANDED ROLES II. (3-4)**

Second clinical practicum which focuses on continued assessment of health needs of individuals, families, and/or aggregates which emphasizes planning, implementation, monitoring, and evaluation of nursing services. Laboratory, nine to 12 hours per week. Prereq or coreq: NUR 655; 662; 742 or 744.

**NUR 673 MANAGEMENT OF CLINICAL NURSING PRACTICE II. (4)**

In this clinical practicum students will be assigned to a preceptor for the purpose of applying the theoretical content from NUR 731. Students will focus on implementation and monitoring of nursing services and evaluation of the effectiveness of programs in meeting the needs of the population served through the health care agency. Laboratory, 12 hours per week. Prereq: NUR 663; prereq or coreq: NUR 731.

**NUR 682 CLINICAL NURSING PRACTICE IN EXPANDED ROLES III. (3-8)**

Individually arranged in-depth clinical practicum focusing on the development of leadership and clinical management skills and the application, refining, and synthesis of knowledge and skills developed in didactic and clinical courses. May be repeated to a maximum of eight credits. Laboratory, nine to 24 hours per week. Prereq or coreq: NUR 672; coreq: NUR 743, 744, or 745.

**NUR 683 MANAGEMENT OF CLINICAL NURSING PRACTICE III. (3-8)**

Individually arranged in-depth study and practice in executive level nursing management in a health setting for the purpose of synthesizing the knowledge and skills developed through didactic and clinical experiences. Laboratory, nine to 24 hours per week. Prereq: NUR 673.

**NUR 688 MEASUREMENT OF NURSING PHENOMENA. (4)**

This course builds on the conceptual, philosophical, and methodological foundations of NUR 790, 791, and 792. Measurement issues in developing, testing, and applying middle range theory(ies) in nursing practice are discussed. The psychometric purposes of instruments and assessment methods appropriate to the theoretical and conceptual demands of selected frameworks are evaluated. Students plan, implement, and report the results of pilot research related to the dissertation area. Lecture, two hours; laboratory, two hours per week. Prereq: NUR 790, 791, 792.

**NUR 700 BEHAVIORAL RESPONSES TO HEALTH PROBLEMS. (2)**

This course focuses on the concepts and theories that assist in understanding behavioral responses to health problems. Although the focus will be on adults, these concepts and theories may be applied across age groups or clinically defined populations. Of specific interest are human responses influenced by cognitive processing of information related to health, health problems, and health service utilization. Approaches to nursing diagnosis and intervention to support and/or modify these responses to health problems are emphasized within the context of clinical decision-making. Prereq: Admission to graduate program in nursing or consent of instructor.

**NUR 701 BIOLOGICAL RESPONSES TO HEALTH PROBLEMS. (2)**

This course focuses on concepts and theories that assist in the understanding of biological responses of adults to health problems. The course draws on previous knowledge of physiology and pathophysiology and the ability of participants to integrate behavioral and biological phenomena. Approaches to nursing diagnosis and intervention to support and/or modify these responses to health problems are emphasized within the context of clinical decision-making. Prereq: NUR 700.

**NUR 702 BIOLOGICAL PHENOMENA IN ACUTE ILLNESS. (3)**

This course focuses on the biological phenomena of concern to nursing acutely ill patients. Phenomena common to the management of acutely ill, high intensity adults and elders are addressed by students pursuing advanced practice in high intensity environments. Research generated from biological and nursing sciences is applied to the diagnosis, decision analysis, and intervention for acutely ill adults and elders. Prereq or coreq: PGY 412G or equivalent.

**NUR 703 BIOLOGICAL AND BEHAVIORAL PHENOMENA IN CHRONIC ILLNESS. (2)**

This course focuses on the biological and behavioral phenomena of concern to nursing chronically ill patients. Phenomena common to the management of chronically ill adults and elders are addressed by students pursuing advanced practice in high acuity environments. Research generated from biological, behavioral and nursing sciences is applied to the diagnosis, decision analysis, and intervention for chronically ill adults and elders. Prereq: NUR 702.

**NUR 710 ADVANCED PARENT-CHILD NURSING I. (2)**

This seminar focuses on biopsychosocial concepts and theories related to the nursing care of children, adolescents, and their families. Students are expected to become familiar with research findings and literature applicable to parent-child nursing. Coreq: NUR 614.

**NUR 711 ADVANCED PARENT-CHILD NURSING II. (2)**

This seminar focuses upon application of theories, concepts, and research related to clinical decision-making in parent-child nursing. Prereq: NUR 710, NUR 614.

**NUR 715 PERINATAL NURSING: LOW RISK FAMILIES. (2)**

This seminar will focus on diagnosing and treating the biopsychosocial responses of families to the child bearing continuum. Concepts, theories, and research related to low risk mother and infant will be emphasized. Prereq: Admission to graduate program in nursing or consent of instructor.

**NUR 716 PERINATAL NURSING: HIGH RISK MOTHER. (2)**

The physiological, psychological, sociological, and behavioral responses of the high risk mother and family to interruptions during the normal maternity cycle will be explored. Emphasis will be on nursing assessment, diagnosis, interventions and evaluation appropriate to the maternal-fetal responses. Ambulatory and inpatient aspects of care will be investigated. Prereq: NUR 715.

**NUR 717 PERINATAL NURSING: HIGH RISK NEONATE. (2)**

The physiological and behavioral responses of the high risk neonate to interruptions in normal fetal development and transition to extrauterine life will be explored. The psychological and social responses of parents will be examined. Emphasis will be on nursing interventions appropriate to the responses. Prereq: NUR 715.

**NUR 720 ADVANCED PSYCHIATRIC/ MENTAL HEALTH NURSING I. (2)**

Focus is on concepts, theories and research underlying psychiatric/mental health nursing practice. Definitions of mental health and illness, classification models and problems of clinical decision making are explored. Psychological, social and cultural influences on individual coping responses are examined and individual intervention models are introduced. Coreq: NUR 614.

**NUR 721 ADVANCED PSYCHIATRIC/ MENTAL HEALTH NURSING II. (2)**

Major mental health problems affecting individuals, families and communities are studied, and related nursing research problems are identified. Group theory, process and practice models are introduced. Prereq: NUR 720; coreq: NUR 615.

**NUR 730 NURSING MANAGEMENT IN THE ORGANIZATION I. (3)**

The focus of this course will be on strategies for the assessment of health care needs of patient client groups and the development of programs to respond to those needs. Emphasis will be placed on the use of concepts and principles from epidemiology, health planning, clinical nursing science, and management in identifying and generating relevant assessment data and in designing nursing program. Human resource management for program implementation will be emphasized. Prereq: Admission to graduate program in nursing or consent of instructor.

**NUR 731 NURSING MANAGEMENT IN THE ORGANIZATION II. (3)**

This course focuses on strategies for monitoring delivery of care to populations and for evaluating program effectiveness. Issues involved in decision-making related to continuing, altering, or discontinuing services will be considered from a variety of perspectives including organizational theory, change theory, and political dynamics in the community. Emphasis will be placed on the use of systematic strategies in assessing the quality of care and in monitoring the performance and productivity of staff. Attention will be given to budgeting issues, particularly clinically meaningful approaches to deriving costs of nursing services. Prereq: NUR 663.

**NUR 735 FAMILY AND COMMUNITY HEALTH PROMOTION. (3)**

Focus is on concepts, theories, and techniques for assessing families and communities and assisting individuals, families, and groups to maximize their health status. The evaluation of community resources to meet health care needs is emphasized. Research related to the influence of lifestyle, health habits, and coping with developmental and situational crises on health is reviewed. Selected field of observational experiences are included. Prereq: Admission to graduate program in nursing or consent of instructor.

**NUR 737 NURSING CARE MANAGEMENT-RESOURCE MANAGEMENT.****(3)**

In this course, students will learn about the financial contexts within which care management occurs. They will learn methods of cost estimation and cost control in the provision of nursing and health services both within and across health care settings. They will analyze use of ICDM and CPT codes in identifying and costing out nursing services. Students will examine use of the Nursing Minimum Data Set and the Classification of Nursing Interventions as well, in evaluating methods of costing nursing services. Further, students will examine the concept of nursing relative value units and will evaluate methods for establishing and standardizing indices of patient needs for nursing resources. Students will analyze nursing productivity issues in managed care environments. Finally, students will learn techniques for cost-effectiveness analysis and for calculating the net present social value of nursing services. Prereq: Admission to program.

**NUR 738 MODELS AND PROCESSES OF NURSING CARE MANAGEMENT.****(3)**

In this course students will learn the various models of care management and will analyze the advantages and disadvantages of each from the perspective of clients, health care providers, and payors. They will evaluate how each model promotes seamless care delivery for clients and under what conditions each model is most effective. Students will identify the roles and function of nurse care managers within each model and opportunities for further role development. They will analyze criteria for targeting client populations most likely to benefit from nursing care management and will learn methods for multidisciplinary care planning and care monitoring. They will develop and critique critical paths for selected high risk, high volume client groups and will identify methods for negotiating care with clients and other health care providers. Students will identify a wide range of community and inpatient resources available to meet client needs. They will analyze therapeutic nursing interventions to help clients with symptom management, health promotion, and illness prevention. Finally, students will examine and refine their own interpersonal, leadership, and managerial skills to enable effective care coordination, service negotiation, and client counseling. Prereq: NUR 737 or consent of instructor.

**NUR 739 NURSING CARE MANAGEMENT-CLINICAL OUTCOMES AND QUALITY IMPROVEMENT.****(2-3)**

In this variable credit course, students will focus on articulating clinical outcomes for care management and on promoting optimal clinical outcomes. Students will learn methods of measuring clinical outcomes and will analyze issues associated with measuring outcomes that span service settings. Students will learn how to adapt the methods used by the Patient Outcome Research Teams for identifying optimal client outcomes with varying therapeutic interventions. Finally, students taking the course for three credits will learn methods of quality improvement in health care, including variance analysis, process improvement techniques, and how to work with multidisciplinary teams in continuous quality improvement. Prereq: NUR 737 and 738 or NUR 702 and 703.

**NUR 740 NURSE-MIDWIFERY MANAGEMENT: NEONATE.****(2)**

A study of theories, concepts, and research related to the neonate with emphasis on adaptation to extrauterine life and stabilization of the newborn, parameters and methods of assessment, variations in normal, deviations from normal, and physical and emotional needs of the neonate. Focus will be on the theoretical aspects of the nurse-midwifery management of the care for the neonate. Prereq: Enrollment in the Nurse-Midwifery Component.

**NUR 741 NURSE-MIDWIFERY MANAGEMENT: WELL WOMAN.****(2)**

A study of theories, concepts, and research related to well woman health care with emphasis on reproductive health maintenance, sexuality, family planning, variations in normal, deviations from normal, sexual dysfunction, infertility, and unplanned pregnancy. Focus will be on the theoretical aspects of the nurse-midwifery management of care for healthy women throughout the life span. Prereq: Enrollment in the Nurse-Midwifery Component; prereq or coreq: AHE 670 or equivalent.

**NUR 742 NURSE-MIDWIFERY MANAGEMENT: ANTEPARTAL WOMAN.****(2)**

A study of theories, concepts, and research related to the antepartal phase of the maternity cycle. Emphasis will be on the normal pregnant woman, common variations in normal, deviations from normal, fetal development, and enhancement of the pregnant family's childbearing experience through utilization of the teaching-learning theory and principles of anticipatory guidance. Focus will be on the theoretical aspects of the nurse-midwifery management in the care of the pregnant family during the antepartal phase of the maternity cycle. Prereq: NUR 741; coreq: NUR 744.

**NUR 743 NURSE-MIDWIFERY MANAGEMENT: INTRAPARTAL & POSTPARTAL WOMAN.****(2)**

A study of theories, concepts, and research related to the intrapartal and postpartal phases of the maternity cycle. Emphasis will be on the normal aspects during labor, birth, and the postpartum, common variations in normal, deviations from normal, fetal status during labor and the immediate period following birth, and enhancement of the pregnant family's childbirth experience. Focus will be on the theoretical aspects of nurse-midwifery management in the care of the pregnant family during the intrapartal phase and postpartal phase of the maternity cycle. Prereq: NUR 740; prereq or coreq: NUR 742 and NUR 744.

**NUR 744 NURSE-MIDWIFERY MANAGEMENT: WOMAN WITH PROBLEMS.****(2)**

A study of theories, concepts, and research related to complications during the maternity cycle will be explored. Emphasis will be on common variations in normal, and deviations from normal. Focus will be on effects of the complications on the woman, fetus, pregnancy, labor, birth, and family, as well as the effects of pregnancy, labor, and fetus on the complications. The theoretical aspects of nurse-midwifery management will be stressed in relation to the care of women with complications during the maternity cycle. Coreq: NUR 742.

**NUR 745 NURSE-MIDWIFERY PRACTICE ORGANIZATIONS.****(2)**

A study of strategies for the development of nurse-midwifery practice and its relationship within the health care delivery system. Emphasis will be on the historical development of nurse-midwifery practice; structure and function of the American College of Nurse-Midwives and its relationship to practice; interdisciplinary organizations as they pertain to the maternal child health care delivery system; the legal base for nurse-midwifery practice; and the use of organizational, behavioral, and management theories, concepts and principles to design, administer, and evaluate various nurse-midwifery practice alternatives. Prereq: NUR 743.

**NUR 748 MASTER'S THESIS RESEARCH.****(0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**NUR 749 DISSERTATION RESEARCH.****(0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**NUR 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.****(1-6)**

May be repeated to a maximum of 12 hours.

**NUR 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.****(0-12)**

May be repeated indefinitely.

**NUR 776 SPECIAL TOPICS SEMINAR (Subtitle required).****(2-4)**

A seminar on selected topics in nursing, with emphasis on knowledge development and application of research findings to clinical practice. Examples of topics are: computerized health surveillance at home, prevention of drug use in young children, support systems for the mentally ill, rehabilitation of injured farmers. May be repeated to a maximum of eight credits. Prereq: Consent of instructor.

**NUR 778 PROSEMINAR IN CONTEMPORARY HEALTH AND NURSING POLICY ISSUES.****(3)**

A critical analysis of the development of policy related to health and nursing is emphasized. Attention is focused on the formation of a policy strategy to address a major policy issue affecting health care and the discipline of nursing.

**NUR 779 DISSERTATION SEMINAR.****(1-3)**

Review and critique of aspects of the dissertation for students beginning development of a dissertation proposal. May be repeated to a maximum of three credits. Prereq: Must have completed all research course requirements.

**NUR 781 INDEPENDENT STUDY IN NURSING.****(1-3)**

An elective course which gives the student an opportunity to explore a topic of special interest. May be repeated to a maximum of eight credits. Prereq: Admission to graduate program in nursing or consent of instructor.

**NUR 790 KNOWLEDGE DEVELOPMENT IN NURSING. (3)**

This course focuses on the nature of nursing science and on approaches to the development of knowledge for use in nursing practice. Concepts and theories from philosophy of science and methods of theory development are used to critically examine the process of knowledge development in nursing. Emphasis is placed on the role of logical analysis and critical thinking in the development of theory for nursing practice. Prereq: Consent of instructor or enrollment in the doctoral program in nursing.

**NUR 791 QUALITATIVE METHODS IN NURSING RESEARCH. (3)**

Approaches to developing clinical nursing research using qualitative strategies will be the focus of this course. Prereq: NUR 790 or consent of instructor.

**NUR 792 QUANTITATIVE METHODS IN NURSING RESEARCH. (3)**

Approaches to developing clinical nursing research to test clinical hypotheses using quantitative strategies will be the focus of this course. Prereq: NUR 791 or consent of instructor; STA 570 and STA 671 or the equivalents.

**NUR 800 ORIENTATION TO PROFESSIONAL NURSING. (1)**

Provides students with an introduction to nursing as a profession and to student life in the College of Nursing. Focuses on nursing as a unique discipline in a societal context and on the College of Nursing's organizational structure, philosophy, services and program of study. A beginning socialization into the profession of nursing and to the College of Nursing, providing students with opportunities to clarify their own ideas about and expectations of nursing as the career choice. Prereq: College of Nursing major or consent of instructor.

**NUR 821 PROFESSIONAL NURSING I. (5)**

This course is designed to introduce the baccalaureate student to cognitive, interpersonal, and psychomotor nursing skills. Attention will be given to the theoretical and clinical knowledge needed to make sound judgments and perform fundamental nursing activities for clients experiencing health problems with predictable outcomes. Lecture, three hours; laboratory, six hours per week. Prereq: Sophomore status in College of Nursing, ANA 299, NUR 825; coreq: NFS 212.

**NUR 823 PROFESSIONAL NURSING II. (6)**

This course builds and expands on the cognitive, interpersonal, and psychomotor nursing skills introduced in Professional Nursing I. Assessment and psychomotor skills will be integrated providing the student with additional theoretical and clinical knowledge in the performance of nursing activities for clients experiencing health problems with predictable outcomes. Lecture, four hours; laboratory, six hours per week. Prereq: Sophomore status in College of Nursing, ANA 299, NUR 825, NUR 821.

**NUR 824 CLINICAL DECISION MAKING IN PROFESSIONAL NURSING I. (6)**

The focus of this course is methods for making clinical decisions. Emphasis will be on how to collect and utilize data in formulating judgments about patient states and in choosing nursing actions for patients with health problems with predictable outcomes. Lecture, four hours; laboratory, six hours per week. Prereq: Junior standing in the RN-BSN curriculum in the College of Nursing. Prereq or coreq: NUR 831 and NUR 833.

**†NUR 825 BASIC PHYSIOLOGY FOR THE HEALTH SCIENCES.**

**NUR 826 CLINICAL DECISION MAKING IN PROFESSIONAL NURSING II. (6)**

This course emphasizes clinical decision making with clients, families or groups experiencing complex or multiple health problems with unpredictable outcomes. The emphasis is on interpreting and using complex patterns of data in making decisions about patient care. Lecture, four hours; laboratory, six hours per week. Prereq: NUR 824. Prereq or coreq: NUR 835, NUR 837.

**NUR 827 IMPLICATIONS OF DRUG THERAPY FOR NURSES. (3)**

The study of actions and reactions of medications frequently used as therapeutic agents. This course will provide information primarily about drug classifications and prototypical drugs in these classifications. Prereq: Sophomore status; NUR 821, NUR 825, ANA 299.

**NUR 831 BIOLOGICAL CONCEPTS: THREATS TO HUMAN HEALTH. (2)**

This course addresses biological concepts basic to nursing practice. Concepts essential for understanding major health problems which occur across the life span and that are encountered in multiple health care settings are discussed. Prereq: Junior year standing in the College of Nursing; coreq: NUR 832, NUR 834 for non-RN students.

**NUR 832 NURSING CARE OF ADULTS. (5)**

This course provides theoretical and clinical learning experiences in the nursing care of adults. The nursing process is used to diagnose and manage human responses to predictable and, with assistance, unpredictable health problems. Focus will be on clinical decision making in providing nursing care for adults of all ages. Lecture, three hours; laboratory, six hours per week. Prereq: Junior standing in the College of Nursing, NUR 827; coreq: NUR 831, NUR 834, NUR 835.

**NUR 833 EPIDEMIOLOGIC CONCEPTS FOR HEALTH CARE. (2)**

This course is an introduction to epidemiologic concepts and interdisciplinary applications to health care of aggregates; structure of the community as it relates to access and utilization of available resources; structure of the health care system; levels of prevention; levels of care and economic factors affecting health. Field assignments will allow students to explore data sources. Prereq: Junior standing in the College of Nursing; STA 200.

**NUR 834 NURSING CARE OF CHILDREN. (5)**

This course provides theoretical and clinical learning experiences to promote competence in the professional nursing care of child-rearing families. The nursing process is used to identify and treat human responses to actual or potential health problems. The focus is on the development of critical thinking and clinical decision-making skills to reduce stress and promote adaptation of clients and their families. Lecture, three hours; laboratory, six hours per week. Prereq: Junior year standing in the College of Nursing, NUR 827; coreq: NUR 831, NUR 832, NUR 835.

**NUR 835 FAMILY HEALTH CONCEPTS. (2)**

This course provides theoretical perspectives on family functioning throughout the lifespan. The focus will be on the developmental stages of families as influenced by social, cultural, economic, and political forces. Family assessment, promotion of health in families, and resources for referral will be emphasized. Prereq: Junior year standing in the College of Nursing; coreq: NUR 834 and NUR 836.

**NUR 836 MATERNAL-NEONATAL NURSING. (5)**

This course provides theoretical and clinical learning experiences to promote competence in the professional nursing care of child-bearing families. The nursing process is used to facilitate adaptive responses of families to the experience of childbirth. The focus is on the development of critical thinking and clinical decision-making skills to reduce stress and promote health and well-being of clients and their families. Lecture, three hours; laboratory, six hours per week. Prereq: Junior year standing in the College of Nursing.

**NUR 837 MENTAL HEALTH CONCEPTS. (2)**

This course presents concepts which are foundational to psychiatric-mental health nursing and are fundamental to professional nursing practice. Prereq: Junior year standing in the College of Nursing.

**NUR 839 NURSING RESEARCH. (3)**

This course provides a theoretical and methodological basis for applying nursing research to clinical practice. Skills necessary for participating in the use of nursing research are addressed. Legal and ethical ramifications of research are discussed. Prereq: Junior year standing in the College of Nursing; coreq: STA 200.

**NUR 840 PSYCHIATRIC-MENTAL HEALTH NURSING. (5)**

This course provides theoretical and clinical learning experiences in the psychiatric/mental health nursing care of clients (individuals, families, and groups). The focus is on complex psychiatric problems with unpredictable outcomes. Lecture, three hours per week; laboratory, six hours per week. Prereq: Senior standing in the College of Nursing; NUR 837.

**NUR 841 ISSUES IN NURSING. (2)**

This course involves a critical analysis of the emerging issues and problems affecting nursing and their impact on health care. The responsibilities of the individual practitioner and of the professional are emphasized. Prereq: Senior year standing in the College of Nursing or consent of the instructor.

**NUR 842 COMMUNITY HEALTH NURSING. (6)**

Concepts and skills of family and population-based nursing practice are applied using standards of Community Health Nursing. Health promotion and disease prevention are emphasized. Lecture, three hours; laboratory, nine hours per week. Prereq: Senior standing in the College of Nursing; NUR 833.

**NUR 843 NURSING ETHICS. (1)**

A variety of vignettes/case studies will be used to enable students to use decision-making processes to explore viable options to ethical dilemmas confronted in nursing practice. Delineation of facts and principles involved in each case will be prepared by the student in advance of each class in order for them to select a particular stance which they will then be prepared to defend. Prereq: Senior standing in the College of Nursing.

**NUR 844 NURSING CARE OF ADULTS WITH COMPLEX HEALTH PROBLEMS. (5)**

This course integrates theoretical and clinical content through the use of the nursing process in the nursing care of ill adults. Emphasis will be placed on assessment, diagnosis, management, evaluation of human responses to unpredictable health problems with complex care requirements. Students will be responsible for addressing continuity of care between health care settings. Lecture, three hours; laboratory, six hours per week. Prereq: Senior year standing in the College of Nursing; coreq: NUR 846.

**NUR 846 LEADERSHIP/MANAGEMENT IN NURSING. (5)**

This course is designed for the student to demonstrate management and leadership skills as they relate to human and material resource management and clinical decision-making. Lecture, three hours; laboratory, six hours per week. Prereq: Senior standing in the College of Nursing; coreq: NUR 844.

**NUR 882 SPECIAL TOPICS IN NURSING. (1-3)**

Study and analysis of current and topical problems and issues in nursing. Directed by a faculty member with expertise in the topic under study. May be repeated to a maximum of 18 credits. Prereq: Admission to the College of Nursing.

**NUR 895 ELECTIVE STUDY IN NURSING. (1-4)**

An independent study project investigating an area of interest under the guidance of faculty. May encompass library study or patient care utilizing aspects of scientific approach. May be repeated to a maximum of four credits. Prereq: Approval of sponsoring instructor and the assistant dean.

**OBG Obstetrics and Gynecology****OBG 815 FIRST-YEAR ELECTIVE, OBSTETRICS AND GYNECOLOGY. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Obstetrics and Gynecology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**OBG 825 SECOND-YEAR ELECTIVE, OBSTETRICS AND GYNECOLOGY. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Obstetrics and Gynecology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**OBG 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth-year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:****OBG 850 GYNECOLOGIC ONCOLOGY****OBG 851 OBSTETRICS AND GYNECOLOGY PRECEPTORSHIP****OBG 852 OBSTETRICS AND GYNECOLOGY INDEPENDENT STUDY****OBG 854 CLINICAL CLERKSHIP IN OBSTETRICS****OBG 861 OUTPATIENT OBSTETRICS AND GYNECOLOGY****OBG 862 ACTING INTERNSHIP IN REPRODUCTIVE ENDOCRINOLOGY****OBG 863 MATERNAL-FETAL MEDICINE****OBG 890 OFF-SITE OBSTETRICS AND GYNECOLOGY****OBI Oral Biology****OBI 650 ORAL BIOLOGY FOR POSTDOCTORAL DENTAL STUDENTS. (4)**

This seminar course provides a review of selected topics in the biological sciences. Emphasis is placed on the use of current literature for an in-depth study of those aspects of the subject particularly relevant to the practice of dentistry. Prereq: Admission to an advanced education program of the College of Dentistry or consent of instructor.

**OBI 720 MICROBIAL STRUCTURE AND FUNCTION. (4)**

Molecular basis of structure and function in unicellular microbes. Molecular genetic and structural approaches to the analysis of bacterial architecture growth, division, and differentiation. Prereq: Consent of instructor, BCH 501, BCH 502, and BIO 476G or equivalent. (Same as MI 720 and BIO 720.)

**\*OBI 812 DENTAL BIOCHEMISTRY. (6)**

This is a comprehensive course in biochemistry designed to fulfill the specific needs of student dentists. Course content is generally as outlined in the American Association of Dental Schools suggested curriculum guidelines for biochemistry. Part I acquaints students with the chemical constituents of prokaryotic and eukaryotic cells; topics include the chemistry of lipids, carbohydrates, proteins, vitamins and coenzymes, and the nature of enzyme action. Part II integrates the chemical principles learned from Part I with concepts of cell dynamics, structure, function, subcellular organization, and metabolism. Topics include intermediary metabolism, bioenergetics, DNA replication, protein synthesis, and cellular regulatory and control mechanisms. Course content, where possible, is related to current concepts concerning the etiology of oral diseases, their treatment, and prevention to assist student dentists in attaining institutional goals and objectives for clinical competency. Lecture: 96 hours. Prereq: Admission into the College of Dentistry or consent of the course director. (Same as BCH 812.)

**\*OBI 814 PRINCIPLES OF HUMAN PHYSIOLOGY FOR DENTAL STUDENTS. (4)**

This course enables student dentists to understand the basic principles of human physiology, especially as it relates to the practice of dentistry. The introduction of the course presents the basic physiology of cells, conducting and contracting tissues, lining and secretory tissues, and other special tissues. The course focuses on the major physiological systems and presents them at the system, cellular, and molecular levels; and emphasizes those aspects particularly relevant to dentistry - dentin sensitivity, dental and pulpal pain, muscle dysfunction, ischemic and, hypertensive heart disease, oral manifestations of endocrine abnormalities, temperature regulation, calcium-phosphate homeostasis, and the dental mineralized tissues. Upon successful completion of the course, student dentists will be able to rationally and scientifically apply basic cell, tissue, organ, and organ system function to clinical decision-making. Lectures with assigned reading: 68 hours. Prereq: OBI 812 or consent of the course director. (Same as PGY 814.)

**†OBI 816 PRINCIPLES OF MICROBIOLOGY AND IMMUNOLOGY.****†OBI 818 THE PHYSIOLOGY AND PHARMACOLOGY OF MAMMALIAN SYSTEMS I.****\*OBI 822 MICROBIOLOGY, IMMUNOLOGY AND INFECTIOUS DISEASE. (6)**

This course enables student dentists to understand how microorganisms live and infect humans and how humans respond to these infections to preserve health. Part I of the course presents basic microbial structure, function, and genetics; and principles of chemotherapy and drug resistance. Part II covers mammalian host defenses and the molecular basis of immunity. Part III presents the biologic and clinical basis of infectious diseases of all major organ systems including the mouth. The course focuses on the mechanism of pathogenesis and the common features of all forms of parasitism beginning with the encounter of the host with the microbe and ending with the outcome - the host wins, the microbe wins, or they coexist. Dental examples are used where possible so that student dentists will be able to more readily apply concepts to the diagnosis, therapy, and prevention of infectious diseases of the mouth and contiguous tissues that they encounter later in the curriculum and in their practice of dentistry. Lecture: 103 hours. Prereq: ANA 530, ANA 532, ANA 534, OBI 812, OBI 814 or consent of course director.

**†OBI 824 THE PHYSIOLOGY AND PHARMACOLOGY OF MAMMALIAN SYSTEMS II.****\*OBI 826 DENTAL PHARMACOLOGY. (5)**

This course is designed to give student dentists a basic knowledge and understanding of pharmacology, specifically as it relates to dentistry. This course begins with presentations regarding the basic principles of drug action with respect to absorption, distribution, metabolism and excretion. The pharmacology of specific drug groups including autonomic, local anesthetic, antibiotic, plaque control, analgesic, antipsychotic, antidepressant, anti-anxiety, sedative-hypnotic, anticonvulsant, anti-Parkinson, general anesthetic, respiratory, endocrine, cardiovascular and renal pharmacology will be covered. Dental examples are used where possible so that dental students will be prepared to apply pharmacologic knowledge to the analysis of patients' histories and to the subsequent treatment of these patients with pharmacologic agents. Lecture: 88 hours. Prereq: OBI 812 and OBI 814.

**#OBI 840 CLINICAL DENTAL PHARMACOLOGY. (1)**

This course will reinforce to fourth year dental students the principles of basic and applied pharmacology enabling them to evaluate and manage patients with systemic and oral diseases. The course will be given before the Dental National Board Examination. This should help the students review for the pharmacology portion of the examination. Advances in drug therapy that have occurred since the basic pharmacology courses will be discussed. The course will be presented in both lecture and case presentation format to help the students understand and recognize the importance of pharmacologic agents in the management of their patients. Lecture: 16 hours. Prereq: OBI 812, OBI 814, OBI 822, OBI 826, CDS 821 CDS 831, and ODM 831. (Same as PHA 840.)

**OBI 850 ORAL BIOLOGY ELECTIVE. (1-10)**

Elective courses offered by the Department of Oral Biology provide opportunities for further study of or experience in various aspects of oral biology. Topics may include seminars in new developments in the basic sciences, basic research in the laboratory, and the development of a particular biological topic of mutual interest to the student and faculty member. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks of laboratory research. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

## ODM Oral Diagnosis and Oral Medicine

### ODM 820 ORAL RADIOLOGY. (1)

This course is designed to achieve proficiency in the interpretation of intraoral and extraoral dental radiographs. Also pedodontic, panoramic and occlusal techniques and interpretations are reviewed. Principles of image formation, radiation biology, and special radiographic procedures for the dentist are included. Lecture/seminar, 29 hours. Prereq: CDS 811 or consent of course director.

### ODM 821 CLINICAL ORAL DIAGNOSIS I. (1)

This course consists of two components: 1) examination, diagnosis, and treatment planning for patients assigned to dental students in general clinics; and 2) an emergency clinic assignment in which the students will diagnose and treat patients with acute oral problems. Clinic, 30 hours. Prereq: CDS 811; Coreq: CDS 824.

### ODM 830 MANAGEMENT OF THE MEDICALLY COMPROMISED DENTAL PATIENT. (1)

This course covers a variety of common medical disorders which may be encountered in dental patients. General descriptions, pathophysiology, signs and symptoms, and current medical treatment for each disorder are included as well as detailed management guidelines for dental care. Lecture/self instruction, 25 hours. Prereq: OPT 820 or consent of course director.

### ODM 831 CLINICAL ORAL DIAGNOSIS II. (1)

This course is a continuation of ODM 821 and also consists of two components: 1) examination, diagnosis and treatment planning for patients assigned to dental students in general clinics; and 2) emergency clinic assignments in which the students will diagnose and treat patients with acute oral problems. Clinic, 40 hours. Prereq: ODM 821; coreq: CDS 832.

### ODM 841 CLINICAL ORAL DIAGNOSIS III. (1)

This course is a continuation of ODM 831 and also consists of two components: (1) examination, diagnosis and treatment planning for patients assigned to dental students in general clinics; and (2) emergency clinic assignments in which the students will diagnose and treat patients with acute oral problems. Clinic, 40 hours. Prereq: ODM 830 and ODM 831.

### ODM 850 ORAL DIAGNOSIS ELECTIVE. (1-10)

Elective courses offered by the Department of Oral Diagnosis and Oral Medicine provide opportunities for further study of or experience in various aspects of oral diagnosis and medicine. Topics may include extraoral radiology, advanced X-ray technique, oral medicine, and clinical laboratory experience. Hours variable ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

## OFP Oral Health Practice/ Orofacial Pain Center

### OFP 634 CURRENT CONCEPTS IN TEMPOROMANDIBULAR DISORDERS. (3)

This course provides the student with information on the anatomy, physiology and function of the masticatory system. The etiology, diagnosis and treatment of temporomandibular disorders will be emphasized. Lecture, 41 hours; laboratory, 15 hours per semester. Prereq: Acceptance into the College of Dentistry M.S. Program and/or consent of the College of Dentistry's Director of Graduate Studies and the course director.

### OFP 636 CLINICAL MANAGEMENT OF TEMPOROMANDIBULAR DISORDERS. (3)

This course provides the student with clinical experience in the diagnosis and management of temporomandibular disorders. The student will provide treatment for patients referred to the Orofacial Pain Center under the supervision of the course director. Clinic, 144 hours. Prereq: Acceptance into the College of Dentistry M.S. Program and/or consent of the College's Director of Graduate Studies and the course director.

### OFP 700 OROFACIAL PAIN TREATMENT PLANNING SEMINAR. (2)

This course will provide the student with experience in diagnosing and treatment planning various orofacial pain patients. Lecture: 32 hours per year or 16 hours per semester. Prereq: Acceptance into the College of Dentistry M.S. Program and/or consent of the College's Director of Graduate Studies and the course director.

### OFP 734 CURRENT CONCEPTS IN OROFACIAL PAIN. (3)

This course provides the students with information on non-masticatory orofacial pain problems. The etiology and differential diagnosis of head and neck pain will be emphasized. The student will learn the dentist's role in the management and/or referral of complex facial pain problems. Prereq: OFP 634 and OFP 636.

### OFP 736 CLINICAL MANAGEMENT OF OROFACIAL PAIN. (3)

This course provides the student with clinical experience in the diagnosis and management of complex orofacial pain problems. The student will provide treatment for patients referred to the Orofacial Pain Center under the supervision of the course director. Clinic, 144 hours. Prereq: OFP 634 and OFP 636.

## OHP Oral Health Practice

### OHP 850 INDEPENDENT WORK IN ORAL HEALTH PRACTICE. (1-3)

An elective course offered by the department of Oral Health Practice. Students may work on individual projects in one or more of the disciplines encompassed by this department under the direction of a faculty member. The work should involve independent laboratory or clinical research and include supporting literature searches. The end result should be either a table clinic presentation or a paper suitable for publication. The minimum number of hours to be spent on the project and the means of evaluation will be decided before beginning the project. May be repeated to a maximum of 12 credits. Prereq: Specific course prerequisites and year in dental school will depend on the nature of the proposed project; consent of instructor.

## OHS Oral Health Science

### OHS 850 INDEPENDENT WORK IN ORAL HEALTH SCIENCE. (1-3)

An elective course offered by the department of Oral Health Science. Students may work on individual projects in one or more of the disciplines encompassed by this department under the direction of a faculty member. The work should involve independent laboratory or clinical research and include supporting literature searches. The end result should be either a table clinic presentation or a paper suitable for publication. The minimum number of hours to be spent on the project and the means of evaluation will be decided before beginning the project. May be repeated to a maximum of 12 credits. Prereq: Specific course prerequisites and year in dental school will depend on the nature of the proposed project; consent of instructor.

## OPH Ophthalmology

### OPH 815 FIRST-YEAR ELECTIVE, OPHTHALMOLOGY. (1-3)

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Ophthalmology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

### OPH 825 SECOND-YEAR ELECTIVE, OPHTHALMOLOGY. (1-4)

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Ophthalmology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

### OPH 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

#### Approved electives:

OPH 850 CLINICAL CLERKSHIP IN OPHTHALMOLOGY

OPH 852 ADVANCED CLINICAL CLERKSHIP IN OPHTHALMOLOGY

OPH 890 OPHTHALMOLOGY OFF-SITE



**OPT Oral Pathology**

**OPT 651 GRADUATE ORAL PATHOLOGY. (3)**  
Seminar course in advanced oral pathology. Prereq: Dental degree and enrollment in a graduate program of the College of Dentistry, or consent of instructor.

**OPT 820 GENERAL PATHOLOGY FOR DENTAL STUDENTS. (2)**  
This is a basic course covering the principles of general pathology and the common disorders affecting the major organ systems. Emphasis is placed on cell damage, inflammation, neoplasia, immunology and systemic diseases that affect dental patient management. Lecture, 43 hours. Prereq: Enrollment in the College of Dentistry, ANA 530 and ANA 532; or consent of course director.

**OPT 830 ORAL PATHOLOGY I. (2)**  
This is a comprehensive lecture course on oral and paraoral diseases. The course deals mainly with the clinical aspects of oral disease, with emphasis on clinical and/or radiographic appearance, etiology, management and prognosis. Lecture, 41 hours. Prereq: OPT 820 or consent of course director.

**OPT 832 ORAL PATHOLOGY II. (1)**  
This course teaches the dental student an effective approach to patients with oral lesions. It will stress the following: development of a reasonable differential diagnosis list, procedures to be used in obtaining a definitive diagnosis, management of the patient after a diagnosis has been made, and treatment if indicated. Attendance at one lecture and one session of Head and Neck Oncology Clinic is included in the course. Seminar, 26 hours; clinic, three hours. Prereq: OPT 830.

**OPT 840 ORAL PATHOLOGY III. (1)**  
This is an advanced course in oral pathology in which various diseases and abnormal conditions of the head, neck, and oral cavity are presented. The pertinent information on several selected cases will be on display for a week each and then followed by a lecture/discussion period for the development of a differential diagnosis, establishment of a definitive diagnosis, and discussion of treatment and prognosis. Attendance at one lecture and one session of Head and Neck Oncology Clinic is included in the course. Lecture, 17 hours; clinic, three hours. Prereq: OPT 832.

**OPT 850 ORAL PATHOLOGY ELECTIVE. (1-10)**  
Elective courses offered by the Department of Oral Pathology provide opportunities for further study of or experience in various aspects of oral pathology. Topics may include principles of clinical and histologic diagnosis, the management of patients with oral disease, and discussions of specific oral diseases. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

**OR Operations Research**

**\*OR 515 MATHEMATICAL PROGRAMMING AND EXTENSIONS. (3)**  
Mathematical and computational aspects of linear programming, large scale structures, quadratic programming, complementary pivoting, introduction to nonlinear programming. Applications to engineering and economics. Additional topics selected in geometric programming, stochastic programming. Prereq: A course in linear algebra or consent of instructor.

**OR 524 PROBABILITY. (3)**  
Sample space, random variables, distribution functions, conditional probability and independence, expectation, combinatorial analysis, generating functions, convergence of random variables, characteristic functions, laws of large numbers, central limit theorem and its applications. Prereq: MA 432G or 471G or consent of instructor. (Same as STA 524.)

**OR 525 INTRODUCTORY STATISTICAL INFERENCE. (3)**  
Simple random sampling, statistics and their sampling distributions, sampling distributions for normal populations; concepts of loss and risk functions. Bayes and minimax inference procedures; point and interval estimation; hypothesis testing; introduction to nonparametric tests; regression and correlation. Prereq: STA 320 or STA 524 or STA 424G. (Same as STA 525.)

**\*OR 616 NUMERICAL TECHNIQUES FOR NONLINEAR OPTIMIZATION. (3)**  
Unconstrained optimization, Kuhn-Tucker conditions for nonlinear programs (constrained optimization). Solutions procedures: methods of feasible directions, penalty methods, approximation methods, the method of generalized Lagrangians. Discrete optimal control (dynamic formulation). Solutions methods for control problems: decomposition and structured problems. Prereq: MA 515 or consent of instructor.

**\*OR 617 MARKOVIAN DECISION PROBLEMS. (3)**  
Control of discrete-time Markov processes by dynamic programming inventory theory. Computational approaches to control of Markov chains. State space methods: modeling of engineering and economic systems by linear stochastic difference equations. The discrete-time matrix Riccati equations, Kalman filtering. Optimal control of linear stochastic difference equations with complete or incomplete state information and with quadratic cost criterion. Prereq: STA 624.

**\*OR 618 COMBINATORICS AND NETWORK. (3)**  
Graphs, networks, min flow-max cut theorem and applications; transportation problems, shortest route algorithms, critical path analysis, multi-commodity networks, covering and packing problems; integer programming, branch-and-bounding techniques, cutting plane algorithms, computational complexity. Prereq: MA 515; can be taken concurrently with MA 515.

**\*OR 619 PROBLEMS SEMINAR IN OPERATIONS RESEARCH. (3)**  
In this course the student is exposed to the art of applying the tools of operations research to "real world" problems. The seminar is generally conducted by a group of faculty members from the various disciplines to which operations research is applicable. Prereq: MA 617 and STA 525 or consent of instructor.

**OR 624 APPLIED STOCHASTIC PROCESSES. (3)**  
Definition and classification of stochastic processes, renewal theory and applications, Markov chains, continuous time Markov chains, queuing theory, epidemic processes, Gaussian processes. Prereq: STA 524 or consent of instructor. (Same as STA 624.)

**\*OR 674 HEURISTIC ALGORITHMS. (3)**  
Advanced topics in algorithm design emphasizing the application of various heuristics. The course will treat active research topics. These topics include graph algorithms, parallel algorithms, randomization, linear and integer programming, VLSI and geometry problems. Prereq: CS 575 and CS 580.

**ORT Orthodontics**

**ORT 610 CRANIO-FACIAL FORM. (3)**  
Applied radiographic anatomy for graduate students in dentistry. Prereq: Admission to graduate dental programs; D.D.S. or D.M.D. degree.

**ORT 620 ORAL-PHARYNGEAL FUNCTION, PART I. (2)**  
Basic and applied physiology for graduate students in dentistry. Class, two and one-half hours. Prereq: Admission to a graduate program of the College of Dentistry; D.D.S. or D.M.D. degree.

**ORT 621 ORAL-PHARYNGEAL FUNCTION, PART II. (2)**  
A continuation of ORT 620, emphasizing speech physiology and language development. Lecture, two and one-half hours. Prereq: Admission to a graduate program of the College of Dentistry; D.D.S. or D.M.D. degree.

**ORT 660 ORTHODONTIC DIAGNOSIS. (1)**  
This course emphasizes the principles of data collection and diagnosis for planning comprehensive orthodontic treatment. Lecture, 24 hours. May be repeated to a maximum of two credits. Prereq: Admission to a postdoctoral program of the College of Dentistry.

**ORT 661 ORTHODONTIC SEMINAR-CLINIC. (3)**  
Seminar, laboratory and clinical instruction in orthodontic theory and practice. Lecture, three hours; laboratory, 15 hours. May be repeated to a maximum of 12 credits. Prereq: ORT 660.

**ORT 662 ORTHODONTIC TECHNIQUE. (3)**  
In this technique course, management of orthodontic apparatuses, sequence of treatment, and mechanics in comprehensive orthodontic therapy are covered. Laboratory, 100 hours. May be repeated to a maximum of six credits. Prereq: Admission to a postdoctoral program of the College of Dentistry.

**ORT 664 BIOMECHANICS. (1)**  
Biological reactions of the periodontal and craniofacial structures during orthodontic treatment, as well as theoretical mechanical principles of tooth movement are taught in this course. Lecture, 22 hours. May be repeated to a maximum of two credits. Prereq: Admission to a postdoctoral program in the College of Dentistry.

**ORT 710 MANAGEMENT OF COMPLEX OROFACIAL DEFORMITIES.**

(1)

Seminar discussions of techniques in orthodontic problem solving and planning treatment for patients with orofacial deformities refractory to either orthodontic therapy or oral surgery but which are resolvable by utilizing combinations of orthodontic and oral surgical therapies. Lecture, one hour per week; laboratory, one hour per week. Prereq: ORT 660 or permission of instructor.

**ORT 748 MASTER'S THESIS RESEARCH.**

(0)

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**ORT 768 RESIDENCE CREDIT FOR MASTER'S DEGREE.**

(1-6)

Maximum of nine weeks residence credit. Prereq: Admission to the orthodontic graduate program of the College of Dentistry or consent of instructor.

**ORT 770 ORTHODONTIC SEMINAR.**

(1)

Seminar in orthodontic theory and practice for advanced graduate and postdoctoral students in orthodontics. May be repeated to a maximum of six credits. Lecture, three hours. Prereq: Admission to the Orthodontics Graduate Program and consent of course director.

**ORT 790 RESEARCH IN ORTHODONTICS.**

(1-5)

Research in orthodontics. May be repeated to a maximum of five credits. Prereq: Admission to the orthodontic graduate program of the College of Dentistry; special permission.

**ORT 822 ORTHODONTICS I.**

(3)

This course concerns the development of knowledge and skills needed to conduct a thorough orthodontic diagnosis and to plan orthodontic therapy. Lectures are oriented to data base collection, analysis and interpretation. Laboratory exercises provide opportunity to develop skills in analysis of facial proportions, analysis of diagnostic dental casts, cephalometric tracings, formulating a prioritized problem list and development of long-term and short-term treatment goals. A clinical experience is provided to collect records in a child patient. Seminar discussions are provided to discuss and review the data base. Lecture, 12 hours; laboratory, 19 hours; seminar, 18 hours; clinic, four hours. Prereq: Second year standing in College of Dentistry, CDS 812.

**ORT 830 ORTHODONTICS II.**

(1)

This course concerns the teaching of preclinical orthodontic technique and theory. The course is designed to give the student a basic understanding of the skills required to fabricate fixed and removable appliances that are typically indicated for limited tooth movement in interceptive orthodontics and adjunctive orthodontic treatment in a general practice setting. Lecture, 14 hours; laboratory, 28 hours. Prereq: CDS 812, ORT 822.

**ORT 841 CLINICAL ORTHODONTICS.**

(1)

This clinical course requires the students to analyze and diagnose the present and developing occlusal disharmonies in their assigned patients and to provide therapy for those patients who need tooth movements judged to be within the scope of the general practice of dentistry. Clinic, 50 hours. Prereq: ORT 820 and consent of course director.

**ORT 850 ORTHODONTIC ELECTIVE.**

(1-10)

Elective courses offered by the Department of Orthodontics provide opportunities for further study of or experience in various aspects of orthodontics. Topics may include principles of comprehensive orthodontic treatment, types of orthodontic appliances, and methods of correcting facial skeletal problems. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

**OSG**

**Oral and Maxillofacial Surgery**

**OSG 651 ANATOMICAL RELATIONSHIPS IN SURGERY.**

(1)

A seminar course for dental graduate students in areas other than surgery, emphasizing anatomical and surgical principles applicable to all dental specialties. Prereq: Admission to graduate or post-doctoral programs of College of Dentistry; D.D.S. or D.M.D. degree.

**OSG 820 ORAL SURGERY I.**

(1)

The general objectives of this course are to teach the student the significance of a history and physical examination, how to identify and use basic oral surgery instruments, how to perform basic oral surgical techniques including the removal of teeth and preparation of the mouth for dentures. Lecture, 20 hours. Prereq: CDS 811 or consent of course director.

**OSG 830 ORAL SURGERY II.**

(1)

This course is an overview of the specialty of oral surgery. The student is introduced to the surgical management of congenital and acquired abnormalities of the oral structures and associated parts. Management of odontogenic infection, cysts and tumors is presented, as well as the role of the dentist in the care of head and neck cancer patients. The diagnosis and management of facial fractures also are presented, particularly as they relate to the general practitioner. Lecture, 25 hours. Prereq: OSG 820 or consent of course director.

**OSG 831 ORAL SURGERY ROTATION I.**

(1)

This course teaches the management of the ambulatory oral surgical patient. It includes patient evaluation, control of pain and anxiety, performance of minor oral surgical procedures, treatment of acute and chronic oral infections and of complications associated with oral surgery, and the use of the problem-oriented record. Slide-text programs and reading assignments supplement the outpatient clinical experience. Clinic, 48 hours. Prereq: CDS 821 and OSG 820 or consent of course director.

**OSG 841 ORAL SURGERY ROTATION II.**

(2)

In this course students learn the management of oral surgical patients in a hospital. It consists of a full-time rotation on the oral surgery hospital service, including standing in-hospital night call with the oral surgery house staff. Students assist in patient care and perform procedures such as exodontia and biopsy. Oral surgical management of comprehensive care patients in the outpatient clinic is also included. Clinic, two weeks. Prereq: OSG 830 and OSG 831.

**OSG 850 ORAL SURGERY ELECTIVE.**

(1-10)

Elective courses offered by the Department of Oral Surgery provide opportunities for further study of or experience in various aspects of oral surgery. Topics may include hospitalized and ambulatory patient management, emergency care, operating room experience, pain and anxiety control, and surgical technique. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

## PA Public Administration

### PA 621 QUANTITATIVE METHODS OF RESEARCH. (3)

A survey of behavioral science research methods for the public administrator. Emphasis is placed upon problem selection and identification, research design, and data analytic techniques. Prereq: MPA or MHA program status; prereq or concur: completion of MPA or MHA computer skills program requirement. (Same as HA 621.)

### PA 622 PUBLIC PROGRAM EVALUATION. (3)

This course is designed to provide students with the conceptual and analytical tools to evaluate the effectiveness of public programs and policies. The focus will be on program monitoring and evaluation. Of particular concern will be program process and outcome measurement; quasi-experimental design; multiple regression analysis; and analysis of variance models. Prereq: PA 621.

### \*PA 623 DECISION ANALYSIS. (3)

An introduction to organizational decision making under conditions of uncertainty, risk, and certainty. Concepts of analysis from the areas of economics, mathematics, and statistics will be utilized in terms of administrative decision making in public administration. Prereq: PA 621. (Same as HA 623.)

### PA 625 PUBLIC MANAGEMENT COMPUTER APPLICATIONS. (3)

A general introduction to the computer, including an emphasis on usage of PL/I, specific and generic computer packages, design and implementation of large scale information systems, the concept of the database and public sector computer issues. Prereq: MPA program status or consent of instructor.

### PA 628 PERSONNEL MANAGEMENT IN THE PUBLIC SECTOR. (3)

The course will present an overview of career development, human resource planning, staffing, training and development in the public sector. Prereq: MPA program status; consent of instructor.

### PA 631 PUBLIC FINANCIAL MANAGEMENT. (3)

An analysis of budget structure and process; revenue structure and administration; and public capital acquisition and debt management. This course emphasizes an applied focus and comparative analysis of alternative budget, revenue, and debt management structures and strategies. Prereq: MPA program status; prereq or concur: completion of MPA or MHA computer skills program requirement.

### PA 632 PUBLIC FUNDS MANAGEMENT. (3)

A study of the management of public funds including the accumulation, management and investment of such funds and the accounting for those transactions. It will also include topics such as fund accounting, cash forecasting, cash management practices and public funds investment strategies. Prereq: MPA or MHA program status; prereq or concur: completion of MPA or MHA computer skills program requirement. (Same as HA 632.)

### PA 636 HEALTH ECONOMICS. (3)

This course applies general theoretical principles of economics to the health care sector. The basic approach is to recognize the importance of scarcity and incentives, allowing for differences peculiar to health. The demand and supply of health and medical care are examined as they involve physicians, nurses and hospitals. The competitiveness of their markets, health insurance and the role of government are explored. Special topics include regulation and planning, benefit-cost analysis, and reform health plans. Prereq: PA 652, HA 601, HA 621, MHA or MPA program status. (Same as ECO/HA 636.)

### PA 637 HEALTH FINANCE. (3)

This course applies general principles of finance to the financial management of health care institutions. The major financial incentives which dictate how health care is delivered are studied and proposals to change these incentives are explored. Prereq: MHA/MPA program status and HA 601, HA 621, PA 623, HA 635. (Same as FIN/HA 637.)

### PA 639 MANAGEMENT CONTROL SYSTEMS IN NON-PROFIT ORGANIZATIONS. (3)

This course is designed to introduce the concept of management control systems in non-profit organizations. The focus of management control is on using resources effectively and efficiently in accomplishing the organizational objectives. Cases covering the spectrum of governmental and non-profit organizational settings will be used to stress the basic concepts and illustrate management techniques that could be used effectively to help accomplish the objectives of the organization. The use of the accounting system database will be analyzed in terms of strengths and weaknesses in designing and implementing an effective management control system.

### PA 641 POLITICAL ENVIRONMENT OF PUBLIC ORGANIZATIONS. (3)

A study of those aspects of political and legal systems that particularly affect the administration of public agencies. Emphasis on party systems, legislative and executive processes, administrative law, and judicial review of administration. Prereq: MPA program status.

### PA 642 PUBLIC ORGANIZATION THEORY AND BEHAVIOR. (3)

A course which examines the interaction of both external and internal resources and constraints upon the administrative decision processes in a number of public organizational settings. The objective is an understanding of the practice of administration in public organizations. Prereq: MPA or MHA program status and HA 601. (Same as HA 642.)

### PA 651 THE POLICY PROCESS. (3)

Broad-based course in public policy formulation and social planning. Emphasis is on the parameters of policy formulation as well as the social planning and impact variables. Both policy processes and relevant content areas will be stressed. Prereq: MPA program status.

### PA 652 PUBLIC POLICY ECONOMICS. (3)

Principles and practices of economical resource management in the governmental sector: tax and expenditure types, intergovernmental fiscal cooperation, debt financing, budgeting and financial planning. Prereq: MPA or MHA program status and HA 601 and HA 621. (Same as ECO/HA 652.)

### #PA 653 LOCAL ECONOMIC DEVELOPMENT. (3)

The course develops the capacity to employ the theories, practices and philosophies of economic development as applied to local areas. The primary geographic focus of the course is the rural south-east of the United States, but examples will be drawn from rural areas in other developed countries. Prereq: Graduate status in agricultural economics, public administration, economics, or consent of instructor. (Same as AEC 653.)

### PA 656 HEALTH PROGRAM EVALUATION. (3)

A study of the tools necessary for planning and evaluating health programs: planning systems, needs assessment methodologies, data analysis skills, the epidemiologic method, effectiveness and efficiency evaluation. An overview of trends and requirements leading to increased emphasis on planning and program accountability. Prereq: MHA/MPA program status, HA 601, HA 621, PA 623, and HA 635. (Same as HA 656.)

### PA 671 OVERVIEW OF THE HEALTH CARE DELIVERY SYSTEM. (3)

An introduction to the health care delivery system in the United States, including its composition, functioning, the interrelationships of organizations and professional groups within the system in various settings, health care terminology, and major problems and issues in the delivery of health services. Prereq: MHA/MPA program status. (Same as HA/HSM 601.)

### PA 673 HEALTH POLICY DEVELOPMENT. (3)

An analysis of the development and implementation of health policy on a national, state, local and organizational level. The course will focus on issue and policy analysis, formal and informal processes of policy development and the issues, values and political and community factors affecting policy development and program implementation. Prereq: HA 601 and one of the following courses: HA 611, 621, or 622 and MHA/MPA program status. (Same as HA 673.)

### PA 680 BENEFIT-COST ANALYSIS. (3)

Principles, practices and applications of applied welfare analysis are the content of this course. The basic theory of benefit-cost analysis is presented and the relevance of implementation analysis in policy analysis is established. Prereq: PA 652. (Same as ECO 680.)

### PA 711 INTERNSHIP IN PUBLIC ADMINISTRATION. (3)

Practical field experience in an administrative setting under the direction of an academic and a workplace supervisor. Prereq: MPA program status or consent of instructor.

### PA 722 POLICY AND PROGRAM EVALUATION. (3)

This is a doctoral course concerning policy and program evaluation. Major emphasis will be given to specifying the relationship between evaluation and management functions, evaluation concepts and processes and research methods applicable to evaluation systems and processes. Prereq: MKT 762 or PS 671, or equivalent and Ph.D. program status or consent of instructor.

**PA 727 ENVIRONMENTAL ECONOMICS, REGULATION AND POLICY. (3)**

This course takes a balanced practitioner approach to the problems of the environment and environmental regulation. Efficiency aspects will be developed carefully, so as to provide a background for an extensive coverage of various available alternative policies. Prereq: PA 652 and MPA or economics program status or consent of instructor. (Same as ECO 684.)

**PA 731 FISCAL AND BUDGETARY POLICY. (3)**

This course examines public budgeting and finance in the public sector. Included is an analysis of economic, managerial, and political approaches to public budgeting and finance. These approaches are then used to analyze several current topics in public finance. Prereq: PA 631 or equivalent, and Ph.D. program status or consent of instructor.

**PA 742 THEORY OF PUBLIC ORGANIZATIONS. (3)**

This course provides doctoral students an in-depth knowledge of the various aspects of public organization theory. It will attempt to integrate the work on public organizations which is currently spread over the fields of organization theory and behavior, executive and bureaucratic politics and public choice economics. Prereq: PA 642 or equivalent, and Ph.D. program status or consent of instructor.

**PA 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying examinations.

**PA 751 PUBLIC POLICY FORMULATION AND IMPLEMENTATION. (3)**

The major goals of this course are to examine how public issues become policy proposals, how various proposals are filtered into (or out of) the political process, shaped by political institutions and rules, and the process by which policy is implemented. Prereq: PA 651, or equivalent and Ph.D. program status or consent of instructor.

**PA 752 THE ECONOMICS OF POLICY ANALYSIS. (3)**

This course examines economic approaches to policy analysis. Included is an analysis of the major concepts of economic analysis and their application to a number of policy problems. Prereq: PA 652 or equivalent, and Ph.D. program status or consent of instructor. (Same as ECO 752.)

**PA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**PA 775 SPECIAL TOPICS IN HEALTH ADMINISTRATION. (1-3)**

An analysis of selected issues with special significance for health administration. Prereq: MPA/MHA program status. (Same as HA/HSM 775.)

**PA 785 INDEPENDENT STUDY IN HEALTH ADMINISTRATION. (1-3)**

Supervised individual research on a topic related to health administration selected by the student. May be repeated to a maximum of six credits. Prereq: Consent of instructor. (Same as HA/HSM 785.)

**PA 795 SPECIAL TOPICS IN PUBLIC ADMINISTRATION. (1-3)**

Analysis of specialized topics in public administration of particular interest to practitioners. May be repeated to a maximum of six credits. Prereq: MPA program status or consent of instructor.

**PA 796 INDEPENDENT STUDY IN PUBLIC ADMINISTRATION. (1-3)**

Tutorial course of directed readings, discussion, and analysis of special topics on public administration. May be repeated to a maximum of six credits. Prereq: MPA program status and consent of instructor.

**PAS Physician Assistant Studies**

**PAS 842 CLINICAL PRACTICUM IN PHYSICIAN ASSISTANT STUDIES. (1-6)**

This field assignment offers supervised clinical experience appropriate to the PA student's chosen area of practice. May be repeated to a maximum of 12 credits. Studio, 40 hours per week. Prereq: Enrollment in Physician Assistant Program.

**PAS 850 CLINICAL METHODS. (3)**

This course is designed to provide the general principles of obtaining medical histories and performing physical examinations. Lecture, two hours; laboratory, three hours. Prereq: Enrollment in the Physician Assistant Program.

**PAS 851 INTRODUCTION TO THE PA PROFESSION. (2)**

This course provides an overview of selected health care delivery issues affecting primary care physician assistants. The first half of the semester is devoted to examination of the history and evolution of the PA profession, current PA practice demographics and regulations, principles of quality assurance, risk management, and medical literature evaluation. The second half of the semester is devoted to the study of the ethical dimensions of PA practice. Topics include moral principles and ethical theories, as well as a series of seminar discussions on contemporary ethical issues confronting primary care providers in the 20th and 21st centuries. Prereq: Enrollment in the Physician Assistant Program.

**PAS 853 INTRODUCTION TO HEALTH AND DISEASE. (3)**

An overview of the etiology, distribution, and prevention of basic disease processes. Prereq: Enrollment in Physician Assistant Program.

**PAS 854 CLINICAL LECTURE SERIES. (5)**

A study of common disease entities identifying causes, clinical presentation, diagnostic evaluation, and management. Emphasis is on primary care problems with substantial overlap in the major medical specialties. Prereq: Enrollment in Physician Assistant Program or consent of instructor.

**PAS 855 PSYCHOSOCIAL FACTORS IN PRIMARY HEALTH CARE. (3)**

This course focuses on psychosocial factors which play an important role in the development and treatment of common primary health care problems. Prereq: Admission to Physician Assistant Program.

**PAS 856 PATIENT EVALUATION AND MANAGEMENT. (3)**

A combination of formal presentations, laboratory practice sessions, and supervised patient care experiences involving patient evaluation and management skills. Lecture, one hour; laboratory, five hours per week. Prereq: Enrollment in Physician Assistant Program or consent of instructor.

**\*PAS 857 CLINICAL LABORATORY PROCEDURES. (3)**

This is a survey laboratory course covering common laboratory procedures performed in the primary care clinical setting. Emphasis will be placed on performing and interpreting basic clinical tests. Lecture, two hours; laboratory, three hours per week. Prereq: Enrollment in the Physician Assistant Studies Program.

**PAS 860 FAMILY MEDICINE CLERKSHIP. (5)**

This is a five-week clinical course designed to provide the student physician assistant experience associated with family medicine. The student will have the opportunity to function in either an office-based or clinical setting supervised by a family physician. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 861 PEDIATRIC CLERKSHIP. (5)**

This is a five-week clinical course designed to acquaint the student physician assistant with clinical experience in evaluating pediatric patients. The student will have the opportunity to function within a pediatric practice under medical supervision. Emphasis will be placed on the diagnosis and management of diseases of children. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 862 OBSTETRICS AND GYNECOLOGY CLERKSHIP. (5)**

This is a five-week course designed to provide the student physician assistant experiences in the care of the obstetrical patient involving prenatal labor and delivery and post-partum care under medical supervision. Emphasis will be placed on gynecologic problems commonly seen in primary care settings. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 863 SURGERY CLERKSHIP. (5)**

This is a five-week clinical course that provides the student physician assistant experiences in the management of patients with surgical problems. Emphasis will be placed on the central principles of surgery. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 867 PRECEPTORSHIP I. (4)**

Provides the PA student with the opportunity to integrate his previous year of didactic education and seven months of clinical course work into a functioning system. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 868 PRECEPTORSHIP II. (4)**

This course provides the student with the opportunity to integrate his previous year of didactic education and seven months of clinical course work into a functioning system. This course is a continuation of Preceptorship I. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 869 INTERNAL MEDICINE CLERKSHIP. (5)**

This course provides the students with an experience in evaluating the adult patient with the variety of acute and chronic problems seen in an outpatient setting. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 870 EMERGENCY MEDICINE CLERKSHIP. (5)**

This course provides the student with training in triaging, evaluating and managing patients with a wide variety of complaints seen in an emergency room setting. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 871 PSYCHIATRIC CLERKSHIP. (5)**

This course provides the student with an experience in evaluating psycho-social problems and mental health in an outpatient setting, and observation of the ongoing management of these problems. An assigned textbook and specified reading assignments will be required. In addition, students will be required to successfully pass practical as well as written examinations on course content. Prereq: Successful completion of the junior year and enrollment in the Physician Assistant Program.

**PAS 872 PRACTICAL THERAPEUTICS. (3)**

The purpose of this course is to provide the student with an understanding of the practical use of drugs utilized in primary care. Prereq: Enrollment in the Physician Assistant Program.

**PAS 880 SEMINAR IN PHYSICIAN ASSISTANT STUDIES. (1-3)**

A study of selected topics and contemporary issues regarding the delivery of health care services by physician assistants. May be repeated to a maximum of six credits. Prereq: Enrollment in Physician Assistant Program or consent of instructor.

**PAT Pathology**

**PAT 598 CLINICAL MICROBIOLOGY. (3)**

An introduction to the concepts of clinical microbiology through a survey of the microbial diseases of man using an organ system approach. Prereq: BIO 208 and 209, BIO 476G recommended, CHE 230 or 236, or consent of instructor. (Same as MI 598.)

**PAT 660 CLINICAL TOXICOLOGY AND DRUG MONITORING. (3)**

A lecture and demonstration course designed to acquaint the student with the two main areas of clinical toxicology. The first part of the course will cover the scope of the drug abuse problem in the U.S.A. and detail the emerging role of the clinical toxicologist in dealing with a wide variety of analytical and medicolegal problems associated with illicit drug detection. The second part of the course will cover the rapidly expanding area of clinical toxicology which deals with the monitoring of therapeutic drugs as they relate to the appropriate clinical management of patients. Prereq: BCH 501 and 502, PHA 521 and 522 or equivalent with consent of instructor. (Same as TOX 660.)

**#PAT 665 THE FORENSIC APPLICATION OF DNA TYPING METHODS. (3)**

A lecture course that will give the student comprehensive exposure to the methods of molecular biology that enable the detection and analysis of polymorphic regions in DNA. Emphasis is placed on the application of these techniques to the biological fluids and tissues that are often the byproducts of violent crimes.

**PAT 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:**

**PAT 850 AUTOPSY PATHOLOGY**

**PAT 851 SURGICAL PATHOLOGY**

**PAT 852 LABORATORY MEDICINE**

**PAT 853 NEUROPATHOLOGY**

**PAT 854 LABORATORY MEDICINE-REGIONAL BLOOD CENTER SERVICES**

**PAT 855 RESEARCH IN PATHOLOGY**

**PAT 856 FORENSIC PATHOLOGY**

**PDO Pediatric Dentistry**

**PDO 820 PEDIATRIC DENTISTRY I. (1)**

This course is designed to introduce basic modern concepts in dentistry for children. Emphasis is placed on principles of child behavior management and basic restorative dentistry techniques. Lecture, 20 hours; laboratory, six hours. Prereq: CDS 812 and second-year standing in the College of Dentistry.

**PDO 830 PEDIATRIC DENTISTRY II. (2)**

In this course in dentistry for children, emphasis will be placed on principles of oral surgical procedures, advanced restorative techniques, diagnosis and treatment of traumatic injuries, preventive dentistry and diagnosis and treatment of oral habits and cosmetic dentistry. Lecture, 36 hours. Prereq: PDO 820.

**PDO 831 CLINICAL PEDIATRIC DENTISTRY I. (2)**

An intermediate clinical course designed to teach comprehensive dental treatment for the child patient. Clinic, 75 hours. Coreq: PDO 830.

**PDO 841 CLINICAL PEDIATRIC DENTISTRY II. (4)**

An advanced clinical course designed to provide the student with an opportunity to practice methods of good parent and patient management. Additionally, the student will become more proficient in technical skills. Prereq: PDO 831 or consent of instructor.

**PDO 850 PEDIATRIC DENTISTRY ELECTIVE. (1-10)**

Elective courses offered by the Department of Pediatric Dentistry provide opportunities for further study of or experience in various aspects of pediatric dentistry. Topics may include management of children with developmental/medical conditions in a hospital, dental treatment of handicapped children and of normal children and adolescents, and further discussion of treatment techniques. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

**PED Pediatrics**

**PED 815 FIRST-YEAR ELECTIVE, PEDIATRICS. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Pediatrics. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**PED 825 SECOND-YEAR ELECTIVE, PEDIATRICS. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Pediatrics. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**PED 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**  
 With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:**

- PED 850 NEONATAL INTENSIVE CARE**
- PED 852 PEDIATRIC RENAL-IMMUNOLOGY**
- PED 853 INFECTIOUS DISEASE**
- PED 859 ACTING INTERNSHIP IN PEDIATRICS—UK**
- PED 868 AMBULATORY PEDIATRICS**
- PED 869 PEDIATRIC ALLERGY AND CLINICAL IMMUNOLOGY**
- PED 870 PEDIATRIC CARDIOLOGY**
- PED 871 GENETICS/ENDOCRINOLOGY/METABOLISM**
- PED 875 RESEARCH IN PEDIATRICS**
- PED 876 DYSMORPHOLOGY/GENETICS**
- PED 877 PEDIATRIC DEVELOPMENTAL DISABILITIES**
- PED 878 PEDIATRIC INTENSIVE CARE**
- PED 890 COMMUNITY PEDIATRICS**

**PER Periodontics**

- PER 626 ADVANCED CONCEPTS IN GENERAL DENTISTRY. (1)**  
 This course presents, by seminar, lecture or continuing education courses, advanced concepts in general dentistry that are essential to the clinical practice of periodontics. It includes advanced instruction in orthodontics, periodontal prosthesis, prosthodontics and oral surgery. May be repeated to a maximum of four credits. Prereq: Admission to a postdoctoral program of the College of Dentistry or consent of course director.
- PER 661 MODERN CONCEPTS IN PERIODONTICS. (2)**  
 A seminar course designed to present the present understanding of the etiology of periodontal disease and current techniques for treatment of periodontal problems. Prereq: Admission to graduate program of College of Dentistry; D.D.S. or D.M.D. degree.
- PER 748 MASTER'S THESIS RESEARCH. (0)**  
 Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.
- PER 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
 May be repeated for a total of 12 hours. Prereq: Admission to the Periodontics postdoctoral program and consent of director of graduate studies.
- PER 770 TREATMENT PLANNING SEMINAR. (2)**  
 In this seminar course, graduate students present and discuss diagnosis, prognosis, ideal treatment plans and alternative treatment plans for patients with periodontal disease. Each student gives at least eight case presentations. May be repeated to a maximum of eight credits. Lecture, 40 hours. Prereq: Admission to the Periodontics postdoctoral program or consent of course director.
- PER 772 PERIODONTAL BIOLOGY AND PATHOLOGY. (2)**  
 Seminar discussions, review and evaluation of the literature covering periodontal anatomy, periodontal biology, the pathology of periodontal diseases and etiological factors in periodontal disease. The subject area will be covered in four semesters. May be repeated four times for a maximum of eight credits. Lecture, 40 hours. Prereq: Admission to the Periodontics postdoctoral program or consent of course director.
- PER 774 PERIODONTICS SURGICAL SEMINAR. (1)**  
 In this seminar course participants present, discuss and critique surgical procedures that have been accomplished in the clinic. Reading assignments from the literature augment the clinical discussions and students are encouraged to use the literature to justify their procedures. Cases are presented on a rotating basis. May be repeated to a maximum of four credits. Prereq: Admission to Periodontics postdoctoral program or consent of course director.

**PER 776 PERIODONTAL THERAPY SEMINAR. (1)**  
 This is an advanced series of seminars on the clinical aspects of periodontal therapy. During the course, the students will learn about various modalities of periodontal therapy as presented in the periodontal literature, e.g., mucogingival treatment, implants and curettage. May be repeated to a maximum of two credits. Prereq: Admission to the Periodontics postdoctoral program or consent of course director.

**PER 790 RESEARCH IN PERIODONTICS. (1-3)**  
 This course involves direct student participation in a research project. Projects and theses are approved by the course director and may be clinical, laboratory experimental or related to dental education. Projects may include original or ongoing research within the Department of Periodontics or other departments of the Medical Center. May be repeated to a maximum of six credits. Prereq: Admission to the Periodontics postdoctoral program and consent of the department involved.

**PER 820 PERIODONTICS II. (1)**  
 This course presents the components of the first stages of periodontal therapy. Emphasis is on diagnosis, prognosis, treatment planning and treatment of the periodontally involved patient. The student is also introduced to the principles of periodontal surgery. Lecture, 25 hours; laboratory, two hours. Prereq: PER 810 or consent of course director.

**PER 821 CLINICAL PERIODONTICS II. (2)**  
 This is a course designed to provide the student with clinical experience so that he can obtain a minimal competence in the applications of periodontal procedures. Therapeutic procedures involving initial periodontal therapy will be performed by each student. Clinic, 50 hours. Prereq: PER 811, or consent of instructor.

**PER 830 PERIODONTICS III. (1)**  
 This is a surgically oriented course which presents information necessary for the diagnosis, treatment planning and treatment of surgical cases. The information gained is applied to planning treatment for actual surgical cases. Lecture, 24 hours; laboratory, six hours. Prereq: PER 820 or consent of course director.

**PER 831 CLINICAL PERIODONTICS III. (2)**  
 This is a clinical course which offers the student the opportunity to treat patients with more advanced periodontal disease. Therapeutic procedures will be performed by each student as his patients' needs dictate. Clinic, 50 hours. Prereq: PER 821; corequisite: PER 830; or consent of instructor.

**PER 841 CLINICAL PERIODONTICS IV. (4)**  
 This clinical course is a continuation of PER 831. The student receives further instruction and experience in diagnosing, planning treatment and treating patients with periodontitis and mucogingival problems. Prereq: PER 830 and PER 831, or consent of instructor.

**PER 850 PERIODONTICS ELECTIVE. (1-10)**  
 Elective courses offered by the Department of Periodontics provide opportunities for further study of or experience in various aspects of periodontics. Topics may include treatment planning, diagnosis, treatment and prognosis in periodontal disease; periodontal surgery, including suturing; splinting; referrals, maintenance and prevention. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

**PGY Physiology**

- PGY 206 ELEMENTARY PHYSIOLOGY. (3)**  
 An introductory survey course in basic human physiology. Prereq: One semester of college biology.
- #PGY 207 NURSING COROLLARY IN ELEMENTARY PHYSIOLOGY. (1)**  
 Supplementary section to Elementary Physiology (PGY 206) for nursing students only. Discussions are uniquely designed for the application of basic physiological principles to the practice of nursing. Prereq: ANA 299, Sophomore standing, or consent of instructor.
- PGY 412G PRINCIPLES OF HUMAN PHYSIOLOGY LECTURES. (4)**  
 Intermediate level human physiology course emphasizing applied concepts. Prereq: One year biology or PGY 206.

**PGY 502 PRINCIPLES OF SYSTEMS, CELLULAR AND MOLECULAR PHYSIOLOGY. (5)**

Advanced survey of major mammalian physiological systems at the systems, cellular and molecular level; lectures, assigned reading, advanced texts or monographs, demonstrations and problem oriented study questions. Prereq: One year each, physics, general chemistry; PGY 206 or its equivalent. (Same as BIO 502.)

**PGY 504 INDEPENDENT WORK IN PHYSIOLOGY. (2-4)**

A study of some advanced problems in physiology under the direct supervision of the instructor. Discussion period, one hour; laboratory, four hours. May be repeated to a maximum of eight credits. Prereq: Consent of instructor.

**PGY 522 QUANTITATIVE PHYSIOLOGY. (4)**

Presents principles of biophysics applicable to physiological systems. Mechanical and electrochemical systems are discussed and compared. Applications to neurophysiology, respiratory, cardiovascular, renal and endocrine physiology are given.

**PGY 535 COMPARATIVE NEUROBIOLOGY AND BEHAVIOR. (3)**

The course consists of an introduction to neurophysiology and study of the neural basis of sensory processing and motor patterns. A comparative analysis of the neurobiological basis of behavioral responses will be made, utilizing a broad range of vertebrates and invertebrates. Prereq: BIO 350 or consent of instructor. (Same as BIO 535.)

**PGY 549 COMPARATIVE ENDOCRINOLOGY. (3)**

An introductory and comparative survey of invertebrate and vertebrate endocrine organs and neuroendocrine mechanisms with emphasis on the evolution, chemistry, actions and functions of hormones. Prereq: BIO 350 or consent of instructor. (Same as BIO 549.)

**†PGY 550 AN INTRODUCTION TO INTEGRATIVE THOUGHT.****PGY 560 PATHOPHYSIOLOGY: INTEGRATIVE STUDY IN PHYSIOLOGY AND MEDICINE. (1)**

This course aims at the development of an integrative conception of the human organism, and involves the study of medical case histories. The complex network of physiologic interactions which underlie disease states is investigated. The physiologic bases of health, illness, dying, and death are explored. May be repeated to a maximum of three credits. Prereq: PGY 412G, PGY 502 or consent of instructor.

**\*PGY 590 CELLULAR AND MOLECULAR PHYSIOLOGY. (4)**

This course will focus on the cellular and molecular physiology of inter- and intracellular communication. In particular, it will provide an overview of established and emerging intracellular signaling mechanisms which utilize i) cyclic nucleotides (cAMP; cGMP), ii) calcium (phosphatidylinositol metabolism: cyclic ADP-ribose), iii) transmembrane ion fluxes (voltage- and receptor-operated channels), iv) tyrosine kinases, and v) nuclear transcription factors. The material will be presented in a number of formats including didactic lecture and group discussions of selected readings. Prereq: PGY 412G, PGY 502 or consent of instructor. (Same as MI 590.)

**PGY 601 MAMMALIAN ENDOCRINOLOGY. (3)**

An introduction to the basic anatomy, physiology and biochemistry of endocrine systems with emphasis on mechanisms of hormone synthesis, secretion and action. Lectures and reading assignments will focus on endocrine function in mammalian species, including laboratory animals, humans and livestock. Prereq: BCH 401G and BIO 350 or equivalents. (Same as ASC 601.)

**PGY 602 READINGS IN SYSTEMS, CELLULAR AND MOLECULAR PHYSIOLOGY. (3)**

A critical evaluation at the advanced level of the literature of the major mammalian physiological systems at the organ, cellular and molecular level. The course is intended to be taken with and to complement PGY 502. It includes a critical reading of the primary literature. Prereq: One year each of physics, general chemistry; PGY 206 or equivalent.

**PGY 604 ADVANCED CARDIOVASCULAR PHYSIOLOGY. (3)**

The objective of this course is to examine in-depth the various functions of the cardiovascular system and their proposed mechanisms. Prereq: PGY 502 or consent of instructor.

**PGY 605 PRINCIPLES OF NEUROBIOLOGY. (4)**

The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of neurobiology. Areas covered will include neuronal and glial cell biology, neurotransmitters, signaling mechanisms, neuroanatomy, and neuronal development. The course is designed to provide a brief overview of each of the areas and introduce students to current research questions. The course will consist of lectures and informal presentations in a 'Journal Club' format. The course will be interdisciplinary and will be of interest to graduate students in anatomy, biology, biochemistry, immunology, pharmacy, pharmacology, physiology, psychology and toxicology and to neurology and neurosurgery residents. Prereq: Introductory biochemistry course, or equivalent, and/or consent of instructor. (Same as ANA/BCH/NEU/PHA 605.)

**PGY 606 ADVANCED NEUROPHYSIOLOGY. (3)**

Electrical analysis of nerve fibers and synapse; nerve impulse theories, reflexes, metabolism and central nervous function are considered from the cybernetic viewpoint. Prereq: PGY 502 or consent of instructor.

**PGY 607 HORMONAL CONTROL MECHANISMS (Subtitle required). (3)**

Advanced study of the role of hormones in the physiologic regulation of vertebrate organ systems. One or two specific areas of endocrinology will be selected by the instructor. Emphasis will be placed on critical analysis and discussion of the experimental basis for current theories of the mechanisms whereby hormones modulate physiologic processes. Readings will be taken from the literature. May be repeated to a maximum of six credits. Prereq: PGY 502, PGY 549 or their equivalent.

**PGY 608 ADVANCED RENAL PHYSIOLOGY. (3)**

This course will examine in-depth the physiology and pathophysiology of the renal system, as well as provide an understanding of advanced renal physiological techniques. Prereq: PGY 412G, PGY 502 or consent of instructor.

**PGY 609 ADVANCED RESPIRATORY PHYSIOLOGY. (3)**

This course will examine in-depth the physiology and pathophysiology of the respiratory system. Prereq: PGY 412G, PGY 502 or consent of instructor.

**PGY 610 EXPERIMENTAL PHYSIOLOGY. (4)**

This course will introduce students to the nature of physiological experimentation, and provide an opportunity to gain first-hand experience in conducting experiments which illustrate fundamental physiological concepts. Laboratory, eight hours per week. Prereq: PGY 502 or consent of instructor.

**†PGY 611 ADVANCED MEDICAL PHYSIOLOGY.****PGY 618 MOLECULAR NEUROBIOLOGY. (4)**

This course provides knowledge base and analytical skills in the field of molecular neurobiology. An in-depth introduction to current technologies, their rationale and limitations, will be the focus to address normal brain function and neuropathological conditions. Prereq: BCH 501, 502, NEU 605, or consent of instructor. (Same as ANA/BIO/MI 618.)

**PGY 627 PROSEMINAR IN PHYSIOLOGICAL PSYCHOLOGY. (3)**

An intensive examination of theories, methods of investigation, and current developments in the field of physiological psychology. Prereq: Graduate standing or consent of instructor. (Same as PSY 627.)

**PGY 630 ADVANCED TOPICS IN PHYSIOLOGY. (1-3)**

Contemporary topics in physiology. Course designed to utilize the special research interests of resident and visiting faculty. May be repeated to a maximum of six credits. Prereq: PGY 502 or consent of instructor.

**PGY 638 DEVELOPMENTAL NEUROBIOLOGY. (3)**

An explanation of the processes which contribute to the development of the nervous system. Neurophysiological, cell biological and molecular approaches to cell differentiation, neuronal pathfinding and synapse formation and stabilization will be explored and discussed. Examples will be drawn from both vertebrate and invertebrate preparations. Prereq: BIO 535 or consent of instructor. (Same as ANA/BIO/PSY 638.)

**PGY 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PGY 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**PGY 767 TOPICAL SEMINAR IN BEHAVIORAL NEUROSCIENCE. (3)**

A study of selected topics in behavioral neuroscience with emphasis on recent research and theory. May be repeated to a maximum of nine credits. Prereq: Consent of instructor. This course may be elected to fulfill requirements in the psychology and physiology graduate programs. (Same as PSY 767.)

**PGY 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**PGY 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**PGY 771 PROSEMINAR IN CELL PHYSIOLOGY. (2)**

A comprehensive discussion of topics in cellular physiology and biophysics using advanced texts and readings in the original literature. Includes such topics as biological membranes, transport mechanisms, effects of hormones on membranes. Prereq: Graduate student in physiology and biophysics or consent of Director of Graduate Study.

**PGY 774 GRADUATE SEMINAR IN PHYSIOLOGY. (1)**

**PGY 791 RESEARCH IN PHYSIOLOGY. (1-15)**

May be repeated to a maximum of 15 credits. Prereq: Consent of instructor.

**\*PGY 814 PRINCIPLES OF HUMAN PHYSIOLOGY FOR DENTAL STUDENTS. (4)**

This course enables student dentists to understand the basic principles of human physiology, especially as it relates to the practice of dentistry. The introduction of the course presents the basic physiology of cells, conducting and contracting tissues, lining and secretory tissues, and other special tissues. The course focuses on the major physiological systems and presents them at the system, cellular, and molecular levels; and emphasizes those aspects particularly relevant to dentistry - dentin sensitivity, dental and pulpal pain, muscle dysfunction, ischemic and, hypertensive heart disease, oral manifestations of endocrine abnormalities, temperature regulation, calcium-phosphate homeostasis, and the dental mineralized tissues. Upon successful completion of the course, student dentists will be able to rationally and scientifically apply basic cell, tissue, organ, and organ system function to clinical decision-making. Lectures with assigned reading: 68 hours. Prereq: OBI 812 or consent of the course director. (Same as OBI 814.)

**PGY 815 FIRST-YEAR ELECTIVE, PHYSIOLOGY. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Physiology and Biophysics. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**PGY 825 SECOND-YEAR ELECTIVE, PHYSIOLOGY. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Physiology and Biophysics. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**PGY 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved elective:**

**PGY 850 RESEARCH IN PHYSIOLOGY**

**PHA Pharmacology**

**PHA 522 SYSTEMS PHARMACOLOGY. (3)**

This course is aimed to give a fundamental understanding of the pharmacodynamic action of drugs most commonly used in medical practice. Prereq: PHA 521; consent of instructor.

**PHA 602 NEUROPHARMACOLOGY. (4)**

A study of drugs which modify the function of all parts of the nervous system, including the brain, spinal cord, nerve fibers, the pituitary gland and endocrines as well as an introduction to receptor theory and principles of general pharmacology. Lecture, 77 hours; demonstration, four hours. Prereq: BCH 501 and 502, and PGY 502 and/or consent of faculty.

**PHA 603 PHARMACOLOGY OF ORGANS AND SYSTEMS. (3)**

Discussion of the pharmacodynamic principles underlying the action of cardiovascular, renal, gastrointestinal, and hematologic drugs, as well as drugs used in the treatment of infections. In addition, cancer chemotherapeutic drugs, drugs for treating arteriosclerosis, principles of toxicology and drug metabolism and kinetics are discussed. Lecture, 43 hours. Prereq: BCH 501 and 502, PGY 502, PHA 602 and/or consent of faculty.

**PHA 605 PRINCIPLES OF NEUROBIOLOGY. (4)**

The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of neurobiology. Areas covered will include neuronal and glial cell biology, neurotransmitters, signaling mechanisms, neuroanatomy, and neuronal development. The course is designed to provide a brief overview of each of the areas and introduce students to current research questions. The course will consist of lectures and informal presentations in a 'Journal Club' format. The course will be interdisciplinary and will be of interest to graduate students in anatomy, biology, biochemistry, immunology, pharmacy, pharmacology, physiology, psychology and toxicology and to neurology and neurosurgery residents. Prereq: Introductory biochemistry course, or equivalent, and/or consent of instructor. (Same as ANA/BCH/NEU/PGY 605.)

**PHA 606 MECHANISMS OF NEUROLOGIC DISEASE. (4)**

The objective of this course is to provide graduate students of diverse backgrounds with an introduction and overview of current problems and controversies in neurobiology and clinical neurology. The course will cover a variety of illnesses including epilepsy, neurodegenerative diseases, stroke, psychiatric illness, pain, diseases of immune origin, motor dysfunction and inherited disorders. Prereq: ANA/BCH/NEU/PGY/PHA 605 or consent of instructor. (Same as ANA/NEU 606.)

**PHA 612 QUANTITATIVE PHARMACODYNAMICS: PHARMACOKINETICS. (3)**

Quantitative treatment of dynamics of drug absorption, distribution, metabolism and excretion, including development of both mathematical models and model-independent approaches for describing these processes. Prereq: PHR 802 (or equivalent), MA 114 and consent of instructor. (Same as PHR 612.)

**PHA 621 ADVANCED PHARMACODYNAMICS. (3)**

Small group discussion course for students of the natural sciences who, using drugs as research tools, wish to understand the basis of drug therapy. The principles and mechanism of drug action on biochemical and physiological systems is emphasized. Prereq: Consent of instructor.

**PHA 630 SPECIAL TOPICS IN PHARMACOLOGY. (1-3)**

Detailed examination of current, significant topics in pharmacology such as: contemporary neuroscience methodology, molecular and cellular pharmacodynamics, transmembrane signaling. Course is designed to offer flexibility to students in different tracks, different emphasis in a given year and to utilize the special research interests in resident and visiting investigators. May be repeated to a maximum of six credits. Prereq: Consent of course director.

**PHA 634 PHARMACOLOGY OF CARDIOVASCULAR DRUG THERAPY. (3)**

A discussion of the mechanism of action, dosing theory, toxicity and metabolism of drugs used as therapeutic agents in the treatment of cardiovascular disease. Prereq: Consent of instructor.

**PHA 649 MOLECULAR PHARMACOLOGY. (3)**

The intent of this course is to describe the molecular aspects of a variety of physiological systems that are subject to pharmacological manipulation. Emphasis will be on the molecular genetics, biochemistry, and subcellular organization and biology of these systems, and on the pharmacological techniques used to study these systems. Genetic diseases associated with these systems will also be described. The course will focus on areas of research which represent the forefront of modern pharmacological investigation. Prereq: PHA 522, PGY 502, BCH 501, 502, or consent of instructor. (Same as PHR/TOX 649.)

**PHA 658 ADVANCED NEUROPHARMACOLOGY. (3)**

A study of the general theories of the mode of action of drugs upon nervous tissue and a review of the effects of analgesics, sedatives, hypnotics, anesthetics, tranquilizers, psychotomimetics, analeptics, antidepressants, anti-convulsants and drugs affecting motor dyskinesias upon neurones, synapses and functional components of the central nervous system. Prereq: PGY 412G or equivalent and PHA 522 or equivalent; consent of instructor.

**PHA 663 DRUG METABOLISM AND DISPOSITION. (2)**

Drug metabolism and disposition. Lectures and discussion of the chemistry and biochemistry of drug biotransformation with emphasis on the mixed-function oxidase system. Prereq: BCH 401G or 501, 502 or consent of instructor. (Same as TOX 663.)

**PHA 670 CHEMICAL CARCINOGENESIS. (3)**

Lectures and discussion of the chemical and biochemical reactions of chemical carcinogens and their metabolites. Prereq: CHE 232; PHR 400; or BCH 501, 502. (Same as TOX 670.)



**PHA 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PHA 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**PHA 750 RESEARCH IN PHARMACOLOGY. (1-5)**  
May be repeated to a maximum of 15 credits.

**PHA 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**PHA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

**PHA 770 SEMINAR IN PHARMACOLOGY. (1)**  
May be repeated indefinitely.

**PHA 779 MEMBRANE SCIENCES COLLOQUIUM. (1)**  
Outstanding membrane scientists present their current research on biological and/or synthetic membranes. Students read a pertinent paper by the speaker prior to his/her talk and write a short paper on the talk; especially important is relevance of the main points of the talk to membrane science in general and the student's own research in particular. May be repeated to a maximum of six credits. (Same as BCH/CHE/CME/PHR 779.)

**PHA 815 FIRST-YEAR ELECTIVE, PHARMACOLOGY. (1-3)**  
With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Pharmacology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**PHA 825 SECOND-YEAR ELECTIVE, PHARMACOLOGY. (1-4)**  
With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Pharmacology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**#PHA 840 CLINICAL DENTAL PHARMACOLOGY. (1)**  
This course will reinforce to fourth year dental students the principles of basic and applied pharmacology enabling them to evaluate and manage patients with systemic and oral diseases. The course will be given before the Dental National Board Examination. This should help the students review for the pharmacology portion of the examination. Advances in drug therapy that have occurred since the basic pharmacology courses will be discussed. The course will be presented in both lecture and case presentation format to help the students understand and recognize the importance of pharmacologic agents in the management of their patients. Lecture: 16 hours. Prereq: OBI 812, OBI 814, OBI 822, OBI 826, CDS 821 CDS 831, and ODM 831. (Same as OBI 840.)

**PHA 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**  
With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

## PHI Philosophy

**Note:** Prior to the priority registration period each semester, the Department of Philosophy publishes information on courses (200 level and above) to be offered for the next semester. This information includes details on course topics and materials to be used in each course. Students are encouraged to obtain the information to assist them in course selection.

**PHI 100 INTRODUCTION TO PHILOSOPHY: KNOWLEDGE AND REALITY. (3)**  
An introduction to philosophical studies with emphasis on issues of knowing, reality, and meaning related to human existence.

**PHI 120 INTRODUCTORY LOGIC. (3)**  
A course which treats argumentation, syllogistic, and sentential logic. The focus will be on the use of formal methods in the construction and criticism of actual arguments, the aim being to inculcate standards of good reasoning, e.g., clarity, consistency and validity. Credit is not given to students who already have credit for PHI 320.

**PHI 130 INTRODUCTION TO PHILOSOPHY: MORALITY AND SOCIETY. (3)**  
An introduction to philosophical studies with emphasis on a critical study of principles of moral action and social and political values.

**PHI 251 PHILOSOPHY AND CLASSICAL PHYSICS. (3)**  
An historical introduction to the philosophical background of classical physics as the latter was developed by thinkers like Isaac Newton and James Clerk Maxwell. Concentrating on metaphysics and the philosophy of scientific method, this course includes a study of scientists and philosophers like Aristotle, Copernicus, Galileo, Leibniz, and Faraday. Prereq or concur: PHY 231 or consent of instructor.

**PHI 260 HISTORY OF PHILOSOPHY I: FROM GREEK BEGINNINGS TO THE MIDDLE AGES. (3)**  
An introductory study of the development of Western philosophy from ancient through late medieval times including systematic work in logic, metaphysics, epistemology and ethics by such philosophers as Plato, Aristotle, Augustine and Aquinas.

**PHI 270 HISTORY OF PHILOSOPHY II: FROM THE RENAISSANCE TO THE PRESENT ERA. (3)**  
An introductory study of the development of Western philosophy from early modern to recent times including systematic work in logic, metaphysics, epistemology and ethics by such philosophers as Occam, Descartes, Hume and Kant.

**PHI 300 UNDERGRADUATE SEMINAR. (3)**  
An intensive study of special topics in philosophy with emphasis on current scholarship. The focus may be intradisciplinary or interdisciplinary. Prerequisites appropriate to the specific topic will be listed in the schedule book for each offering. May be repeated to a maximum of six hours.

**PHI 305 HEALTH CARE ETHICS. (3)**  
A consideration of the ethical issues and difficult choices generated or made acute by advances in biology, technology, and medicine. Typical issues include: informed consent, healer-patient relationships, truth telling, confidentiality, problem of birth defects, abortion, placebos and health, allocation of scarce medical resources, genetic research and experimentation, cost containment in health care, accountability of health care professionals, care of the dying, and death.

**PHI 310 PHILOSOPHY OF HUMAN NATURE. (3)**  
A course introducing philosophy at the upper division level which studies various issues involved in analyzing what it means to be human, in the interest of developing a coherent conception of man. Answers will be sought to questions like these: Is there a human nature? What would differentiate the properly human from the nonhuman? What kind of relations tie a human being to environment, society, and history?

**PHI 317 EXISTENTIALIST THOUGHT AND LITERATURE. (3)**  
A survey of existentialism as a literary movement as well as a philosophical one, with emphasis upon their intersection and interaction. The course will trace the emergence of existentialist themes in modern thought and culture, and will analyze and assess the movements' continuing significance.

**PHI 320 SYMBOLIC LOGIC I. (3)**  
A systematic study of sentential logic, elementary quantification, and the logic of identity. The student will acquire specific skills in symbolic methods of analysis which are necessary for further study in logic as well as useful for addressing complex issues in philosophy and other areas.

**PHI 330 PROFESSIONAL ETHICS. (3)**

A study of ethical issues related to professional roles, especially those of physicians and lawyers. Among the topics to be considered are the nature and justification of professional responsibilities and duties; obligations of professions to society; the professional-client relationship and its rights and obligations; enforcement of codes of ethics.

**PHI 333 AGRICULTURAL ETHICS. (3)**

This course examines the moral dilemmas which arise from the production, distribution and consumption of food in modern societies. Various theoretical positions, such as Libertarianism, Utilitarianism, Egalitarianism, are examined. In addition the course will consider how the right of everyone to an adequate diet can be justified as well as what that right implies for public policy decisions.

**PHI 335 THE INDIVIDUAL AND SOCIETY. (3)**

An examination of several incompatible views concerning the relation between the individual and society, including radical individualism and collectivism, as well as more moderate theories. Attention will be given to contemporary as well as classical spokesmen for these views and emphasis will be placed upon relating these theories to contemporary social, cultural, and political issues.

**PHI 337 INTRODUCTION TO LEGAL PHILOSOPHY. (3)**

A general introduction to basic concepts, institutions, and mechanisms of law. Understanding of the legal system and its methods is promoted through discussion of topics which include: basic legal reasoning, the function of the legal process, fundamental legal concepts and categories (such as property, crime, and contract).

**PHI 338 MORALITY AND BUSINESS. (3)**

A systematic analysis of moral questions for business and economics. How do major ethical theories view the practice of business in general? What moral principles underlie activities such as stock issuance, advertising, accounting and the social audit? What ethical issues are involved in hiring and promotion, ecological concerns and conflicts of interest?

**#PHI 340 INTRODUCTION TO FEMINISM AND PHILOSOPHY. (3)**

Introduction to basic feminist thought from a philosophical perspective. Emphasis on causes and solutions to the oppression of women. Topics may include philosophical perspectives and gender roles, images of women in society, violence against women, and reproductive choices.

**PHI 343 ASIAN PHILOSOPHY. (3)**

An introduction to the main concepts, assumptions, problems and texts of one or more Asian philosophical traditions, such as Hinduism, Buddhism, Taoism, and Confucianism.

**PHI 350 DEATH, DYING AND THE QUALITY OF LIFE. (3)**

A philosophical and interdisciplinary investigation of a cluster of prominent issues about the meaning of life and death, caring for dying persons, and the quality of life of the terminally ill. Among topics included are: death definitions and criteria; allowing to die vs. killing; euthanasia and suicide; life prolongation, ethics of care of the terminally ill; and rights of the dying.

**PHI 361 BIOLOGY AND SOCIETY. (3)**

A study of the implications of biology for understanding and changing society. Emphasis is on sociobiology and the value of viewing social behavior as a product of adaptive evolution by natural selection. Representative philosophical issues include biological constraints on human nature and society, genetic engineering, reductionism, the scientific method, and bioethics. Prereq: A college course in biology or consent of instructor.

**PHI 395 INDEPENDENT WORK. (3)**

Open only to students who have distinguished themselves in philosophy or in allied subjects. May be repeated to a maximum of 12 credits. Prereq: Major and standing of 3.0 in department.

**PHI 399 EXPERIENTIAL LEARNING. (1-6)**

To provide the opportunity for students to earn credit for work-study experience. The student must work with a faculty member to describe the nature of the experience, the work to be performed, the accompanying philosophical reflection and study, appropriate course credit for the work, and criteria by which the work may be evaluated. This information must be written and filed in the Philosophy Department and the Office for Experiential Education prior to the student's registration for the course. May be repeated to a maximum of 12 credits. Pass-fail only. Prereq: Consent of instructor and department chairperson; completion of a departmental learning agreement.

**PHI 500 TOPICS IN PHILOSOPHY (Subtitle required). (3)**

Topics that cross traditional systematic or historical lines in philosophy or that relate philosophy to topics or periods in other disciplines. May be repeated to a maximum of six credits.

**PHI 520 SYMBOLIC LOGIC II. (3)**

An intermediate course in symbolic logic which reviews sentential logic, develops further the logic of quantification, and introduces metalogical issues such as the construction, consistency, and completeness of deductive systems. Prereq: PHI 320 or consent of instructor.

**#PHI 540 FEMINIST PHILOSOPHY. (3)**

An introduction to feminist philosophical theory, including feminist treatments of various questions in metaphysics, epistemology, logic, and value theory, such as: the nature (if any) of the self; the role of perspectives in knowledge; the nature of reason and the criteria for justification in argumentation; feminist theories of morality and feminist theories of social justice.

**GROUP A**

**PHI 503 TOPICS IN ANCIENT PHILOSOPHY. (3)**

A study of representative texts and issues in Ancient Philosophy with special attention to historical continuity and the interrelations of thinkers and problems. Possible Topics: Pre-Socratic Philosophers, Plato, Aristotle, Stoicism, Epicureanism, Scepticism. May be repeated to a maximum of six credits.

**PHI 504 ISLAMIC AND JEWISH PHILOSOPHY AND THE CLASSICAL TRADITION. (3)**

A study of representative texts and issues in Islamic and Jewish philosophy with special attention to the historical continuity with the Greek philosophical tradition and the interrelations of thinkers and problems. Possible topics: the commensurability of philosophy and (revealed) law, the creation or eternity of the world, the nature of prophecy, the human good, the nature of God and divine language. Prereq: PHI 260 or consent of instructor.

**PHI 506 TOPICS IN MEDIEVAL PHILOSOPHY. (3)**

An investigation of issues in Medieval Philosophy. Topics will be chosen which illustrate continuity both with Ancient Greek Sources and with problems in Modern Philosophy. Possible Topics: Neo-Platonism, Faith and Reason, Freedom and Determinism, Universals, the Existence of God, Renaissance reactions. May be repeated to a maximum of six credits.

**PHI 509 TOPICS IN THE HISTORY OF MODERN PHILOSOPHY. (3)**

A selective study of representative issues and texts in modern philosophy, with special emphasis upon historical continuity and interrelation of thinkers and problems. Possible topics: British empiricism; Leibniz and Locke; Descartes and his critics; Hobbes and Rousseau; Hume and Kant; philosophy and the rise of modern science. May be repeated to a maximum of six credits.

**PHI 513 NINETEENTH CENTURY PHILOSOPHY. (3)**

An examination of the major topics and trends in 19th century philosophy. Prereq: PHI 270 or consent of instructor.

**PHI 514 AMERICAN PHILOSOPHY. (3)**

A study of the development of philosophy in America from colonial to recent times with attention to religious, political, literary and scientific influences on American thought. The focus will be on the pragmatic spirit that was the moving force from 19th century idealism to 20th century naturalism, with emphasis on the works of such thinkers as Royce, Peirce, James and Dewey.

**PHI 515 CONTEMPORARY PHILOSOPHY: THE ANALYTIC TURN. (3)**

A survey of several 20th century philosophical movements, such as logical positivism and ordinary language philosophy, whose members agree that careful attention to language is one of the keys to the resolution of philosophical problems. The works of representative thinkers such as Moore, Russell, the Vienna Circle, Wittgenstein and Austin will be studied.

**PHI 516 CONTEMPORARY PHILOSOPHY: PHENOMENOLOGICAL DIRECTIONS. (3)**

A study of 20th century philosophies represented by the works of thinkers such as Husserl and Heidegger, Gadamer and Ricoeur, Habermas and Apel. Generally based in a reflection on human experience, these philosophies undertake a radical criticism of common conceptions of human nature while variously emphasizing rationality, ontology, language, or social and historical context. Prereq: PHI 270 or consent of instructor.

**PHI 517 EXISTENTIALISM. (3)**

A systematic study of the fundamental concepts and problems of existentialism. Readings selected from such philosophers as Kierkegaard, Nietzsche, Sartre, Marcel, Heidegger, and Jaspers.

**GROUP B**

**PHI 530 ETHICAL THEORY. (3)**  
A study of ethical theories by detailed examination of a few selected works. Theories considered may include naturalism, intuitionism, noncognitivism, utilitarianism, universalizability, and natural law.

**PHI 535 SOCIAL AND POLITICAL PHILOSOPHY. (3)**  
A critical examination of some philosophical problems concerning the nature and evaluation of social and political organizations. For example, questions concerning the nature, justification, and limits of political power may be explored in connection with a study of important classical positions. Prereq: One course in philosophy.

**PHI 537 PHILOSOPHY OF LAW. (3)**  
Concept of law; relations between law and morals; nature of legal reasoning; analysis of legal concepts; justification of punishment. Pass/fail basis only for law students. (Same as LAW 837.)

**PHI 545 PHILOSOPHY OF RELIGION. (3)**  
An analysis of the philosophical issues raised by religion, such as the problem of religious knowledge, the nature of religious language, science and religion, concepts of God, death, and evil.

**PHI 592 AESTHETICS. (3)**  
Problems of method in aesthetics; major types of aesthetic theory. Aesthetic materials of the arts in literature, music, and the space arts. Form and types of form. Meaning in the arts. Interrelations of the arts. Lectures, discussions, reports. (Same as A-H 592.)

**GROUP C**

**PHI 550 PHILOSOPHICAL PROBLEMS IN KNOWLEDGE AND REALITY. (3)**  
Critical examination of issues regarding the foundations of knowledge, the nature of reality and the relation between the two. Evidence, belief, certainty, perception and justification will be among problems considered. Understandings of truth, existence, causality, freedom, time, space and matter will also be attended to. Prereq: PHI 100 or PHI 260 or PHI 270 or equivalent.

**PHI 560 PHILOSOPHY OF SCIENTIFIC METHOD. (3)**  
An examination of the logical and epistemological foundations of empirical science, including fundamentals of concept formation, criteria of cognitive significance, issues of explanation, interpretation, and prediction, and testing and confirmation of theories and laws. Prereq: PHI 120 or equivalent or consent of instructor.

**PHI 561 PHILOSOPHICAL PROBLEMS IN THE NATURAL SCIENCES (Subtitle required). (3)**  
A systematic examination of selected conceptual and/or metaphysical problems in the natural sciences. Possible topics include: reductionism, teleology, causality and determinism, the structure of space-time, and the “anthropic principle” in cosmology. Prereq: PHI 120 or PHI 320, or two semesters of natural sciences or consent of instructor.

**PHI 562 PHILOSOPHICAL PROBLEMS IN THE SOCIAL AND BEHAVIORAL SCIENCES. (3)**  
An examination of various methodological issues and broader philosophical questions of special concern in the social sciences. Among the topics to be studied: the structure of theories and the roles of mathematics and experimentation in the social sciences, the possibility of an objective or value free social science, and the conceptions of human nature presupposed by different schools of social science.

**PHI 565 PHILOSOPHY OF LANGUAGE. (3)**  
An investigation of problems current in the philosophy of language such as meaning and reference, the nature of analysis, linguistic relativity and the relation of linguistics to philosophy.

**PHI 570 PHILOSOPHY OF HISTORY. (3)**  
An examination of the theories and methods utilized by historians with special attention to the problems of laws and explanations in history, the nature of historical knowledge and narrative, and the roles of causal judgments and historical understanding. Attention will also be given to theoretical interpretations of history as offered by Marx, Hegel, Toynbee and others.

**PHI 575 PHILOSOPHY OF MIND. (3)**  
An examination of problems current in the philosophy of mind, such as the concept of person, the relation of mind and body, the relation of minds and machines, knowledge of other minds, and the roles of dispositions and volitions in human action. Attention will be given to the philosophical analysis of such psychological categories as consciousness, feeling, emotion, perception, imagination, thinking and will.

**GRADUATE SEMINARS**

**PHI 630 SEMINAR IN MORAL PHILOSOPHY. (3)**  
A specialized graduate course in moral philosophy that treats the history of moral issues and doctrines, or emphasizes contemporary methodological discussions, or examines the concrete societal implications of major theories, or combines these approaches. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PHI 650 SEMINAR IN METAPHYSICS AND EPISTEMOLOGY (Subtitle required). (3)**  
A specialized advanced study of topics in traditional areas of metaphysics and epistemology or of more contemporary topics, some of which may cut across or even challenge the framework of those traditional domains. Topics may include such issues as the nature of human action, problems of reference and modality, conceptions of time and space, and the sociology of knowledge. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

**PHI 680 SPECIAL TOPICS IN PHILOSOPHY. (3)**  
Studies in philosophical problems which either cut across or lie outside the standard areas of philosophical inquiry. May be repeated to a maximum of six credits.

**PHI 700 SEMINAR IN ANCIENT PHILOSOPHY. (3)**  
Intensive study of original works of such major classical philosophers as Plato and Aristotle. May be repeated to a maximum of six credits. Prereq: PHI 260 or equivalent.

**PHI 705 SEMINAR IN MEDIEVAL PHILOSOPHY. (3)**  
An intensive study of the issues treated by one or more medieval philosophers, e.g., Augustine, Aquinas, Scotus or Ockham. May be repeated to a maximum of six credits. Prereq: PHI 506.

**PHI 710 SEMINAR IN MODERN PHILOSOPHY. (3)**  
Intensive study in the major works of such prominent philosophers of modern times as Descartes, Locke, Hume, Kant, and Hegel. May be repeated to a maximum of six credits. Prereq: PHI 270 or equivalent.

**PHI 715 SEMINAR IN RECENT PHILOSOPHY. (3)**  
Intensive study of major philosophers of the 20th Century such as Russell, Wittgenstein, J.L. Austin, and Merleau-Ponty. May be repeated to a maximum of six credits. Prereq: PHI 515 or equivalent.

**PHI 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**PHI 755 TUTORIAL IN INTERDISCIPLINARY ISSUES. (1-6)**  
As a tutorial, this course is structured individually to a student’s research and study projects. Topics and issues are to be chosen and pursued in work that integrates philosophical methods and ideas within other disciplinary areas. May be repeated to a maximum of nine credits. Prereq: Approval of the Student’s Advisory Committee.

**PHI 768 RESIDENCE CREDIT FOR THE MASTER’S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**PHI 769 RESIDENCE CREDIT FOR THE DOCTOR’S DEGREE. (0-12)**  
May be repeated indefinitely.

**PHI 790 RESEARCH IN PHILOSOPHY. (3)**  
This course is primarily intended for advanced students who desire and are prepared to do research in philosophy. May be repeated to a maximum of 12 credits.

**PHR Pharmacy**

**PHR 222 DRUGS, MEDICINES, AND SOCIETY. (3)**  
The course is designed to enable the university graduate to be sufficiently sophisticated in his understanding of the physiological and behavioral effects of medicines, environmental toxicants, and psychoactive chemicals so that he may make informed decisions regarding their use in his life, home and community. This course provides such information in the context of drug development, standardization, distribution, control, use and misuse in a modern society. (Note: It is felt that this course might be of particular interest to freshmen.)

**PHR 303 HISTORY AND ETHICS OF PHARMACY. (3)**

A study of the development of the profession of pharmacy, emphasizing the historical background and ethical principles upon which the profession rests. The nature and place of pharmaceutical services in society are considered. The moral standards and professional conduct required of a pharmacist are emphasized. Coreq: BSC 331.

**PHR 336 PHYSIOLOGIC BASIS FOR THERAPEUTICS I. (4)**

Basic concepts of human anatomy and physiology integrated with an introduction to pathophysiology and the pharmacodynamics of typical drugs. Strong emphasis is placed on homeostasis, cell and nerve function and the organization of the central and autonomic nervous systems. Lecture, four hours. Prereq: BIO 104, 105; CHE 232 and PHY 203.

**PHR 337 PHYSIOLOGIC BASIS FOR THERAPEUTICS II. (3)**

A continuation of PHR 336 involving the integrated physiology of the cardiovascular, renal and pulmonary systems with an introduction to the pathophysiology of each system and the pharmacodynamics of typical drugs. Lecture, three hours. Prereq: PHR 336.

**PHR 340 PRINCIPLES OF MEDICINAL CHEMISTRY. (4)**

A course designed to introduce the fundamental concepts of the application of chemical principles to the study of medicinal agents. Basic heterocyclic chemistry as is needed to develop the chemistry of physiologically active molecules. Physicochemical properties of drugs and their relation to physiological activity, and fundamental consideration of the metabolic changes in drug molecules are major areas of development of the course presentation. Prereq or concur: PHR 400.

**PHR 395 INDEPENDENT WORK IN PHARMACEUTICAL CHEMISTRY. (1-3)**

Selected problems of interest from the general field of pharmaceutical chemistry. May be repeated to a maximum of six credits. Prereq: Pharmacy major and standing of 3.0 in major. Consent of instructor.

**PHR 400 BIOCHEMISTRY. (4)**

A fundamental course in the chemistry and interrelationships of carbohydrates, lipids, and proteins, as well as the role of enzymes, vitamins, and hormones in physiological processes. Prereq: CHE 232, 233, or equivalent.

**PHR 474 INDEPENDENT PROBLEMS IN TOXICOLOGY. (1-3)**

Selected problems requiring literature and laboratory research are designed to meet specific needs of graduate minors in toxicology and satisfy professional elective requirements for pharmacy students. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PHR 475 INDEPENDENT PROBLEMS IN PHARMACOGNOSY. (1-3)**

Selected problems requiring literature and laboratory research are designed to meet specific needs of graduate minors in pharmacognosy and satisfy professional elective requirements for pharmacy students. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PHR 476 INDEPENDENT PROBLEMS IN PHARMACOLOGY. (1-3)**

Selected problems requiring literature and laboratory research are designed to meet specific needs of graduate minors in pharmacology and satisfy professional elective requirements for pharmacy students. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PHR 510 MODERN METHODS IN PHARMACEUTICAL ANALYSIS. (5)**

A course which deals with the application of modern analytical methods, primarily instrumental methods, in the determination of the strength, purity, and quality of drugs and pharmaceuticals. Laboratory exercises include analysis of raw materials and finished dosage forms. Lecture, three hours; laboratory, four hours. Prereq: CHE 226.

**PHR 520 SPECIAL TOPICS IN PHARMACY LAW. (2)**

Discussion of the legal framework and special legal issues in pharmacy practice. Topics will include application of antitrust laws to pharmacy, patent and trademark issues relevant to pharmacy, legal issues related to prescription drug insurance programs, professional liability and legislative issues such as drug product selection. Prereq: PHR 831.

**PHR 530 RADIOPHARMACEUTICS. (3)**

Basics of radioactive decay and detection. Labelling of molecules and cells with radionuclides. Imaging systems and clinical aspects of radiopharmaceuticals. Radioanalytical applications in pharmaceutical sciences, including positron tomography and gamma scintigraphy. Development of new radiopharmaceuticals and absorbed dose calculations. The principles of radiation safety and radiobiology. Prereq: Consent of instructor.

**PHR 545 STERILE PARENTERALS AND DEVICES. (2-3)**

The course will describe the fundamental concepts, principles and techniques involved in the characterization, development, evaluation and preparation of sterile products. Lecture, two credits; lecture with laboratory, three credits. Prereq: PHR 846 and PHR 825 or equivalent and consent of instructor.

**PHR 595 INDEPENDENT PROBLEMS IN PHARMACY ADMINISTRATION. (1-3)**

Selected problems of interest in the areas of behavioral, economic, ethical, historical, legal, psychological and social aspects of pharmacy. Methods may include literature search, surveys, field studies and experimental design. The course may serve as a professional elective for the pharmacy student and as a graduate course for the graduate student. May be repeated for a maximum of six credits. Prereq: Consent of the instructor.

**PHR 612 QUANTITATIVE PHARMACODYNAMICS: PHARMACOKINETICS. (3)**

Quantitative treatment of dynamics of drug absorption, distribution, metabolism and excretion, including development of both mathematical models and model-independent approaches for describing these processes. Prereq: PHR 802 (or equivalent), MA 114 and consent of instructor. (Same as PHA 612.)

**PHR 622 ADVANCED BIOPHARMACEUTICS. (2)**

An advanced treatment of the factors affecting drug availability from dosage forms and the influence of the route of administration and the dosage regimen on drug availability. Prereq: PHR 612.

**PHR 630 PHARMACEUTICAL RATE PROCESSES. (3)**

Kinetics of reactions of pharmaceutical interest; mechanisms of drug decomposition and theoretical approaches to stabilization and preservation; accelerated stability analysis. Prereq: Physical chemistry and chemical kinetics.

**PHR 631 EQUILIBRIUM PHENOMENA IN PHARMACEUTICAL SYSTEMS. (3)**

An advanced study in special topics of a physical chemical nature which are applicable to pharmacy, with special emphasis on physical properties and molecular structure, solubility, complexation and equilibria in solution. Prereq: Physical chemistry.

**PHR 645 NEUROTOXICOLOGY. (2)**

Multidisciplinary discussions of the major sites and mechanisms of drug/chemical-induced nervous system toxicity. Presentations by faculty and graduate students. Prereq: BCH 501 and 502, PGY 502 and PHA 522 or equivalent and consent of instructor. (Same as TOX 645.)

**PHR 647 INTRODUCTION TO MOLECULAR PHARMACOTHERAPEUTICS. (3)**

A discussion of the development of potential therapeutic entities using molecular biotechnology. Recent advances in the design and delivery of target-specific treatments such as special peptides, monoclonal antibodies and gene therapies will be the primary focus. Prereq: BCH 501 and 502, BCH 401G or equivalent or consent of instructor.

**PHR 649 MOLECULAR PHARMACOLOGY. (3)**

The intent of this course is to describe the molecular aspects of a variety of physiological systems that are subject to pharmacological manipulation. Emphasis will be on the molecular genetics, biochemistry, and subcellular organization and biology of these systems, and on the pharmacological techniques used to study these systems. Genetic diseases associated with these systems will also be described. The course will focus on areas of research which represent the forefront of modern pharmacological investigation. Prereq: PHA 522, PGY 502, BCH 501, 502, or consent of instructor. (Same as PHA/TOX 649.)

**PHR 664 THEORY AND PRACTICE OF DRUG METABOLISM. (3)**

A broad overview of the chemistry of drug biotransformation with emphasis on experimental considerations and analytic methodology for the isolation and identification of metabolites and the study of metabolic processes. Prereq: BCH 501 and CHE 538 or consent of instructor.

**PHR 668 PSYCHOTHERAPEUTICS FOR ADVANCED NURSING PRACTICE. (3)**

This course provides advanced background in psychotherapeutics for psychiatric/mental health nurse practitioners. Psychiatric disorders and their pharmacotherapy are addressed with emphasis on indications for use, mechanisms of action, side effects, pharmacokinetics and nursing management problems. Prereq: Graduate standing in nursing or permission of instructor. (Same as NUR 668.)

**PHR 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PHR 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**PHR 760 TOPICS IN PHARMACEUTICAL SCIENCES. (2-4)**

This course deals with emerging concepts in pharmaceutical sciences which are not being covered in other courses. May be repeated to a maximum of 10 hours. Prereq: Consent of instructor.

**PHR 762 BIOORGANIC MECHANISMS. (3)**

An in-depth discussion on the bioorganic chemistry aspects of the active sites of enzymes and drug receptors, the molecular basis of drug design, and principles of drug metabolism. Within these topics, the mode of action of some of the major coenzymes and drugs will be discussed from a mechanistic chemistry point of view. Prereq: CHE 538, CHE 633, BCH 501 or consent of instructor.

**PHR 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**PHR 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**PHR 774 GRADUATE SEMINAR IN PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS. (1)**

Reports and discussion of current research and literature of general interest in the area of pharmacology and experimental therapeutics. The grade will be based on the presentation of the required annual seminar which will be objectively evaluated by the Faculty of the Division of Pharmacology and Experimental Therapeutics. May be repeated to a maximum of eight credits. Prereq: Graduate standing.

**PHR 776 SEMINAR IN PHARMACEUTICAL SCIENCES I. (1)**

Reports and discussion of pertinent research and literature in the pharmaceutical sciences. Required of all graduate students. Prereq: Graduate standing.

**PHR 778 SEMINAR IN PHARMACEUTICAL SCIENCES II. (1)**

Reports and discussion of pertinent research and literature in a disciplinary area of the pharmaceutical sciences. May be repeated to a maximum of eight credits. Prereq: Graduate standing.

**PHR 779 MEMBRANE SCIENCES COLLOQUIUM. (1)**

Outstanding membrane scientists present their current research on biological and/or synthetic membranes. Students read a pertinent paper by the speaker prior to his/her talk and write a short paper on the talk; especially important is relevance of the main points of the talk to membrane science in general and the student's own research in particular. May be repeated to a maximum of six credits. (Same as BCH/CHE/CME/PHA 779.)

**PHR 780 SPECIAL PROBLEMS IN PHARMACEUTICAL SCIENCES. (1-6)**

Selected problems of laboratory or literature nature in which a student pursues a topic of interest to him under the supervision of a faculty member particularly qualified in that area. May be repeated once. Prereq: Consent of instructor.

**PHR 790 RESEARCH IN PHARMACEUTICAL SCIENCES. (1-12)**

Research work to be conducted in selected areas of pharmaceutical sciences. Prereq: Approval of student's special committee and consent of instructor.

**PHR 804 PHARMACEUTICS I: ANALYSIS AND PHYSICAL PHARMACY. (4)**

A study of the analytical techniques commonly used to conduct drug quality assurance and determine drug concentrations in biologic fluids. Emphasis is placed on compendial standards, pharmaceutical literature and the physical chemical principles of drug dosage form design. Demonstration of competence in pharmaceutical calculations by examination is required for passing the course.

**PHR 805 PHARMACEUTICS II: DRUG DELIVERY SYSTEMS. (4)**

A continuation of PHR 804, concentrating on contemporary drug delivery systems, principles of compounding, and methods of manufacture. Emphasis is placed on the design, function, use, and evaluation of modern drug delivery systems. Laboratory experiences are directed toward a study of the analytical and physical-chemical aspects of dosage form design and quality assurance. Lecture, three hours; laboratory, four hours. Prereq: PHR 804.

**PHR 806 PHARMACEUTICS III: BIOPHARMACEUTICS AND PHARMACOKINETICS. (4)**

A continuation of PHR 805, concentrating on the physical-chemical principles underlying in vivo dosage form performance and the absorption, distribution, metabolism, and excretion of drugs. Emphasis is placed on the biopharmaceutics of drug product performance and the pharmacokinetic calculation of dosage regimens. Lecture, three hours; laboratory, four hours. Prereq: PHR 805.

**PHR 811 COMPUTER APPLICATIONS IN PHARMACY. (2)**

A guide to the selection and use of computers in pharmaceutical practice. Descriptions of functions, cost-benefit considerations, hardware and software, capabilities of various systems, language, applications to patient profiles, inventory control and accounts are considered.

**PHR 812 COMMUNICATION SKILLS FOR PHARMACISTS. (3)**

An analysis and application of the factors that promote or hinder successful communication between pharmacists and patients, pharmacists and the general public, and pharmacists and other health care personnel. The course is designed to make the student more aware of the importance of the role of communication on interpersonal interaction and the consequences of poor communication. The primary focus is to improve upon the student's ability to communicate effectively in specific situations. Prereq: BSC 331, and PHR 831.

**PHR 813 GERIATRIC PHARMACY. (3)**

A course designed to educate students in the basic knowledge of attitudes and skills required to meet the pharmaceutical needs of the elderly. Topics include discussions of the aging process, physiological and psychological changes in the elderly, how these changes influence patient compliance and the responses to drug and nondrug treatments, monitoring drug use in long-term care facilities, and special community services available to the elderly. Prereq: PHR 849, 852, 853, 854 and 856 or permission of instructor. (Same as GRN 513.)

**PHR 826 INTRODUCTION TO NUCLEAR PHARMACY. (3)**

The subject matter in this course includes: an introduction to basic atomic structure, radioactivity, detection of radiation, interactions of radiation with matter, radiation safety, dosimetry, the major emphasis being placed on radiopharmaceuticals and nuclear medicine instrumentation. Prereq: PHR 806 and consent of instructor.

**PHR 828 NUCLEAR PHARMACY EXTERNSHIP. (4, 8, 12, or 16)**

This externship provides the student with an integrated practice experience in the provision of nuclear pharmaceutical services in various practice settings. Each four-credit block consists of four weeks of full time (40 hr/week) directed externship experience. The student may elect the externship experience in blocks of four credits. May be repeated to a maximum of 16 credits. Prereq: PHR 827 and consent of instructor.

**PHR 831 PHARMACY MANAGEMENT AND HEALTH CARE SYSTEMS. (4)**

An introduction to the basic concepts, principles and methods of pharmacy management applicable to all practice settings with emphasis on practice alternatives, management approaches and styles, organizational principles, behavior and forms, personnel, purchasing and inventory control, pricing, professional fees, and pharmacy services and patronage. Topics are discussed within the framework of the health care delivery system in the United States, and the role of the pharmacist within these systems and within professional organizations. Prereq: BSC 331, PHR 303.

**PHR 832 ADVANCED COMMUNITY PRACTICE MANAGEMENT. (2)**

A study of the principles and methods unique to the management of a community pharmacy, building on previous foundations and focusing on the entrepreneurial aspects of management. Prereq: PHR 831 and consent of instructor.

**PHR 833 ADVANCED INSTITUTIONAL PRACTICE MANAGEMENT. (2)**

Application of management principles to institutional and group practices. Emphasis is on the acquisition, distribution and control of drugs by pharmacists in the institutional practice settings and the justification, establishment and evaluation of clinical pharmacy services. Prereq: PHR 831, PHR 848.

**PHR 835 PHARMACEUTICAL LAW. (3)**

A study of important legislation, regulations and rulings related to the practice of pharmacy. Prereq: PHR 831.

**PHR 848 INSTITUTIONAL PRACTICE AND STERILE PRODUCTS. (4)**

An introduction to the practice of pharmacy in institutional settings and clinics. Emphasis is placed on principles of parental drug preparation, home health care and the delivery of pharmaceutical services in group practices. Lecture with some laboratory experiences and demonstrations. Prereq: PHR 805; coreq: PHR 849.

**PHR 849 DISPENSING PHARMACEUTICALS. (3)**

A discussion of the principles of dispensing medications with emphasis on patient counseling, patient monitoring, drug interactions and physical-chemical incompatibilities involved in compounding. Lecture, two hours; laboratory, three hours. Prereq: PHR 806, PHR 830; coreq: PHR 848.

**PHR 850 PHARMACOTHERAPEUTICS: IMMUNE SYSTEMS. (4)**

A study of the immune systems, immunotherapy, and select autoimmune diseases and their treatment. The course includes a discussion of neoplasias and anti-neoplastic therapy. Prereq or coreq: PHR 337.

**PHR 851 PHARMACOTHERAPEUTICS: NERVOUS SYSTEMS. (5)**

A study of human disease processes and rational pharmacotherapeutics relating to the autonomic and central nervous systems. Emphasis is placed on the scientific principles of pathophysiology, pharmacology and toxicology, the incorporation of these principles to the clinical application of modern drug therapy, and how these principles can be utilized in pharmacy practice. Prereq: PHR 805, PHR 340, PHR 337.

**PHR 852 PHARMACOTHERAPEUTICS: CARDIOPULMONARY AND RENAL SYSTEMS. (5)**

An extension of PHR 851 dealing primarily with cardiovascular, renal and respiratory pathologies and the agents used in their treatment. Prereq: PHR 851.

**PHR 853 PHARMACOTHERAPEUTICS: ENDOCRINE SYSTEMS. (4)**

A study of the physiology, pathology and therapeutics of the endocrine system. A discussion of principles of toxicology and the treatment of exposure to select chemicals is included. Prereq: PHR 337; coreq: PHR 851.

**PHR 854 PHARMACOTHERAPEUTICS: NUTRITIONAL AND DERMATOLOGIC SYSTEMS. (3)**

An extension of PHR 851, concentrating on the physiology and major pathologies of the gastrointestinal and dermatologic systems, the agents used in their treatments, and the problems and treatments of nutritional and hematologic disorders. Prereq: PHR 851.

**PHR 856 CHEMOTHERAPEUTICS. (3)**

An extension of PHR 851, concentrating on infectious diseases and agents used in their treatment. Prereq: PHR 850; coreq: PHR 806.

**PHR 865 DISEASE PROCESSES I. (5)**

An interdisciplinary course in which in-depth study of specific disease processes, especially the quantifiable, pathognomonic parameters permit the student to develop a unique understanding of the pathologic factors influencing clinical drug use. Prereq: PHR 849, 852, 853, 854 and 856.

**PHR 866 APPLIED THERAPEUTICS I. (5)**

An in-depth integration of patient factors including age, history, concurrent disease states, medications, allergies, renal and hepatic function, and drug product factors including bioavailability, pharmacokinetics, efficacy, toxicity, risk to benefit ratios, and cost in the application of drug therapy to specific patient situations. Also included are discussions of the prominent considerations relative to patient education about their disease and therapy. Prereq: PHR 849, 852, 853, 854 and 856.

**PHR 867 DISEASE PROCESSES II. (4)**

A continuation of PHR 865. Prereq: PHR 865.

**PHR 868 APPLIED THERAPEUTICS II. (5)**

A continuation of PHR 866, including a presentation of physical assessment techniques necessary for monitoring drug response. Prereq: PHR 866.

**PHR 870 CLINICAL ORIENTATION CLERKSHIP. (8)**

This course acquaints the student with the techniques and various considerations involved in the diagnosis and evaluation of disease states and their treatment. It affords the student opportunity to gain an appreciation of the scientific, social, emotional and psychological aspects of illness and provides the student with ability to work with other health professionals. Offered for letter grade credit only (A, B, C, D, E, I). Prereq: PHR 812, 848, 849, 850, 853, 854 and 856.

**PHR 872 NONPRESCRIPTION PHARMACEUTICALS AND SUPPLIES. (4)**

A study of various nonprescription pharmaceuticals, medical and surgical supplies, and appliances commonly found in community pharmacy practice. Their evaluation, rational use and therapeutic efficacy will be stressed. The use of home remedies and their limitations in the treatment of minor ailments will be considered. Prereq: PHR 850, PHR 851, PHR 853; coreq: PHR 848, 849, 852, and 854.

**PHR 874 DRUG LITERATURE EVALUATION. (3)**

This course appraises the student of the pharmacological and toxicological principles and techniques employed in the clinical evaluation of drugs and enables the student to use more effectively the clinical literature. Prereq: PHR 852, PHR 853, PHR 854 and PHR 856.

**PHR 875 CLINICAL PHARMACOKINETICS. (4)**

Application of pharmacokinetic principles to drug dosing on an individual patient basis, with emphasis on those drugs which have narrow therapeutic ranges or have unique pharmacokinetic or pharmacologic properties. Prereq: PHR 806 or consent of instructor.

**PHR 881 PHARMACY PRACTICE EXTERNSHIP. (8)**

This externship is designed to provide the student with a faculty-directed, integrated experience in the provision of pharmaceutical services in a variety of patient care settings under the supervision of selected pharmacy practitioners on a one-to-one basis of student to practitioner. This experience includes participation in traditional practice settings and may involve participating in new and innovative pharmacy practice models. The course consists of two four-week rotations which are full-time (not less than 40 hours per week) directed externship experiences. Offered on a pass/fail basis only. Prereq: PHR 849, 850, 853, 854, 856, permission of instructor, and minimum 2.0 pharmacy cumulative GPA.

**PHR 882 PHARMACY PRACTICE CLERKSHIP: MEDICINE. (8)**

A clinical experience in the use of drugs in the diagnosis, treatment and management of diseases. Experience will be obtained in general internal medicine. Emphasis is placed on the rationale of drug therapy. Prereq: PHR 868, 874, 875 and 867 or 870 and a 2.0 pharmacy cumulative GPA.

**PHR 883 PHARMACY PRACTICE CLERKSHIP: AMBULATORY CARE. (8)**

A clinical experience in the use of drugs in the treatment of diseases in ambulatory patients. Experience will be obtained in ambulatory care settings. Prereq: PHR 868, 874, 875 and 867 or 870 and a 2.0 pharmacy cumulative GPA.

**PHR 884 PHARMACY PRACTICE CLERKSHIP: SPECIALTY AREAS. (8)**

A clinical experience in the use of drugs in the treatment of diseases encountered in specialized areas. Areas in which experience may be obtained include (but are not limited to) pediatrics, surgery, intensive care and psychiatry. May be repeated to a maximum of 24 credits. Prereq: PHR 868, 874, 875 and 867 or 870 and a 2.0 pharmacy cumulative GPA.

**PHR 885 PHARMACY PRACTICE EXTERNSHIP ELECTIVE. (6)**

This elective externship is designed to provide the student with additional faculty-directed, integrated experience in the provision of pharmaceutical services in a variety of patient care settings under the supervision of selected pharmacy practitioners on a one-to-one basis of student to practitioner. This experience includes participation in new and innovative pharmacy practice models as well as in traditional practice settings. The rotation is six weeks of full-time (not less than 40 hours per week) directed externship experience. Offered on a pass-fail basis only. Prereq: PHR 849, 850, 853, 854, 856, permission of instructor, and minimum 2.0 pharmacy cumulative GPA.

**PHR 886 PHARMACY PRACTICE CLERKSHIP. (4)**

A structured set of rotations designed to provide clinical experience in the use of drugs for the treatment of diseases. Students will be assigned to a variety of patient care areas on a full-time basis under the supervision of a faculty preceptor. Emphasis is placed on the active participation of the student in the provision of contemporary pharmaceutical care in different environments. The experiences provide the opportunity to integrate material presented in previous courses and stress outcome oriented decision making in clinical situations regarding drug therapy. May be repeated to a maximum of 40 credits. Prereq: PHR 867, 868, 874, 875, minimum 2.0 pharmacy GPA, required immunizations.

**PHR 890 CLINICAL PHARMACY SEMINAR. (1)**

Topics in areas of clinical pharmacy concepts and principles of practice emphasizing the technical and professional knowledge and abilities required for involvement of the pharmacist in the health care team. May be repeated to a maximum of two credits. Prereq: Admission to the Doctor of Pharmacy program.

**PHR 892 CLINICAL DRUG COMMUNICATIONS. (1-5)**

The course is designed as a natural continuation of PHR 874 and serves the specific purpose of providing instruction and experience of such a nature and quality as to promote the professional role of the pharmacist in the communication of clinical pharmacology data and therapeutics information. May be repeated to a maximum of 10 credits. Lecture, one hour; laboratory, four-16 hours.

**PHR 895 INDEPENDENT PROBLEMS  
IN CLINICAL PHARMACY.****(1-3)**

Selected problems in patient care, drug information, pharmacy administration, and pharmaceutical technology as related to pharmaceutical services. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PHR 896 INDEPENDENT PROBLEMS IN PHARMACY.****(1-3)**

Selected problems pertaining to the various aspects of pharmacy which may include such problems as pharmaceutical procedures, pharmaceutical formulations, pharmaceutical history, and pharmaceutical economics. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PHR 911 PHYSIOLOGICAL BASIS FOR THERAPEUTICS I.****(4)**

Integrated concepts of human organ system functions with particular emphasis on the physiology of the central and autonomic nervous system, the cellular and molecular mechanisms of neurotransmission and transduction and the response of target tissues. The course includes an introduction to the pathophysiology of each system and the pharmacodynamics of therapeutic agents as a framework for discussion. Variable mixtures of lecture, group discussion and independent study. Prereq: Admission to the first year, College of Pharmacy.

**PHR 912 PHYSIOLOGICAL CHEMISTRY  
AND MOLECULAR BIOLOGY I.****(3)**

The first of a two course sequence covering integrated concepts of human biochemistry from a physiological viewpoint, functional group chemistry essential to biology, key structural and functional relationships of the biomolecules in living systems, energy metabolism emphasizing inter organ relationships and an in depth discussion of information storage and transfer. The course includes an introduction to common metabolic diseases and the therapeutic agents used in those diseases as a framework for discussion. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the first year, College of Pharmacy.

**PHR 913 PHARMACOLOGICAL BASIS  
OF THERAPEUTICS: ANTIBIOTICS.****(3)**

A study of the pathophysiology and microbiology of infectious diseases concentrating on the pharmacology of the therapeutic agents (antibiotics) used to treat those diseases, including discussions of their rational use. Variable mixture of lectures, discussions and independent study. Prereq: Admission to the first year, College of Pharmacy.

**PHR 914 BASIC PRINCIPLES  
OF PHARMACEUTICAL SCIENCE: DRUG DESIGN.****(3)**

The first course of a three semester sequence dealing with the principles of medicinal chemistry and pharmaceuticals. Brief descriptions of the drug development process, routes of administration, dosage forms, literature and biopharmaceutics followed by discussions of the design of molecules to produce safe and effective therapeutic responses in humans and the properties of drug molecules which are important in their formulation into drug products. Variable mixture of lectures, discussions and independent study. Prereq: Admission to the first year, College of Pharmacy.

**PHR 916 NONPRESCRIPTION  
PHARMACEUTICALS AND SUPPLIES I.****(2)**

A study of various nonprescription pharmaceuticals, medical and surgical supplies and appliances commonly found in ambulatory pharmacy practice sites, their rational use and therapeutic efficacy. Decision making skills for ambulatory patient triage are emphasized. The use of home remedies and their limitations in the treatment of minor ailments is considered. Variable mixture of lecture, discussions and independent study. Prereq: Admission to the first year, College of Pharmacy.

**PHR 919 CONTEMPORARY ASPECTS  
OF PHARMACY PRACTICE I.****(4)**

A continuously evolving integration of the administrative, legal, ethical, communicative, problem solving, social, behavioral and practical skills required for contemporary and future pharmacy practice often utilizing principles presented in the co-requisite courses as the introductory framework for discussion or the basis for the problem cases to be covered. In addition, current topics of debate and controversial issues within health care in general and pharmaceutical care in particular are studied. This course is the initial offering in a sequence designed to balance the theoretical perspectives of the professional aspects of pharmacy with practical applications while simultaneously creating an environment to nurture the caring aspects of the profession. Variable mixture of lecture, seminar, group discussion, individual study, laboratory exercises, public service projects and portfolio development. Coreq: Required PHR 91X series courses.

**PHR 921 PHYSIOLOGICAL BASIS FOR THERAPEUTICS II.****(4)**

A continuation of PHR 911 covering integrated concepts of human organ system functions with particular emphasis on the physiology of the cardiovascular, renal, pulmonary and endocrine systems. The course includes an introduction to the pathophysiology of each system and the pharmacodynamics of prototype therapeutic agents as a framework for discussion. Variable mixture of lecture, group discussions and independent study. Prereq: PHR 911 and admission to the first year, College of Pharmacy.

**PHR 922 PHYSIOLOGICAL CHEMISTRY  
AND MOLECULAR BIOLOGY II.****(3)**

A continuation of PHR 912. Variable mixture of lectures, group discussion and independent study. Prereq: Admission to the first year, College of Pharmacy and PHR 912.

**PHR 923 PHARMACOLOGICAL BASIS  
FOR THERAPEUTICS: NUTRITION, HEALTH PROMOTIONS.****(3)**

Consideration of the role of the pharmacist in health promotion and disease prevention including both pharmacologic and non-pharmacologic methods. Major problems of nutrition and certain metabolic/chronic disorders for which nutrition plays a pivotal role will be addressed including hypertension, cancer, and eating disorders. In addition the pharmacology of drugs affecting the gastrointestinal tract and drugs used to treat common gastrointestinal problems are discussed. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the first year, College of Pharmacy.

**PHR 924 BASIC PRINCIPLES  
OF PHARMACEUTICAL SCIENCE: DRUG FORM DESIGN.****(3)**

This is the second course in a three semester sequence dealing with the principles of medicinal chemistry and pharmaceuticals. The application of chemical kinetics to drug stability and the application of physical-chemical principles to the formulation of pharmaceutical solutions and solids are discussed. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the first year, College of Pharmacy and PHR 914.

**PHR 926 NONPRESCRIPTION  
PHARMACEUTICALS AND SUPPLIES II.****(2)**

A continuation of PHR 916. Variable mixture of lecture, group discussions and independent study. Prereq: Admission to the first year, College of Pharmacy and PHR 916.

**PHR 929 CONTEMPORARY ASPECTS  
OF PHARMACY PRACTICE II.****(4)**

A continuation of PHR 919 completing skill development in resolving simple patient/drug problems and including year one comprehensive skill assessment. Variable mixture of lecture, seminar, group discussion, individual study, laboratory exercises, public service projects and portfolio development. Coreq: Required PHR 92X series courses.

**PHR 931 PHARMACOLOGICAL BASIS  
FOR THERAPEUTICS: NERVOUS SYSTEM.****(4)**

A study of human disease processes and rational pharmacotherapeutics relating to the autonomic central and peripheral nervous systems and substances of abuse. Emphasis is placed on the principles of pathophysiology, pharmacology, toxicology and therapeutics, the incorporation of these principles in the clinical application of modern drug therapy, and how these principles can be utilized in pharmacy practice. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the second year, College of Pharmacy.

**PHR 932 PHARMACOLOGICAL BASIS FOR  
THERAPEUTICS: IMMUNOLOGY AND BIOTECHNOLOGY.****(3)**

A study of the immune system, immunopathologies and select autoimmune diseases and their treatment. Includes a discussion of immunizations, immunology of cancer, neoplasias and an introduction to antineoplastic therapy. The course concludes with a discussion of biotechnology and its application to the production and use of pharmaceuticals, diagnostic agents and advanced therapies. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the second year, College of Pharmacy.

**PHR 933 PHARMACOLOGICAL BASIS  
FOR THERAPEUTICS: ENDOCRINE SYSTEMS.****(3)**

A study of the pathophysiology of the major disorders affecting the endocrine system concentrating on the pharmacology of the therapeutic agents used to treat those disorders, including discussions of the rational use of endocrine agents and their congeners in the treatment of non-endocrine diseases. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the second year, College of Pharmacy.

**PHR 937 INTRODUCTION TO PHARMACOKINETICS. (1)**

Basic elements of the pharmacokinetic principles of clearance, volume of distribution, half-life and therapeutic range. Intended to prepare the student to understand issues related to pharmacokinetics. The student is expected, early in the program, to appreciate the applications and utility of pharmacokinetics. Variable mixture of lecture, group discussion and individual study. Prereq: Admission to the first year, College of Pharmacy.

**PHR 939 CONTEMPORARY ASPECTS OF PHARMACY PRACTICE III. (6)**

A continuation of PHR 929 concentrating on initial skill development in resolving moderately complex patient/drug related problems. Variable mixture of lecture, seminar, group discussion, individual study, laboratory exercises, public service projects and portfolio development. Coreq: Required PHR 93X series courses.

**PHR 941 PHARMACOLOGICAL BASIS FOR THERAPEUTICS: CARDIOPULMONARY AND RENAL SYSTEMS. (5)**

A study of the pathophysiology of the major disorders affecting the cardiovascular, renal and respiratory system concentrating on the pharmacology of the therapeutic agents used to treat those disorders. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the second year, College of Pharmacy and PHR 931.

**PHR 944 BASIC PRINCIPLES OF PHARMACEUTICAL SCIENCE: NEW AND NOVEL DOSAGE FORMS. (3)**

The last course in a medicinal chemistry and pharmaceuticals sequence consisting of a discussion of in vivo testing to establish the bioequivalence of drug products, the application of physical-chemical principles to the formulation of pharmaceutical disperse systems, and a survey of modern drug delivery systems with a review of the scientific principles upon which they are based. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the second year, College of Pharmacy.

**PHR 947 APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS. (4)**

The theoretical and practical considerations of the processes of drug absorption (including dosage formulation), distribution, metabolism and excretion and the mathematical models that describe these events including the calculation of dosage regimens for patients with problems ranging from simple to complex. A variable mixture of computer-assisted learning, formal lecture, interactive lecture and problem-based learning laboratory experiences. Prereq: Admission to the second year, College of Pharmacy and PHR 937.

**PHR 948 INTRODUCTORY PHARMACY PRACTICE CLERKSHIP. (4)**

An introductory experience in the clinical use of drugs in the diagnosis, treatment and management of diseases. Experiences may involve on call and evening/weekend responsibilities. Offered on a pass/fail basis only. Laboratory, 40 or more hours per week. Prereq: Successful completion of required courses in the 930 series and consent of instructor.

**PHR 949 CONTEMPORARY ASPECTS OF PHARMACY PRACTICE IV. (5)**

A continuation of PHR 939 completing skill development in resolving moderately complex patient/drug related problems and including a year two comprehensive skill assessment. Variable mixture of lecture, seminar, group discussion, individual study, laboratory exercises, public service projects and portfolio development. Coreq: Required PHR 94X series courses.

**PHR 951 INTEGRATED THERAPEUTICS I. (7)**

Integrated advanced application of pharmaceutical sciences to patient care following an organ system/disease state approach and emphasizing the development and implementation of patient-specific pharmacotherapeutic treatment plans. Therapeutic areas are integrated with corresponding applied pharmacokinetic (e.g. cardiovascular pharmacotherapy with pharmacokinetics of digitalis glycosides and antiarrhythmics). Basic science considerations (usually in pharmacology, biochemistry or pharmaceuticals) are incorporated within each area to reinforce basic principles and their importance in drug therapy. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the third year, College of Pharmacy; coreq: PHR 952.

**PHR 952 DISEASE PROCESSES I. (3)**

A comprehensive study of disease following an organ system approach and emphasizing the etiology, pathogenesis and clinical significance of disease processes with a special emphasis on disease processes that are amenable to drug treatment, influence drug disposition and/or are a result of complications of drug therapy. Variable mixture of lecture, group discussion, independent study and autopsy laboratory. Prereq: Admission to the third year, College of Pharmacy.

**PHR 959 CONTEMPORARY ASPECTS OF PHARMACY PRACTICE V. (7)**

A continuation of PHR 949 concentrating on initial skill development in resolving very complex patient/drug related problems. Variable mixture of lecture, seminar, group discussion, individual study, laboratory exercises, public service projects and portfolio development with primary emphasis on problem based learning and further independent learning skill development. Coreq: Required PHR 95X series courses.

**PHR 961 INTEGRATED THERAPEUTICS II. (7)**

A continuation of PHR 951 Integrated Therapeutics I. Variable mixture of lecture, independent study and group discussion. Prereq: Admission to the third year, College of Pharmacy, PHR 951 and PHR 952; coreq: PHR 962.

**PHR 962 DISEASE PROCESSES II. (3)**

A continuation of PHR 952 Advanced Pathophysiology I. Variable mixture of lecture, group discussion, independent study and autopsy sessions. Prereq: Admission to the third year, College of Pharmacy and PHR 952.

**PHR 969 CONTEMPORARY ASPECTS OF PHARMACY PRACTICE VI. (7)**

A continuation of PHR 959 concentrating on skill development in resolving very complex patient/drug related problems and including a year three comprehensive skill assessment. Variable mixture of lecture, seminar, group discussion, individual study, laboratory exercises, public service projects and portfolio development with primary emphasis on problem based learning and independent learning skill development. Coreq: Required PHR 96X series courses.

**PHR 988 PHARMACY PRACTICE CLERKSHIP. (4)**

A clinical experience in the use of drugs in the diagnosis, treatment and management of diseases. Emphasis is placed on a rationale of drug therapy, the provision of contemporary pharmaceutical care services and functioning as a member of an interdisciplinary health care team. Experiences will be obtained in a variety of areas and may involve on call and evening/weekend responsibilities. May be repeated to a maximum of 44 credits. Laboratory, 40 or more hours per week. Prereq: Admission to the fourth year, College of Pharmacy and permission of instructor.

**PHR 997 ADVANCED CLINICAL PHARMACOKINETICS AND PHARMACODYNAMICS. (2)**

Advanced topics in clinical pharmacokinetics and dynamics theory and practice. Designed for students interested in careers in clinical pharmacokinetics, service, research, industry or education. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the first year, College of Pharmacy and PHR 947.

**PHR 998 PHARMACY PRACTICE CLERKSHIP: MENTORING. (4)**

A continuation of PHR 988 but with the additional responsibilities of serving, with the preceptor, as part of a team mentoring students in introductory clerkship experiences and learning the introductory principles of serving as a preceptor. May be repeated to a maximum of eight credits. Laboratory, 40 or more hours per week. Prereq: Successful completion of 24 credits of PHR 988 and permission of instructor.

**PHY****Physics**

**Note:** It is assumed that all prerequisites include, in addition to any specific course listed, the phrase "or equivalent," or "consent of instructor."

**PHY 105 PHYSICS AND ASTRONOMY TODAY. (1)**

This course is intended for freshmen and others who wish to find out what physics is and how it relates to other fields of study. It is especially useful for physics majors or for those considering physics as a major or minor. One demonstration lecture per week presented by various members of the physics faculty. May only be taken on a pass/fail basis.

**PHY 130 PHYSICS OF ENERGY. (3)**

Energy sources, such as fossil fuels; nuclear, solar and hydro electric power are discussed in the context of the basic laws of physics which govern their uses and limitations. Concepts covered include kinetic and potential energy, heat, radiation, and mass-energy equivalence. Credit is not given to students who already have credit for PHY 201, 211, or 231.

**PHY 140 MUSIC ACOUSTICS. (3)**

An introduction to certain physical laws governing sound, sources of sound and mediums through which sound travels. Included are acoustical explanations of how musical instruments produce sounds and their characteristic timbres. (Same as MUS 140.)



**PHY 151 INTRODUCTION TO PHYSICS. (3)**

A lecture demonstration course covering the mechanics of solids, liquids, gases, heat, and sound. Credit is not given to students who already have credit for PHY 201, 211 or 231. Prereq: Two years of high school algebra or MA 108R.

**PHY 152 INTRODUCTION TO PHYSICS. (3)**

A lecture demonstration course covering electricity, magnetism, optics, atomic and nuclear physics. Credit is not given to students who already have credit for PHY 203, 213 or 232. Prereq: Two years of high school algebra or MA 108R.

**PHY 153 LABORATORY FOR ELEMENTARY AND MIDDLE SCHOOL TEACHERS. (1)**

Laboratory to accompany PHY 151-152 with experiments and exercises designed especially for students preparing to be elementary and middle school teachers. Laboratory, two hours per week. Prereq: PHY 151; coreq: PHY 152.

**PHY 160 PHYSICS AND ASTRONOMY FOR ELEMENTARY TEACHERS. (3)**

Course sequence (GLY 160-PHY 160 six credit hours) in physical science for prospective elementary teachers. The sequence addresses basic concepts of earth science, astronomy and physics appropriate for elementary teachers and is taught with an emphasis on inquiry-based, laboratory activities. PHY 160 includes the basics of the motion of objects, astronomy by sight, electrical circuits, magnetism and the behavior of light. Lecture, one hour; laboratory, five hours per week. Prereq: GLY 160.

**PHY 201 GENERAL PHYSICS. (4)**

Same as PHY 211, but without laboratory. Credit is not given to students who already have credit for PHY 211 or 231. Prereq: A working knowledge of algebra and basic trigonometry as obtainable, for example, in MA 109 and MA 112 or demonstrated by an ACT math score of at least 25.

**PHY 203 GENERAL PHYSICS. (4)**

Same as PHY 213, but without laboratory. Credit is not given to students who already have credit for PHY 213 or 232. Prereq: PHY 201.

**PHY 211 GENERAL PHYSICS. (5)**

A general course covering the mechanics of solids, liquids, and gases; heat; and sound. Lecture, two hours; recitation, two hours; laboratory, two hours. Credit is not given to students who already have credit for PHY 231 and 241. Prereq: A working knowledge of algebra and basic trigonometry as obtainable, for example, in MA 109 and MA 112 or demonstrated by an ACT math score of at least 25.

**PHY 213 GENERAL PHYSICS. (5)**

Continuation of PHY 211, covering electricity and magnetism, optics, and modern physics. Lecture, two hours; recitation, two hours; laboratory, two hours. Credit is not given to students who already have credit for 232 and 242. Prereq: PHY 211 or equivalent.

**PHY 231 GENERAL UNIVERSITY PHYSICS. (4)**

An advanced general course covering the mechanics of solids, liquids, and gases; heat; and sound. Lecture, three hours; recitation, one hour. Prereq or concur: MA 114.

**PHY 232 GENERAL UNIVERSITY PHYSICS. (4)**

An advanced general course covering electricity, magnetism, and optics. Lecture, three hours; recitation, one hour. This course is prerequisite to a significant number of courses in this and related areas of study. Prereq: PHY 231; concur: MA 213.

**PHY 241 GENERAL UNIVERSITY PHYSICS LABORATORY. (1)**

An advanced general laboratory course with experiments on the mechanics of solids, liquids, and gases; and on heat and sound. Prereq or concur: PHY 231.

**PHY 242 GENERAL UNIVERSITY PHYSICS LABORATORY. (1)**

An advanced general laboratory course with experiments on electricity, magnetism, and light. This course is prerequisite to other courses in physics and related areas of study. Prereq: PHY 241; concur: PHY 232.

**PHY 308 PRINCIPLES OF OPTICS. (3)**

A lecture and problems course covering the basic phenomena of geometrical and physical optics. Topics include electromagnetic waves, the nature of light in media, optical systems, interference, diffraction and polarization. Prereq: PHY 232 or 213; concur: MA 214, and PHY 242 (unless completed PHY 213) or consent of instructor.

**PHY 361 PRINCIPLES OF MODERN PHYSICS. (3)**

An introduction to the principles of special relativity, elementary concepts of quantum mechanics and selected topics in atomic and nuclear physics. Prereq: MA 114, PHY 211 or 231, PHY 213 or 232. Note: If necessary, PHY 213 or 232 may be taken concurrently with PHY 361.

**PHY 395 INDEPENDENT WORK IN PHYSICS. (1-3)**

Students may select an approved topic for study under the direction of a faculty member. May be repeated to a maximum of 12 credits. Prereq: Major and a standing of 3.0 in the department.

**PHY 401G SPECIAL TOPICS IN PHYSICS AND ASTRONOMY FOR ELEMENTARY AND HIGH SCHOOL TEACHERS. (2-4)**

Selected topics in physics and astronomy of special interest to teachers will be discussed. When the course is offered, a specific title with specific credits, the number of hours in lecture-discussion and laboratory will be announced. Lecture/discussion, two-four hours; laboratory, zero-four hours. May be repeated to a maximum of eight credits. Prereq: Open only to elementary school and/or high school teachers; consent of instructor.

**PHY 402G ELECTRONIC INSTRUMENTATION AND MEASUREMENTS. (3)**

Elementary laboratory treatment of electronic circuits. Topics will include AC circuits, filters, simple circuits using transistors and other semiconductor devices, simple treatment of operational amplifiers, and an introduction to digital circuits. Lecture, two hours; laboratory, three hours. Prereq: EE 305 or PHY 242 or consent of instructor. (Same as EE 402G.)

**PHY 404G MECHANICS. (3)**

A lecture and problem course covering the fundamental laws of mechanics. Newton's Laws, statics and dynamics of a particle and rigid bodies, and oscillatory motion. Prereq: PHY 232, 242 or 213; concur: MA 214.

**PHY 416G ELECTRICITY AND MAGNETISM. (3)**

A lecture and problem course covering the theory of electrostatic fields, conductors, dielectrics, and steady currents. Prereq: PHY 232, 242 or 213; MA 213.

**PHY 417G ELECTRICITY AND MAGNETISM. (3)**

A continuation of PHY 416G. A lecture and problem course covering electromagnetic induction, magnetic fields, magnetic materials, alternating currents and electromagnetic radiation. Prereq: PHY 416G.

**PHY 422 COMPUTATIONAL PHYSICS LABORATORY. (3)**

An introductory laboratory and lecture course covering the application of numerical methods to the solution of problems encountered in mechanics and electrostatics. Lecture, one hour; laboratory, four hours per week. Prereq: PHY 404G or equivalent.

**PHY 472G INTERACTION OF RADIATION WITH MATTER. (3)**

Basic aspects of the interaction of ionizing radiation with matter. Bohr atom, atomic spectra, radioactivity, energetics of decay. Sources of radiation, penetration of charged particles, electromagnetic radiation, and neutrons through matter; excitation and ionization processes; selected nuclear reactions; basic radiation detection and dosimetry. Prereq: PHY 213 or 232; MA 114 (may be taken concurrently); or equivalent. (Same as RM 472G.)

**PHY 477 PHYSICS AND ASTRONOMY SEMINAR. (1)**

Reports and discussion on student research projects and research topics from the literature of physics and astronomy. May be repeated to a maximum of two credits. Prereq: PHY 361, COM 199 or equivalent.

**PHY 504 ADVANCED MECHANICS. (3)**

A continuation and extension of PHY 404G. Includes dynamics of a particle, rigid bodies, Lagrange's equations, constrained motions, and oscillations. Prereq: PHY 404G, MA 214.

**PHY 506 METHODS OF THEORETICAL PHYSICS I. (3)**

The course and its sequel (MA/PHY 507) are designed to develop, for first-year graduate students, familiarity with the mathematical tools useful in physics. Topics include curvilinear coordinates, infinite series, integrating and solving differential equations of physics, and methods of complex variables. Work with Green's functions, eigenvalues, matrices and the calculus of variations are included as a part of MA/PHY 506 and 507. Prereq: PHY 404G or equivalent. (Same as MA 506.)

**PHY 507 METHODS OF THEORETICAL PHYSICS II. (3)**

Continuation of MA/PHY 506. Fourier and Laplace Transforms, the special functions (Bessel, Elliptic, Gamma, etc.) are described. Work with Green's functions, eigenvalues, matrices and the calculus of variations are included as a part of MA/PHY 506 and 507. Prereq: MA/PHY 506. (Same as MA 507.)

**PHY 508 OPTICS. (3)**

A lecture and problems course covering the basic phenomena of geometrical and physical optics. Topics include thick lenses, apertures, wave motion, interference, diffraction, polarization, double refraction, and the theory of selected optical instruments. Prereq: PHY 417G, PHY 361, MA 214.

**PHY 520 INTRODUCTION TO QUANTUM MECHANICS. (3)**

A lecture and problem course providing an introduction to quantum mechanics at the undergraduate level. Primary emphasis is on the Schrodinger equation, and its applications. Prereq: PHY 361, MA 214.

**PHY 522 HEAT AND THERMODYNAMICS. (3)**

A lecture and problem course stressing some of the fundamental principles of heat phenomena, the laws of thermodynamics, equations of state for ideal and real gases, continuity, derivation of thermodynamic relations. Prereq: PHY 361 and MA 214.

**PHY 524 AND 525 SOLID STATE PHYSICS. (3 ea.)**

Introductory solid state physics with emphasis on the properties of electrons in crystals; crystal structure, crystal diffraction, reciprocal lattice, lattice vibrations and phonons, free electron theory, energy bands in solids, semiconductors. Prereq: (For 524) PHY 520 or consent of instructor. PHY 525 is a continuation of PHY 524. Crystal binding; elastic constants and elastic waves; superconductivity; ferromagnetism; optical and transport properties of metals, semiconductors, insulators, and interfaces. Prereq: (For 525) PHY 524.

**PHY 530 EXPERIMENTAL PHYSICS: OPTICS AND SPECTROSCOPY. (2)**

An advanced laboratory dealing with the wave nature of light, optical systems, interference, diffraction, polarization and spectroscopy. Prereq: PHY 308 or PHY 508.

**PHY 535 EXPERIMENTAL PHYSICS: ATOMIC AND NUCLEAR. (3)**

A combined lecture and laboratory course in which students both learn the statistical methods by which observational data are analyzed and repeat many of the experiments which established the quantum-mechanical behavior of atomic and nuclear systems. Experiments include the quantization of charge, the energy levels of atomic systems, the wave nature of matter, Compton scattering from electrons, X-ray diffraction, Planck constant. Lecture, one hour; laboratory, four hours per week. Prereq: PHY 361.

**PHY 545 RADIATION HAZARDS AND PROTECTION. (3)**

An analysis of common radiation hazards encountered in medicine, research, industry, and the environment. Regulations and procedures for the safe use of ionizing and nonionizing radiations. Lecture, two hours; laboratory, two and one-half hours. Prereq: PHY/RM 472G or consent of instructor. (Same as RM/RAS 545.)

**PHY 546 GENERAL MEDICAL RADIOLOGICAL PHYSICS. (3)**

The uses and dosimetric aspects of radiation in medicine will be analyzed, including many basic applications in the fields of diagnostic radiology physics, therapy physics, and nuclear medical physics. Prereq or concur: RM/PHY 472G or consent of instructor. (Same as RM/RAS 546.)

**PHY 554 FUNDAMENTAL ATOMIC PHYSICS. (3)**

Topics covered include electromagnetic radiation, atomic spectra and their interpretation in terms of atomic models, the Zeeman and Stark effects. Prereq: PHY 520.

**PHY 555 FUNDAMENTAL NUCLEAR PHYSICS. (3)**

Topics covered include nuclear systematics, the nucleon-nucleon-interaction, nuclear models, radioactivity, nuclear reactions, fission and fusion. Prereq: PHY 520.

**PHY 556 FUNDAMENTAL PARTICLE PHYSICS. (3)**

Introduction to elementary particle physics. Topics include: particle interactions and families, the quark model, symmetries and conservation laws, particle reactions and decays, quark dynamics, and elements of quantumchromodynamics and electroweak interactions. Prereq: PHY 520.

**PHY 567 INTRODUCTION TO LASERS AND MASERS. (3)**

Basic principles of laser action, atomic transitions; population inversion; two- and three-level systems; optical resonators; pumping methods; applications. Prereq: Engineering upper division status or consent of instructor. (Same as EE 567.)

**PHY 570 SEMINAR ON TEACHING PHYSICS. (1)**

A seminar course for teaching assistants focused on developing the art and science of teaching physics. Journal articles, books and other texts will be studied to serve as sources of discussion about the teaching and learning activities in the Department of Physics and Astronomy. Prereq: Consent of instructor.

**PHY 571 SEMINAR ON TEACHING PHYSICS LABORATORIES. (1)**

A seminar course for teaching assistants focused on developing the art and science of teaching physics laboratories. Journal articles, books and other texts will be studied to serve as sources of discussion about the teaching and learning activities in the laboratory classes in the Department of Physics and Astronomy. Prereq: Consent of instructor.

**PHY 591 ASTROPHYSICS I - STARS. (3)**

Structure of the universe - an overview: hierarchy of objects, the distance ladder. Stellar structure: hydrostatic equilibrium, energy transport, nuclear energy generation, equilibrium solutions. Stellar evolution: nucleosynthesis, evolution off the main sequence, final stages of stellar life - white dwarfs, supernovae, neutron stars and black holes. Binary stellar systems. Prereq: PHY 361, PHY 416G, PHY 417G. (Same as AST 591.)

**PHY 592 ASTROPHYSICS II - THE GALAXY. (3)**

Interstellar matter: gas and dust, interstellar reddening, absorption lines, 21 cm observations. Phases of the interstellar medium: HII regions, atomic and molecular clouds. Star formation. Stellar populations. Galactic structure and dynamics: the galactic nucleus, spiral structure, rotation curve, dark matter. Prereq: PHY 591. (Same as AST 592.)

**PHY 600 SELECTED TOPICS IN ADVANCED PHYSICS. (2-3)**

Topics of an advanced and specialized nature such as the theory of angular momentum, topics in advanced theoretical nuclear physics, topics in advanced statistical mechanics. May be repeated to a maximum of nine hours. Prereq: Consent of instructor.

**PHY 611 ELECTROMAGNETIC THEORY I. (3)**

A lecture and problem course treating electrostatics, boundary conditions, potential problems, energy in electric and magnetic fields, magnetic materials and Maxwell's equations. Prereq: PHY 416G; MA 214.

**PHY 613 ELECTROMAGNETIC THEORY II. (3)**

Continuation and extension of PHY 611. Includes theory of electromagnetic waves and applications to optical phenomena and radiation. Special theory of relativity and the covariant treatment of Maxwell's equations will be discussed. Prereq: PHY 611.

**PHY 614 QUANTUM MECHANICS I. (3)**

A lecture and problem course dealing with the description of quantum systems in the forms of wave mechanics, matrix mechanics and state vectors. Also includes angular momentum and its addition, and approximation methods for bound states. Prereq: PHY 520.

**PHY 615 QUANTUM MECHANICS II. (3)**

Continuation of PHY 614 covering time dependent perturbation theory, symmetry and invariance principles, and elementary scattering theory including the method of partial waves. Prereq: PHY 614.

**PHY 624, 625 THEORY OF THE SOLID STATE. (3 ea.)**

A lecture and problem course covering the fundamental theories of the structure and properties of solids, including lattice dynamics, electron propagation, electrical, thermal and optical properties. Prereq: PHY 524, 525 and 614.

**PHY 629 NUCLEAR PHYSICS. (3)**

A lecture and problem course dealing with the structure of atomic nuclei, nuclear processes, and nuclear radiations. Topics include nuclear shell structure, nuclear properties, inter-nucleon forces, nuclear binding energies, and nuclear reactions. Prereq: PHY 614.

**PHY 630 TOPICS IN NUCLEAR AND INTERMEDIATE ENERGY PHYSICS (Subtitle required). (3)**

A lecture-problem course alternately dealing with advanced topics in nuclear and intermediate energy physics. Nuclear physics topics include theories of transition rates and moments, the formal theory of nuclear reactions, microscopic models of nuclear matter, and collective and single particle aspects of nuclear structure. Topics in intermediate energy physics include photonuclear reactions, pion absorption and scattering, the role of spin in nucleon scattering, and the relativistic description of scattering and reactions. (May be repeated to a maximum of six hours when taken under different subtitles.) Prereq: PHY 629.

**PHY 632 STATISTICAL MECHANICS. (3)**

A lecture and problem course dealing with the thermal properties of matter from the standpoint of statistical mechanics. Topics include thermodynamic properties, perfect gases, and Fermi-Dirac statistics. Prereq: PHY 522, 604.

**PHY 639 PHYSICAL PROCESSES IN ASTROPHYSICS. (3)**

A lecture and problem course covering the physical processes encountered in astrophysics. The topics covered will include micro-physical processes in stellar atmospheres and the interstellar medium, high-energy astrophysics, and basic hydrodynamics and shock waves. Prereq: PHY/AST 592 or consent of instructor. (Same as AST 639.)

**PHY 640 GALAXIES AND COSMOLOGY. (3)**

A course covering extra-galactic astronomy and cosmology. Topics include properties of galaxies, active galaxies and quasars. The standard big bang model of the universe will be discussed in detail, including observational cosmology, nucleosynthesis in the early universe and formation of large scale structure. Prereq: PHY/AST 592 or consent of instructor. (Same as AST 640.)

**PHY 651 ATOMIC PHYSICS. (3)**

A lecture and problem course dealing with advanced topics in atomic physics, including atomic structure, spectra, and interactions of atoms with charged particles and electromagnetic fields. Topics include Rydberg atoms, ionization processes, electron correlations, laser techniques and general theoretical methods. Prereq: PHY 554, 611 and 614.

**PHY 716 ADVANCED QUANTUM MECHANICS. (3)**

A continuation of PHY 615. Topics covered will include the relativistic wave equations, second quantization, quantum electrodynamics. Prereq: PHY 615.

**PHY 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PHY 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**PHY 756 PARTICLE PHYSICS. (3)**

A lecture-problem course on advanced topics in elementary particle physics. Topics include the quark model and group theory, chiral symmetry of the strong interaction, the parton model and scaling, quantum chromodynamics, electroweak theory, grand unification, and the renormalization group. Prereq: PHY 716.

**PHY 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**PHY 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**PHY 770 COLLOQUIUM. (1)**

A weekly meeting of the staff and advanced students for the discussion of recent developments in physics and of work in progress in the department. Credit is given to those who satisfactorily present papers. May be repeated to a maximum of eight credits.

**PHY 781 INDEPENDENT WORK IN PHYSICS. (3)**

May be repeated to a maximum of 12 credits.

**PHY 790 RESEARCH IN PHYSICS. (3)**

May be repeated to a maximum of six credits.

**PHY 791 RESEARCH IN PHYSICS. (5)**

May be repeated to a maximum of 10 credits.

**PLS Plant and Soil Science****PLS 104 PLANTS, SOILS, AND PEOPLE: A GLOBAL PERSPECTIVE. (3)**

A survey of important world grain, oil, fiber, forage, fruit, vegetable and specialty crop plants. Principles of plant, soil and climatic factors governing adaptation and production of these plants are discussed and applied. Intended to provide substantial plant and soil science background for students not majoring in plant and soil science, but is open and should appeal to beginning plant and soil science majors as well.

**PLS 210 THE LIFE PROCESSES OF PLANTS. (3)**

This course is intended to provide a basic understanding of the natural products and processes that shape the nature of modern plants, and govern their interactions with the environment and characteristics unique to plants, and develop a basic understanding of how these plant attributes relate to organismic function. Emphasis will be placed on exploring the nature of the major plant biomes of the Earth, their community dynamics, and how member plants compete for space and other resources. Development of optimal plant strategies for reproductive success, plant interaction with other living systems as well as abiotic factors and their defense from predation and attack will also be considered. (Same as BIO 210.)

**PLS 220 INTRODUCTION TO PLANT IDENTIFICATION. (3)**

An introduction to the techniques used for plant identification based on over one hundred plants encountered in everyday life. Lecture, one hour; laboratory, four hours per week.

**PLS 366 FUNDAMENTALS OF SOIL SCIENCE. (3)**

Development of concepts and understanding of the properties and processes that are basic to the use and management of soils. Prereq: CHE 105, or consent of instructor.

**PLS 386 PLANT PRODUCTION SYSTEMS. (4)**

In-depth analysis of the underlying principles of plant production systems. Successful strategies, based on application of the principles developed by lecture and laboratory activities, will be discussed in either agronomic or horticultural contexts. Special attention will be given to minimizing the environmental impact of the plant production techniques employed. Prereq: PLS 366 or consent of instructor.

**PLS 490 TOPICS IN PLANT AND SOIL SCIENCE. (3)**

A capstone course for majors in Plant and Soil Science to be taken near the conclusion of the student's academic career. The course provides the student the opportunity to integrate knowledge acquired in previous courses in the plant and soil science and support areas. Emphasis will be placed on problem solving, synthesizing and integrating information, critical thinking, group activities, and written and oral communication. Instructional methods may include formal lectures, laboratories or supervised individual research. The specific nature of the course depends upon the student's Area of Emphasis within the Plant and Soil Science major. All topics offered will be approved by the Undergraduate Education Committee in the Area of Emphasis. Prereq: Senior in Plant and Soil Science.

**PM Preventive Medicine and Environmental Health****PM 521 EPIDEMIOLOGY. (4)**

Initial graduate level course in the principles of epidemiology and its uses and applications in preventive medicine and public health. Lecture, three hours; laboratory, two hours per week. Prereq: Graduate students in Public Health and Nursing students in the Community Health Management component graduate program and consent of instructor.

**PM 601 ENVIRONMENTAL AND OCCUPATIONAL HEALTH. (4)**

An overview of occupational and environmental health problems, toxicology related to the work place and other environments, industrial hygiene, safety, and other topics relevant to environmental health. Lecture, three hours; laboratory, two hours per week. Prereq: PHA 603 and PGY 502 or equivalents, or consent of instructor.

**PM 602 OCCUPATIONAL AND ENVIRONMENTAL HEALTH. (4)**

A continuation of topics in PM 601. Lecture, three hours; laboratory, two hours per week. Prereq: PM 601 or consent of instructor.

**PM 621 TOPICS IN ADVANCED EPIDEMIOLOGY. (2)**

This course provides specialized epidemiologic content and method designed to meet the research and practice needs of health professionals. A series of topic-driven lectures and discussions will focus on the role of epidemiology in the prevention of disease and injury. Prereq: PM 521 or permission of instructor.

**PM 651 WORK PLACE VENTILATION. (3)**

This course will cover ventilation fundamentals for control of the work environment. Principles of airflow, fans, blowers, and basic hood design will be covered. Airflow measurements and ventilation will be discussed. Laboratory experience and field studies will be utilized as part of the teaching approach. Lecture, two hours; laboratory, two hours per week. Prereq: PM 661 or consent of instructor.

**PM 661 INDUSTRIAL HYGIENE SAMPLING. (3)**

This course, using lectures and laboratory exercises, will cover sampling and analysis techniques for industrial hygiene assessment and monitoring. The laboratory experiments are intended to simulate typical industrial hygiene measurement situations and to provide a basis for selection of sampling techniques and critical evaluation of laboratory results. Lecture, two hours; laboratory, two hours per week. Prereq: Consent of the instructor.

**PM 662 PUBLIC HEALTH PRACTICE AND ADMINISTRATION. (3)**

This course is to be a practical application of the principles of health care organization to public health at the national, state, and local levels. Prereq: Health care organization course.

**PM 663 PRACTICUM IN ADVANCED INDUSTRIAL HYGIENE.****(1-3)**

In this individual tutorial/internship course, the student will apply sampling and workplace hazard survey techniques to real-world problems. Evaluations of ventilation and engineering controls will be conducted and discussed, and special techniques for the evaluation of personal protective equipment and documentation of dermal exposures will be utilized. May be repeated to a maximum of six credits. Prereq: Completion of PM 601, 602, and 661.

**PM 748 MASTER'S THESIS RESEARCH.****(0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PM 768 RESIDENCY CREDIT FOR MASTER'S DEGREE.****(1-6)**

May be repeated to a maximum of six credits.

**PM 770 SEMINAR IN PREVENTIVE MEDICINE AND PUBLIC HEALTH.****(1-3)**

A special seminar focusing each semester on an important topic, such as health problems of special working groups, cancer control, and health policy issues. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PM 780 SPECIAL PROBLEMS IN PREVENTIVE MEDICINE AND PUBLIC HEALTH.****(1-3)**

Organized study or tutorial focused on special problems or issues. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PM 790 RESEARCH IN PREVENTIVE MEDICINE AND PUBLIC HEALTH.****(1-3)**

Individually directed research under the supervision of one or more faculty members. Laboratory, two to six hours per week. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PM 815 FIRST-YEAR ELECTIVE, PREVENTIVE MEDICINE AND ENVIRONMENTAL HEALTH.****(1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Preventive Medicine and Environmental Health. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**PM 825 SECOND-YEAR ELECTIVE, PREVENTIVE MEDICINE AND ENVIRONMENTAL HEALTH.****(1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Preventive Medicine and Environmental Health. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**PM 841 PREVENTIVE MEDICINE CLERKSHIP SELECTIVE.****(1-6)**

The medical student working singly or in small groups will, with Preventive Medicine faculty assistance, identify a question in the broadest sense in "medicine" which can best be answered by a population-based study. This could include comparison of therapeutic techniques, status of knowledge by health provider or consumer about certain conditions or costs of care, problems of organizing health services, ethical problems, or any other population-based question amenable to study. Building on the second year experience, the project will involve identification of a question, design and conduct of the study, appropriate analysis of data, and a written and oral presentation. Prereq: Admission to College of Medicine.

**PM 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS.****(1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:****PM 850 PREVENTIVE MEDICINE OFF-SITE ELECTIVE.****PM 851 CLINICAL CLERKSHIP IN PREVENTIVE MEDICINE AND ENVIRONMENTAL HEALTH.****PM 852 RESEARCH IN PREVENTIVE MEDICINE AND ENVIRONMENTAL HEALTH.****PPA****Plant Pathology****PPA 400G PRINCIPLES OF PLANT PATHOLOGY.****(3)**

To present students with the principles of plant pathology. The causes, effects, control and nature of plant diseases will be studied; the laboratory will expose students to common diseases and pathogens discussed in lecture. Emphasis will be given to diseases important in Kentucky. Lecture, two hours; laboratory, two hours. Prereq: One semester of botany (e.g. BIO 351) and microbiology (e.g. BIO 108/109) or consent of instructor.

**PPA 410 FOREST PATHOLOGY.****(3)**

Symptomatology, epidemiology, host-pathogen relations and control of selected diseases of forest trees. Lecture, two hours; laboratory, two hours. Prereq: BIO 106 and 107 or BIO 351 or one equivalent semester of botany. (Same as FOR 410.)

**PPA 503 PLANT BIOCHEMISTRY.****(3)**

The chemical constituents of plants, their interaction and the regulation of their interaction in key plant metabolic systems will be studied. Included in the course will be discussions of photosynthesis, nitrogen, nitrate reduction, nitrogen assimilation, plant growth and its regulation and the structure and metabolism of constituents unique to plants. Prereq: BCH 501 and 502 or equivalent or consent of instructor. (Same as BCH 503.)

**PPA 601 SPECIAL TOPICS IN MOLECULAR AND CELLULAR GENETICS.****(1)**

Each semester five distinguished scientists visit the UK campus to deliver a series of three formal lectures each and participate in numerous informal contacts with graduate students. The emphasis is on the presentation of the most current advances (often unpublished) in selected topics in molecular and cellular genetics. May be repeated to a maximum of six credits. (Same as AGR/BIO/BCH/MI 601.)

**PPA 640 IDENTIFICATION OF PLANT DISEASES.****(3)**

Recognition and identification of plant diseases and their causes and development. The course is designed to give students practical experience in dealing with a wide array of plant diseases, symptom expressions, causal agents and interactions with environmental factors encountered in the difficult task of identifying plant diseases. May be repeated to a maximum of nine credits. Lecture, one hour; laboratory, six hours. Prereq: PPA 400G or equivalent or consent of instructor.

**PPA 652 PLANT PATHOGENIC FUNGI.****(3)**

An advanced study of plant pathogenic fungi with emphasis on diagnosis and identification of fungus plant diseases and inoculation and infection of plants. Lecture, two hours; laboratory, three hours. Prereq: PPA 640 or equivalent or consent of instructor.

**PPA 656 PLANT VIROLOGY.****(3)**

Structure of viruses and viroids that cause plant diseases; replication and genome expression; biology of plant virus infections; ecology, epidemiology and control strategies for virus diseases. Prereq: PPA 400G and BCH 401G or consent of instructor.

**PPA 660 MOLECULAR AND PHYSIOLOGICAL DYNAMICS OF PLANT-MICROBE INTERACTIONS.****(4)**

The course is intended to introduce the advanced student to the dynamic nature of plant-microbe interactions through diverse considerations of molecular genetic, physiological, biochemical and cytological aspects of plant diseases and symbioses. Prereq: AGR 360 or BIO 404G, BCH 401G, PPA 400G, or consent of instructor.

**PPA 661 GENETICS OF PLANT-MICROBE INTERACTIONS.****(3)**

Genetics and molecular genetics of interactions between organisms. Primary emphasis will be plant interactions with fungi and bacteria. Areas of study will be: principles of interorganismal genetics and the gene-for-gene model; race-cultivar interactions; genetic determinants of disease in pathogenic relationships, and symbiosis in mutualistic relationships. Examples will include Flor's flax/flax rust system, plant transformation by *Agrobacterium*, mutualisms involving *Rhizobium*, and others. Prereq: AGR 562 or equivalent, or consent of instructor.

**PPA 695 EPIDEMIOLOGY AND MANAGEMENT OF PLANT DISEASES.****(3)**

An examination of plant disease development at the population level, and of how management practices influence dynamics of pathogen populations and disease development. The spectrum of disease management practices will be considered, including host plant resistance, cultural practices, chemical and biological control. Technical, social, and economic aspects of plant disease management will be discussed. Lecture, two hours; laboratory, two hours. Prereq: PPA 400G.

**PPA 748 MASTER'S THESIS RESEARCH.****(0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PPA 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**PPA 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**PPA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

**PPA 770 PLANT PATHOLOGY SEMINAR. (1)**  
Reports and discussion of problems and investigations of problems in plant pathology. May be repeated to a maximum of four credits.

**PPA 784 SPECIAL PROBLEMS IN PLANT PATHOLOGY. (1-3)**  
May be repeated to a maximum of nine credits. Prereq: PPA 400G or equivalent or consent of instructor.

**PPA 794 RESEARCH IN PLANT PATHOLOGY. (1-4)**  
May be repeated to a maximum of 12 credits. Prereq: PPA 400G or equivalent or consent of instructor.

## PRO Prosthodontics

**PRO 820 INTRODUCTION TO COMPLETE DENTURE PROSTHODONTICS. (4)**  
A preclinical lecture and laboratory introduction to basic concepts of diagnosis and treatment planning, fabrication, placement and maintenance of complete dentures. This course presents the related biological and mechanical factors that must be incorporated for living tissue to be compatible with complete dentures. The methods and materials for constructing complete dentures are presented, and certain laboratory phases of construction are performed by the student in simulated situations. Lecture, 30 hours; laboratory, 68 hours. Prereq: ANA 530, ANA 534 and RSD 814.

**PRO 821 CLINICAL COMPLETE DENTURE PROSTHODONTICS. (1)**  
The treatment of a patient with complete maxillary and mandibular denture needs is performed in the clinic by the student. The student will assist an upper level student in the examination of a complete denture and a removable partial denture recall patient. Clinic, 52 hours. Coreq: PRO 820.

**PRO 824 REMOVABLE PARTIAL DENTURES. (2)**  
This course is designed to teach the student the basic principles and the practical procedures in providing a therapeutic and functional removable restoration. The course also presents the laws and effects of leverages as related to removable partial dentures as well as the considerations for support, occlusion, and health of all oral structures. Lecture, 13 hours; laboratory, 39 hours. Prereq: PRO 820.

**PRO 830 ADVANCED REMOVABLE PROSTHODONTICS. (1)**  
This course is a continuation of PRO 820. It presents more advanced technique and treatment planning for complex prosthodontic needs. Subjects included are immediate dentures, overdentures and dental implants. Lecture, 21 hours. Prereq: PRO 820 and PRO 824.

**PRO 831 CLINICAL REMOVABLE PROSTHODONTICS. (2)**  
A patient with complete denture needs is treated by the student clinically in the course. The student may opt to treat a patient with immediate, intermediate or overdenture needs. He may initiate and/or complete the treatment of two patients with removable partial denture needs. The student may also treat an optional, additional patient in need of a complete or removable partial denture. The student will recall a minimum of two removable prosthodontic patients and perform any treatment necessary for these patients. Clinic, 110 hours. Prereq: PRO 821; coreq: PRO 830.

**PRO 841 ADVANCED CLINICAL REMOVABLE PROSTHODONTICS. (2)**  
This course covers basically the same area as PRO 831 with the exception that the student is to treat the patient with complete denture needs with less supervision from the instructors. If not done previously, the student must initiate and complete the treatment of two patients with removable partial denture needs. The student will recall three removable prosthodontic patients and will perform any treatment necessary for these patients. Clinic, 114 hours. Prereq: PRO 831.

**PRO 850 PROSTHODONTICS ELECTIVE. (1-10)**  
Elective courses offered by the Department of Prosthodontics provide opportunities for further study of or experience in various aspects of prosthodontics. Topics may include treatment of patients who require complete dentures, removable partial dentures and overdentures; maxillofacial prosthodontics; and other prosthodontic treatment procedures. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

## PS Political Science

**Note:** It is assumed that all prerequisites include, in addition to any specific course listed, the phrase "or equivalent," or "consent of instructor."

**PS 101 AMERICAN GOVERNMENT. (3)**  
A survey of national government and the political process in the United States, with emphasis on the Constitution, the President, Congress, and the judicial system.

**PS 202 ORIENTATION TO POLITICAL SCIENCE. (1)**  
An introduction to topics studied by political scientists and the techniques used in these studies. Lectures, discussions and assigned readings will cover major fields of the discipline and will introduce students to research methods. The course will be offered Pass/Fail only.

**PS 210 INTRODUCTION TO EUROPEAN POLITICS: EAST AND WEST. (3)**  
An introduction to the comparative study of political institutions, policy-making processes, citizen participation, and political outcomes in Eastern and Western European states.

**PS 212 CULTURE AND POLITICS IN THE THIRD WORLD. (3)**  
This course analyzes the politics of selected states in Africa, Asia, and Latin America. Various bases of political cleavage and cooperation will be examined: ethnicity, language, social class and ideology. Cultural differences between Africa, Asia and Latin America will be identified and their political implications explored, as well as differences within geo-cultural areas.

**PS 235 WORLD POLITICS. (3)**  
A study of the most significant problems of world politics, including the fundamental factors governing international relations, the techniques and instruments of power politics, and the conflicting interests in organizing world peace.

**PS 240 IDEOLOGY, POLITICAL CHANGE, AND CONTEMPORARY INDUSTRIAL SOCIETY. (3)**  
A study of contemporary political ideas, social and political change, and their reciprocal relationship primarily in the advanced industrial societies. Ideology as a tool of both political action and analysis will be examined. Substantive discussion of political doctrines will deal with traditional and contemporary forms of liberalism, conservatism, socialism, anarchism and fascism, as well as current revolutionary movements and ideologies.

**PS 245 INTRODUCTION TO POLITICAL ANALYSIS. (3)**  
Introduction to the basic knowledge of research methodology in political science; a review of methods of data collection; historical, quantitative and comparative techniques of analysis.

**PS 255 STATE GOVERNMENT. (3)**  
An introduction to the institutions, political processes and policies of state governments, and the relationships of state governments with other levels of government in the United States.

**PS 271 INTRODUCTION TO POLITICAL BEHAVIOR. (3)**  
The study of behavior in a political context; the analysis of basic behavioral concepts used in political science such as political roles, group behavior, belief systems, personality, power and decision-making.

**PS 280 ISSUES IN PUBLIC POLICY. (3)**  
An examination of selected major public policy problems, focusing on their nature, political ramifications and alternate methods of dealing with them. Policies covered will vary from semester to semester, but will include such areas as poverty, health care, energy, education, race relations, environment, etc. Prereq: PS 101.

**PS 390 SEMINAR IN POLITICAL SCIENCE. (1-3)**  
A topical seminar primarily for majors in political science and in related fields. May be repeated to a maximum of 12 credits in seminars of differing topics. Prereq: A standing of 3.0 in the student's major department or consent of instructor.

- PS 395 INDEPENDENT WORK.** (1-6)  
Consent of instructor. May be repeated to a maximum of 12 credits. Prereq: A standing of 3.0 in political science courses.
- PS 399 INTERNSHIP IN GOVERNMENT.** (1-6)  
This course is designed for students who are participating in a state, local or federal internship program with which the political science department is associated. The student must have approval of the department chairperson upon the recommendation of the Committee on Internship and Experiential Education to take the course, negotiate a learning contract with a departmental academic supervisor, and provide the department with a report or a paper on his internship. Pass/Fail only. May be repeated to a maximum of 12 credits.
- PS 411G COMPARATIVE GOVERNMENT – PARLIAMENTARY DEMOCRACIES I.** (3)  
A study of the governments of Britain and selected Commonwealth countries.
- PS 412G COMPARATIVE GOVERNMENT – PARLIAMENTARY DEMOCRACIES II.** (3)  
A study of the political systems of selected continental European countries with special attention to France and Germany.
- PS 417G SURVEY OF SUB-SAHARAN POLITICS.** (3)  
A survey of sub-Saharan government and politics intended to give the student broad knowledge about the setting of African politics, precolonial African political systems, the political legacies of major European colonial powers, and problems of political development.
- PS 419G THE GOVERNMENTS AND POLITICS OF EASTERN ASIA.** (3)  
A comparative analysis of the modern political experiences of China and Japan, exploring their responses to the West, the development of differing political elites in each country, and contemporary problems of the Chinese Communist and Japanese politics.
- PS 420G GOVERNMENTS AND POLITICS OF SOUTH ASIA.** (3)  
A comparative analysis of contemporary political development in India, Pakistan, Bangladesh and Sri Lanka, with emphasis on political cultures, participation, institutions and the capabilities of these political systems.
- PS 421G GOVERNMENT AND POLITICS OF SOUTHEAST ASIA.** (3)  
Study of the political processes, problems and behavior of the several states of Southeast Asia with emphasis on their chief determinants. The different patterns of political development will be examined. Lecture, three hours.
- PS 428G LATIN AMERICAN GOVERNMENT AND POLITICS.** (3)  
A study of contemporary Latin American political institutions and of the dynamics of the Latin American political process.
- PS 429G GOVERNMENT AND POLITICS IN RUSSIA AND THE POST-SOVIET STATES.** (3)  
Analysis of political development in the Soviet Union with emphasis on party-government relations, Communist ideology, and major approaches to the study of Soviet politics.
- PS 430G THE CONDUCT OF AMERICAN FOREIGN RELATIONS.** (3)  
The formulation of American foreign policy from several analytic perspectives, with somewhat more emphasis on inputs and process than on substantive outputs. Prereq: PS 101 or consent of instructor.
- PS 431G NATIONAL SECURITY POLICY.** (3)  
The organization and formulation of military policy; the theory and practice of deterrence; and the problems of disarmament and arms control. Prereq: PS 235 or consent of instructor.
- PS 433G POLITICS OF INTERNATIONAL ECONOMIC RELATIONS.** (3)  
The course examines contending theoretical approaches to global political economy. These approaches are used to analyze various issues of global political economy, such as the international monetary system, multinational corporations, foreign aid, and trade.
- PS 436G INTERNATIONAL ORGANIZATION.** (3)  
A study of the evolution of international organizations in the 20th Century. Examination of the increasing size, complexity, and diversity of contemporary global and regional international organizations. The role of international organizations in future world order.

- PS 437G DYNAMICS OF INTERNATIONAL LAW.** (3)  
An examination of the politics of the development of international law and its operation in a multicultural world. Legal principles and international political processes are discussed through illustrative issue areas: management of conflict; distribution of territorial resources; environmental problems; and human rights.
- PS 439G CONTEMPORARY INTERNATIONAL PROBLEMS.** (3)  
An examination of selected current problems in world politics and foreign policy. Students will be encouraged to apply their knowledge to the analysis of contemporary international issues.
- PS 441G EARLY POLITICAL THEORY.** (3)  
A survey of political theorists in the Western political tradition from classical Greece to the Renaissance. The formative influences upon our conceptions of politics, citizenship, justice, and natural rights will be highlighted and key issues in controversies over rhetoric and philosophy, time and political order, education and the body politic, and political action and human artifice will be illuminated.
- PS 442G MODERN POLITICAL THEORY.** (3)  
Western political theory from Machiavelli to Marx and Weber with emphasis on the impact of early modern culture and liberalism upon contemporary views of power, individualism, community, and political consciousness. Key contributions of modern political theorists to perennial debates on power and the intellectual, institutional bases of modern constitutionalism, human nature and aggression, the sources of alienation, and the relation of modern science and technology to contemporary forms of domination will be explored.
- PS 453G URBAN GOVERNMENT AND POLITICS.** (3)  
An analysis of the formulation of public policy in small towns, middle-sized cities, and metropolitan areas. A theoretical model appropriate to all three settings will be formulated. The principal methods of studying community decision-making will be evaluated. Prereq: Three hours of social sciences.
- PS 454G POLITICS OF LAND USE AND GROWTH MANAGEMENT.** (3)  
A study of the legal and structural features of the land use regulatory system, the social and political environments within which this system operates, and the values, stakes, and perspectives of those who operate or seek to influence this system. Topics will include land use planning, zoning and other regulatory tools, as well as growth management techniques and problems. Prereq: PS 453G.
- PS 456G APPALACHIAN POLITICS.** (3)  
A study of the interrelationships of the Southern Appalachian region and its people with the larger American political system, culture, and economy. Selective examination of public policies and major issues and their development in the politics of the region.
- PS 461G CIVIL LIBERTIES.** (3)  
A study of the philosophy and development of civil liberties in the U.S. Major concentration on the interpretation of constitutional guarantees by the Supreme Court.
- PS 463G THE AMERICAN JUDICIAL PROCESS.** (3)  
A study from the standpoint of the social sciences, of the judicial process at the state and national levels, dealing with the organization of courts, the making of judicial decisions, and the exercising of judicial power.
- PS 465G CONSTITUTIONAL LAW.** (3)  
A non-chronological study of major Supreme Court decisions and recent issues relating to separation of powers, federalism, the commerce clause, taxes, criminal justice and other non-civil liberties areas. Prereq: PS 101 or consent of instructor.
- PS 467G THE U.S. SUPREME COURT.** (3)  
A study of the Court as a political-legal institution, focusing on the appointment of justices, the development of its docket, the decisional process, and its interaction with other political institutions. Prereq: PS 101 or consent of instructor.
- PS 470G AMERICAN POLITICAL PARTIES.** (3)  
An analysis of American national and state party systems, organization, and functions; nominations and elections; and voting patterns.
- PS 472G POLITICAL CAMPAIGNS AND ELECTIONS.** (3)  
An analysis of individual voting behavior and candidate strategies during presidential and congressional elections. The effect of the mass media, political action committees, and political advertising on the vote decision is examined. Attention is also devoted to candidates' campaign organizations and communication strategies.
- PS 473G PUBLIC OPINION.** (3)  
An introduction to the nature and content of public opinion, how polls are conducted, the political effects of polling, and the role of public opinion in the policymaking process.

**PS 474G POLITICAL PSYCHOLOGY. (3)**  
An exploration of different models of political behavior, based on concepts of psychoanalysis, behaviorism, humanism, and social psychology. Prereq: PS 101 and PSY 100 or equivalent, or consent of instructor.

**PS 475G POLITICS AND THE MASS MEDIA. (3)**  
The ways the modern mass media affect the dynamics of politics in the United States are examined in this course. Specific topics include the impact of television on political discourse; the structure and ownership of mass media; how news is made and how it influences our political attitudes and behaviors; the role of the media in campaigns, elections and policy making. Prereq: PS 101.

**PS 476G LEGISLATIVE PROCESS. (3)**  
A study of Congress and the state legislatures, covering the legislative power structure, legislative committees, the selection of legislators and the roles they play, decision making, and the relations of the legislative and executive branches.

**PS 479 WOMEN AND POLITICS. (3)**  
A study of the role of women as political actors in the United States including the status of women in American society and the contribution of government policy to maintaining or changing that status. The political behavior of women at the mass and elite level will be examined.

**PS 480G GOVERNMENT AND THE ECONOMY. (3)**  
This course analyzes the relationship between political and economic systems in the modern, democratic, capitalist state. While the focus is primarily upon the United States, other political/economic systems as well as more general theoretical statements will be considered. Prereq: PS 101 and ECO 101 or equivalent.

**PS 487G INTRODUCTION TO PUBLIC ADMINISTRATION. (3)**  
A study of theories of administration and organization, problems of management and control, the principal staff and auxiliary functions and agencies, and the problem of administrative responsibilities under democratic government, and the political, social, and institutional context of administration.

**PS 489G THE ANALYSIS OF PUBLIC POLICY. (3)**  
A study of the development, implementation and impacts of government policies; and the sources of variation in policies adopted by differing governmental units.

**PS 490 HONORS IN POLITICAL SCIENCE. (3)**  
This course will provide, in a seminar setting, the opportunity for students to concentrate on developing and implementing research projects on topics of their own choice. The course will allow discussion of various perspectives in political science as well as on problems encountered in the research process. Prereq: Senior standing with 3.25 overall GPA and 3.50 GPA in major.

**PS 491 SPECIAL TOPICS IN POLITICAL SCIENCE (Subtitle required). (1-3)**  
Course will focus on selected topics drawn from various areas of political science taught by faculty members with special interests and competence. May be repeated in courses of differing topics to a maximum of 12 credits.

**PS 538 CONFLICT AND COOPERATION IN LATIN AMERICAN RELATIONS. (3)**  
An examination of (1) national development strategies as determinants of Latin American foreign policies, (2) the origins and political consequences of economic nationalism, (3) historical patterns of U.S. response to reformist and/or revolutionary change, (4) the role of extra-continental contenders for influence in the Americas, and (5) at least one contemporary foreign policy issue in inter-American relations. Prereq: PS 428G or permission of instructor.

**PS 545 AMERICAN POLITICAL THOUGHT. (3)**  
This course explores the American tradition of political thought, its formation, and the ways it is involved in major problems of culture, political economy, ideology, and identity. Alternative ideas of work, power, political obligation, science and technology, and related issues are examined. Relationships of theory and practice, public and private, and government and society are analyzed.

**PS 557 KENTUCKY GOVERNMENT AND POLITICS. (3)**  
A study of current political issues and institutions in Kentucky.

**PS 566 CONSTITUTIONAL INTERPRETATION. (3)**  
A study of the political and the philosophical origins of the U.S. Constitution and of the competing and overlapping philosophies about how it should be interpreted in modern times. Prereq: One of the following: PS 461G, PS 465G, or HIS 573.

**PS 571 INTEREST GROUPS. (3)**  
A study of interest groups, their roles in the political process, and techniques of lobbying and influencing opinion. Prereq: Junior standing.

**PS 580 THE BUDGETARY PROCESS. (3)**  
A study of the development of budgetary techniques in the United States, the uses to which budgets are put, the roles of the budgetary process in budgetary politics and in the functioning of government, and the distribution of government resources through the budget.

**PS 584 THE AMERICAN PRESIDENCY AND THE FEDERAL EXECUTIVE. (3)**  
A course in the American presidency, emphasizing institutional developments and the impact of recent presidents on the office, on other governmental institutions, on domestic and foreign policies, and including an examination of the broader context of the executive branch of government.

**PS 620 COMPARATIVE POLITICS: THEORY AND METHOD. (3)**  
A study of the evolution and development of comparative government and politics within the discipline with particular emphasis upon the formulation, application, and limitations of the theories, taxonomies and conceptual frameworks employed in comparative research.

**PS 630 PROSEMINAR IN NON-INSTITUTIONAL POLITICAL BEHAVIOR. (3)**  
Focuses on literature with implications for individual-level political behavior, particularly mass behavior. Major works in such fields as political socialization, biopolitics, political communication, and political games and coalitions. Specific content may vary in response to current demands. Readings in a substantive field such as voting behavior are also examined as examples of the application of listed areas. Prereq: Consent of instructor.

**PS 654 PROSEMINAR IN JUDICIAL PROCESS. (3)**  
A thorough survey of the recent literature in the judicial process, focusing particularly on judicial recruitment, the relationship of the judiciary to other power centers, and the decision-making process of judges.

**PS 671 STRATEGIES OF INQUIRY IN POLITICAL SCIENCE. (3)**  
Analysis of research paradigms for political science, and investigation into the foundations of scientific inquiry. Emphasis on topics such as explanation, concept formation, the construction and function of theory, data, and verification.

**PS 672 INTRODUCTION TO TECHNIQUES OF POLITICAL RESEARCH. (3)**  
Basic techniques of data collection, coding, and processing applicable to political research are introduced. Various statistical techniques of data analysis are discussed and applied to political data. Prereq: PS 671, familiarity with appropriate statistical methods and consent of instructor.

**PS 674 PROSEMINAR IN THEORIES OF INTERNATIONAL POLITICS. (3)**  
A survey of the major theoretical approaches to the study of international systems and processes.

**PS 680 PROSEMINAR IN POLITICAL INSTITUTIONS AND PROCESS. (3)**  
A thorough survey of recent literature on political institutions and the political process, including political parties and the legislative and executive processes, at the national and sub-national levels.

**PS 685 PROSEMINAR IN PUBLIC ADMINISTRATION AND POLICY. (3)**  
A survey of recent literature on public administration and public policy, including organizational theory, the political environment of administration, public budgeting, public personnel administration, public policy administration, and public management.

**PS 690 PROSEMINAR IN CONTEMPORARY POLITICAL THEORY. (3)**  
An examination of contemporary political theories, especially their relationships to theoretical issues in policy analysis. Major problems such as inquiry and change, ideology and power, and knowledge and authority will be studied, particularly in the context of public policy.

**PS 711 TOPICAL SEMINAR IN POLITICAL SCIENCE (Subtitle required). (3)**  
Topic and instructor will vary from semester to semester. Faculty member presents seminar on topic in which he has particular research competence or special expertise. May be repeated under different subtitle to a maximum of nine hours. Prereq: Two semesters of graduate work and consent of instructor.

**PS 730 AMERICAN FOREIGN POLICY. (3)**

The course emphasizes contending interpretations of the nature and sources of American foreign policy, the position of the United States in the international system, and foreign policy decision making. Prereq: Consent of instructor.

**PS 731 INTERNATIONAL SECURITY/CONFLICT ANALYSIS. (3)**

The seminar examines international security affairs, with an emphasis on the sources and nature of conflict, and methods of conflict, the patterns of conflict, and methods of conflict resolution and regulation, both within states and among them. Prereq: Consent of instructor.

**PS 733 INTERNATIONAL POLITICAL ECONOMY. (3)**

The course examines the contending theoretical perspectives and substantive functional issues underlying the politics of international economic relations. Special attention is paid to international trade and money, the politics of North-South relations, and comparative foreign economic policies. Prereq: Consent of instructor.

**PS 737 TRANSNATIONAL ORGANIZATIONS AND PROCESSES. (3)**

An analysis of approaches to the study of international, transnational and regional political and economic organizations and processes within the context of world politics. An examination of the impact of these activities and processes on contemporary problems of world order. Prereq: Graduate student status.

**PS 738 SEMINAR IN THE POLITICS OF ECONOMIC DEVELOPMENT (Subtitle required). (3)**

An analysis of the political environment and consequences of policy-making for developmental ends in Latin America, Africa, the Mid-East or Asia. Economic policy-making will be emphasized, but consideration may also be directed to housing, health, and educational policy-making. Course will generally focus on a geographic area. May be repeated to a maximum of nine credits under different subtitles. Prereq: Introductory economics or consent of the instructor.

**PS 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PS 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**PS 750 POLITICAL PARTIES AND ELECTIONS IN AMERICA. (3)**

A study of the organization and functions of political parties, nominations and elections, and voting alignments. Prereq: An undergraduate political parties course or consent of instructor.

**PS 757 SEMINAR IN COMPARATIVE DEMOCRATIC POLITICAL SYSTEMS. (3)**

An analysis of democratic political systems with emphasis upon the comparative approach as a method of political analysis. Prereq: PS 411G or consent of instructor.

**PS 758 SEMINAR IN SOVIET POLITICS, GOVERNMENT AND FOREIGN POLICY. (3)**

Emphasis on methodology of various approaches to the study of the USSR, as well as substantive research. Subjects will alternate yearly between Soviet politics and Soviet foreign policy. Prereq: PS 429G and PS 539 or consent of instructor.

**PS 762 SEMINAR IN JUDICIAL POLICY MAKING. (3)**

Formulation, development and implementation of Constitutional policy by the United States Supreme Court and other agencies. Primary focus on areas of contemporary importance (excluding civil rights). Cases and supporting materials. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PS 763 SEMINAR IN ADMINISTRATIVE POLITICS. (3)**

The process by which administrative agencies establish and enforce policy are analyzed in terms of both legal and political considerations and behavioral theory. Prereq: Consent of instructor.

**PS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**PS 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**PS 770 DEMOCRATIC THEORY AND PUBLIC POLICY. (3)**

This seminar typically focuses on the relationship of democratic theories to specific issues of public policy, including the role of values in policy analysis. Questions of science, ethics, and democracy and the relationship between technical knowledge and political knowledge may receive attention. Prereq: PS 690 or consent of instructor.

**PS 772 ADVANCED PROBLEMS IN RESEARCH METHODS. (3)**

A seminar in selected topics; the application of mathematical models and advanced statistical techniques to political science data. May be repeated to a maximum of six credits.

**PS 775 SEMINAR IN PUBLIC POLICY. (3)**

A political analysis of the domestic policy process including the formation, implementation, and impact of policy.

**PS 778 RESEARCH PROBLEMS IN TRANSNATIONAL POLITICS. (3)**

This seminar focuses on research strategies that can be utilized in dealing with problems in transnational politics. May be repeated to a maximum of six hours with consent of the instructor. Prereq: PS 620 or PS 674.

**PS 780 LEGISLATIVE BEHAVIOR. (3)**

A study of recent research in the legislative process emphasizing both the substantive and methodological aspects. Prereq: An upper division course in the legislative process or consent of instructor.

**PS 785 PSYCHOLOGICAL BASES OF POLITICAL BEHAVIOR. (3)**

The role of psychological constructs and theory in political explanation; measurement and inference problems; critical analysis of research concerned with such topics as the effect of psychological mechanisms on loyalty, quiescence, participation, political change and revolution. Prereq: PS 671 and PS 672 or consent of instructor.

**PS 795 SPECIAL PROBLEMS IN POLITICAL SCIENCE. (1-3)**

Specific programs of readings are developed to meet the needs of individual students. May be repeated to a maximum of six credits for master's students and 12 credits for Ph.D. students. Prereq: Any 600 level course in political science or consent of the Director of Graduate Study.

**PS 796 DIRECTED RESEARCH IN POLITICAL SCIENCE. (1-3)**

Individual research in a particular field of political science under the supervision of selected faculty. Open to advanced graduate students who are prepared for intensive study and research beyond that offered in regular classes in each field. May be repeated to a maximum of six hours. Prereq: Consent of the instructor and the director of graduate studies.

**PSC Psychiatry**

**PSC 815 FIRST-YEAR ELECTIVE, PSYCHIATRY. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Psychiatry. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**PSC 825 SECOND-YEAR ELECTIVE, PSYCHIATRY. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Psychiatry. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**PSC 841 PSYCHIATRY SELECTIVE. (4)**

Designed to give fourth year med student advanced exposure to principles and practice of psychiatry with close faculty supervision. Formalized seminars. Includes outpatient specialty wards, family counseling, emergency areas, consult psychiatry and geropsychiatry. Advance instruction in psychopharmacology and neurochemistry, straightforward constructs in psychotherapy, couple/family assessment, crisis intervention, etc. Course individualized within department, staffing patterns. Grade determined by supervisor's assessment of knowledge, skills, performance and progress. Four-week rotation. Prereq: PSC 831.



**PSC 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:**

**PSC 869 RESEARCH IN PSYCHIATRY**

**PSC 876 TRIPLE BOARD ACTING INTERNSHIP**

**PSC 890 OFF-SITE CLERKSHIP IN PSYCHIATRY**

**PSY Psychology**

**PSY 100 INTRODUCTION TO PSYCHOLOGY. (4)**

An introduction to the study of behavior covering theories, methods and findings of research in major areas of psychology. Topics covered will include the biological foundations of behavior; learning, perception, motivation, personality; developmental, abnormal, and social behavior; and methods of assessment. This course is a prerequisite to a significant number of courses in this and related areas of study. Lecture, three hours; laboratory/discussion, two hours.

**\*PSY 195 ORIENTATION TO PSYCHOLOGY. (1)**

An orientation to educational issues and career planning for students who have declared psychology as a major. Topics include career paths and opportunities, professional resources and issues, and educational planning. Pass/Fail only. Prereq: Declared major in Psychology, or consent of instructor.

**PSY 215 EXPERIMENTAL PSYCHOLOGY. (4)**

A study of the application of scientific methods to psychological research. Special emphasis is placed on the critical evaluation of contemporary research in experimental psychology. Particular attention is focused on the design, execution, and written report of laboratory research. Lecture, three hours; laboratory, two hours. Prereq: PSY 100 and sophomore standing, or consent of instructor.

**PSY 216 APPLICATIONS OF STATISTICS IN PSYCHOLOGY. (4)**

An introduction to statistical procedures used in making decisions based on psychological data. May not be used to satisfy the laboratory requirement in the College of Arts and Sciences. Lecture, three hours; laboratory, two hours. Prereq: PSY 100.

**PSY 223 DEVELOPMENTAL PSYCHOLOGY. (3)**

An introduction to the principles of developmental psychology as seen in human growth over the entire lifespan, with the primary focus on infancy through adolescence. Emphasis is placed on theory and data relating to the developmental aspects of cognition, language and personality. Prereq: PSY 100 or equivalent. (Same as FAM 254.)

**PSY 302 PSYCHOLOGY IN BUSINESS AND INDUSTRY. (3)**

Survey of the many applications of psychological principles and methods to problems in business and industry. Topics include consumer research and marketing, personnel selection, performance appraisal, employee training, motivation, leadership, dynamics of work groups, job stress, and person-machine interactions. Prereq: PSY 100.

**PSY 305 PSYCHOLOGY OF SEX ROLES. (3)**

A survey of the psychology of sex roles designed for the upper division undergraduate. The course will explore sex roles as they have been examined in the research literature of the social personality, developmental, physiological, and clinical areas of psychology. Both theoretical concepts and research findings will be considered. Prereq: PSY 100 and sophomore standing.

**PSY 331 THE PSYCHOLOGY OF ADJUSTMENT. (3)**

The individual's psychological adjustment to society is analyzed from a mental health perspective. The course provides a general orientation to the normal-abnormal continuum of behavior, including individual, social, and cultural determinants of behavior. Prereq: PSY 100. Not open to students who have had CH 520.

**PSY 395 INDEPENDENT WORK IN PSYCHOLOGY. (1-3)**

Designed for advanced students who assist faculty members on research projects that are conducted in regular consultation with the faculty member. Those students who take the course for three credits will meet as a group with a faculty member on a weekly basis; written and reading assignments will be given and the students will discuss the projects on which they are involved. May be repeated to a maximum of 12 credits. Pass-fail only. Prereq: Major in the department with a standing of 3.0 in psychology courses. A signed contract between student and faculty member must be filed in the departmental office prior to enrollment in the course.

**PSY 399 FIELD BASED/COMMUNITY BASED EDUCATION. (1-6)**

A community-based or field-based experience in psychology, under the supervision of a faculty member. May be repeated to a maximum of 12 credits (if applicable). Pass-fail only. Prereq: Consent of instructor and department chairperson; filing of a learning contract with departmental office and Office for Experiential Education; completion of 12 hours in psychology with a GPA of 2.5 in psychology courses. Psychology majors, juniors and seniors only.

**PSY 400 HISTORY AND SYSTEMS OF PSYCHOLOGY. (3)**

The course is designed primarily for majors in psychology in the senior year. A review of the history of psychology with special emphasis on the development of major psychological theories. The philosophical origins of psychology as a science are analyzed along with their impact on important psychologists. The influence of psychology's history on its current concepts, methods and problems is studied. Prereq: PSY 100.

**PSY 421 COGNITIVE PROCESSES LABORATORY. (1)**

Laboratory for PSY 427 to provide experience with the research methods of cognitive psychology. Lab sessions involve participation in a series of experiments on attention, memory, language, and problem-solving. Laboratory: two hours. Prereq or concurrent: PSY 427.

**PSY 423 PROCESSES OF PSYCHOLOGICAL DEVELOPMENT. (3)**

An advanced lecture course for majors in the life sciences (social, behavioral, and biological). The course will examine the nature of developmental processes in the areas of intelligence, learning, personality, and social behavior. Students will be required to do extensive reading in primary source materials. Prereq: PSY 223 or consent of instructor.

**PSY 424 HUMAN SENSES AND PERCEPTION. (3)**

A study of the stimulus, receptor and organism variables that underlie perceptual experience and perceptually based behavior with emphasis upon theory and experimental method. Prereq: PSY 100.

**PSY 425 DIMENSIONS OF AGING. (3)**

Analysis of demographic and institutional patterns, social roles, psychological and physiological changes, and social policies and programs associated with aging. Prereq: Six hours of social science or permission of instructor. (Same as SOC 425, ANT 425.)

**PSY 426 HUMAN SENSE AND PERCEPTION LABORATORY. (1)**

Laboratory to accompany PSY 424. Laboratory consists of a series of exercises and experiments with students serving as experimenters and subjects. Emphasis is on perceptual content, but methods and report writing are also stressed. The course includes prescribed studies of visual fields, auditory discrimination, visual acuity, form perception, space perception and binocular rivalry in addition to a final independent project of the student's own choice. Laboratory, two hours. Prereq or concur: PSY 424; PSY 216 is recommended.

**PSY 427 COGNITIVE PROCESSES. (3)**

Theory and experimental techniques in the study of human thought processes. Emphasis on research in memory, information processing, language, and concept formation. Prereq: PSY 100.

**PSY 428 RESEARCH METHODS IN DEVELOPMENTAL PSYCHOLOGY. (4)**

An advanced course in research methods in human development. Emphasis will be placed on the understanding and use of research designs and techniques that examine behavior change from a developmental perspective. Students are expected to design and carry out a research project. Lecture, three hours; laboratory, two hours. Prereq: PSY 100, 215, and 216.

**PSY 439 INTERPERSONAL PROCESSES. (3)**

A systematic analysis of interpersonal behavior. Topics covered include social-cognitive aspects of interpersonal relations (e.g., expectancies, attribution), personal relationships (e.g., friendship, romance), and small-group dynamics (e.g., minority influence, cooperative learning). Prereq: PSY 100.

- PSY 444 SOCIAL PSYCHOLOGY. (3)**  
Theoretical and empirical analysis of individual behavior in the social setting with particular emphasis on social learning, motivation, and the measurement, formation, and changing of social attitudes. (Note: Not open for graduate credit to graduate students in Psychology and Sociology.) Prereq: One of the following: PSY 100, SOC 101, or GEN 102. (Same as SOC 444G.)
- PSY 447 SOCIAL PSYCHOLOGY LABORATORY. (1)**  
Participation in the use of survey, laboratory, and field research methods for studying social-psychological phenomena. Class members will design and carry out research on basic social-psychological processes. Laboratory, two hours. Prereq: PSY 215; and (may be concurrent) one of the following: PSY 444, PSY 448, or PSY 439.
- PSY 448 APPLIED SOCIAL PSYCHOLOGY. (3)**  
Application of social-psychological knowledge, both theoretical and empirical, to contemporary social issues. Coverage includes application to such diverse topics as health, education, business, law, and international relations. Prereq: PSY 100. (Same as SOC 448.)
- PSY 450 PSYCHOLOGY OF LEARNING. (3)**  
Fundamental principles and findings from laboratory investigations of classical, instrumental, and verbal learning. Prereq: PSY 215.
- PSY 451 PSYCHOLOGY OF LEARNING LABORATORY. (1)**  
Laboratory demonstration of, and participation in, the use of scientific methodology as it applies to basic principles of learning appearing in human and subhuman subjects. Laboratory, two hours. Prereq or concur: PSY 450; PSY 216 is recommended.
- PSY 456 BEHAVIORAL NEUROSCIENCE. (3)**  
An intensive study of neural bases of behavior. Principal concerns are the neural and chemical substrates of processes such as sensation and perception, learning and memory, motivation and emotion, and behavior disorders. Prereq: PSY 215 and BIO 103, or 150 or equivalent, or consent of instructor.
- PSY 457 BEHAVIORAL NEUROSCIENCE LABORATORY. (1)**  
Laboratory for PSY 456 provides firsthand experience with the research methodology of physiological psychology. Prereq or concur: PSY 456.
- PSY 459 DRUGS AND BEHAVIOR. (3)**  
General principles of drug action from a physiological perspective. Major emphasis is on the psychoactive drugs encountered in experimental, clinical and social settings. Prereq: PSY 215 and BIO 103, or BIO 150 or equivalent.
- PSY 495 SENIOR THESIS SEMINAR. (4)**  
This course focus will be on the development and presentation of a research question, and the design of an experimental test of the question. The course will use a seminar format. Students will be expected to give both an oral and written presentation of their research proposal and to participate in the discussion of the proposals of other students. Prereq: Major in psychology, senior status, research sponsor, approval of instructor.
- PSY 496 SENIOR THESIS RESEARCH. (4)**  
This course focus will be on the oral and written presentation of research results. The course will use a seminar format. Students will complete their thesis research, prepare a written report, and present it to the seminar. Prereq: PSY 495.
- PSY 503 PSYCHOLOGY OF INDUSTRIAL PERSONNEL PROCEDURE. (3)**  
A practical course for those preparing for personnel administration and for psychology in industry and business. A study is made of the theory and methods of position classification, job analysis, job evaluation, merit rating, supervisor selection and training, and collective bargaining. Prereq: PSY 100.
- PSY 529 PSYCHOLINGUISTICS. (3)**  
Study of the acquisition, production and perception of human language. The relationship between linguistic theories and experimental data will be critically examined. Prereq: Either PSY 215 or LIN 211.
- PSY 532 PERSONALITY. (3)**  
An examination of several prominent personality theories in terms of the contexts in which they were originated, their influence upon contemporary psychological thought, and their present applications. Prereq: PSY 100 plus one of the following: PSY 215, 216 or 223.
- PSY 533 ABNORMAL PSYCHOLOGY. (3)**  
A study of the major mental disorders, especially the psychoneuroses and the psychoses, and the biological, psychological, and sociological factors which contribute to their causation. Prereq: PSY 100 plus one of the following: PSY 215, 216 or 223.

- PSY 534 CHILD PSYCHOPATHOLOGY. (3)**  
The course is designed to cover issues in the classification, assessment, and treatment of the major childhood behavior disorders, including attention deficit and conduct disorders, learning disabilities, depression, and child abuse. In addition, issues relating to parent-child relations, divorce, and children's attributions will be covered. Prereq: PSY 215; and either PSY 223 or 533 or FAM 255.
- PSY 535 PSYCHOLOGICAL TESTING. (3)**  
A general orientation to the field of psychological testing. Introduction to the principles and methods of psychological testing, and a survey of the various kinds of psychological tests. Prereq: PSY 100 and 216.
- PSY 552 ANIMAL BEHAVIOR. (3)**  
Experimental techniques used in the study of animal behavior. Particular emphasis is placed on the assessment of intellectual capacities in animals. Topics include: memory, concept learning, imitation, tool use, language, cooperation, and altruism. Prereq: PSY 215 or consent of instructor.
- PSY 553 ANIMAL BEHAVIOR LABORATORY. (1)**  
Application of techniques used in the study of animal behavior. The class will design and carry out experiments in animal behavior. Students will organize and discuss results and will explore theoretical and applied implications of the research. Laboratory, two hours. Prereq or concur: PSY 552. Prereq: PSY 216.
- PSY 558 BIOLOGY OF MOTIVATION. (3)**  
An examination of the causes of human and nonhuman behavior from a biological perspective. Special attention is paid to the interaction between genetic inheritance, individual experience, and physiological state in the control of the appetitive and consummatory behaviors. Prereq: PSY 215 and BIO 103, or BIO 150 or equivalent.
- PSY 561 ADVANCED TOPICS IN FOUNDATIONS OF CLINICAL PSYCHOLOGY (Subtitle required). (3)**  
Selected topics in clinical psychology such as health psychology and introduction to clinical psychology. Course topics will vary from year to year, providing students with a diversity of material in the area of clinical psychology. May be repeated to a maximum of six credits. Prereq: PSY 533 or PSY 532.
- PSY 562 ADVANCED TOPICS IN COGNITIVE PSYCHOLOGY (Subtitle required). (3)**  
This course is designed to provide in-depth study of a specialized topic within cognitive psychology. Topics will vary from year to year and may include: theories of memory; theories of reading; cognition and emotion; connectionist modeling; engineering and environmental psychology. May be repeated to a maximum of six credits. Prereq: PSY 427 or equivalent.
- PSY 563 ADVANCED TOPICS IN DEVELOPMENTAL PSYCHOLOGY (Subtitle required). (3)**  
This course is designed to provide in-depth study of a specialized topic in developmental psychology. Topics will vary from year to year and may include: cognitive development; development of memory and attention; development of reasoning and problem solving; and media use and children's development. May be repeated to a maximum of six credits. Prereq: PSY 223 or equivalent.
- PSY 564 ADVANCED TOPICS IN LEARNING (Subtitle required). (3)**  
The course will provide in-depth study of specialized topics in the area of higher learning in animals. Topics will vary from year to year and may include concept learning, memory, imitation, language, and cooperation. The course will also examine these processes from the perspective of sociobiology. May be repeated to a maximum of six credits. Prereq: PSY 450, PSY 552 or consent of instructor.
- PSY 565 ADVANCED TOPICS IN NEUROSCIENCE (Subtitle required). (3)**  
Advanced coverage of recent research within the field of behavioral neuroscience. The course will provide in-depth coverage of one topic, such as developmental psychobiology, neurobiology of learning and memory, or the biological basis of reward. May be repeated to a maximum of six credits. Prereq: PSY 456 or consent of instructor.
- PSY 566 ADVANCED TOPICS IN SOCIAL PSYCHOLOGY (Subtitle required). (3)**  
Selected topics exploring aspects of social psychology. The content of the course will vary from year to year, focusing on topics such as social cognition, the self, cross-cultural psychology, personal relationships, consumer and organizational psychology, and nonverbal communication. Class format will be determined by the instructor, with some years having a small seminar structure and other years having a more traditional lecture format. May be repeated to a maximum of six credits. Prereq: PSY 444, PSY 216, or consent of instructor.

**PSY 603 PSYCHOPATHOLOGY. (3)**

An examination of the descriptive, theoretical, and research material relevant to the major classes of disturbed behavior. Special attention is devoted to the stylistic features of neurotic and psychotic communication and behavior. Prereq: Enrollment in the graduate program in clinical psychology.

**PSY 610 PSYCHOMETRICS. (3)**

Analysis and interpretation of human measurements. The course deals with the application of basic inferential procedures to the analysis and interpretation of psychological data. Required of all graduate students in psychology. Prereq: A course in statistics.

**PSY 611 PSYCHOLOGICAL RESEARCH. (3)**

The course deals with the design of psychological experiments. Emphasis is upon issues concerning choice of appropriate designs for psychological research. Both experimental and correlational research designs are studied. Required of all graduate students in psychology. Prereq: PSY 610 or permission of instructor.

**PSY 616 RESEARCH DESIGN IN CLINICAL PSYCHOLOGY. (3)**

Concentrates on current methodologies utilized in clinical research and on the application of sophisticated techniques to traditional research problems. Students are expected to master critical skills for the evaluation of research designs and are encouraged to explore creative approaches to research in important clinical areas. Prereq: Enrollment in the graduate program in clinical psychology.

**PSY 620 PROSEMINAR IN HISTORY AND SYSTEMS OF PSYCHOLOGY. (3)**

A study of the philosophical precursors and scientific traditions of psychology. The schools of 19th and 20th century psychology are surveyed as are the major theoretical positions and content areas of contemporary psychology. Prereq: Graduate standing in Department of Psychology or Department of Educational and Counseling Psychology. (Same as EDP 615.)

**PSY 621 PROSEMINAR IN LEARNING. (3)**

An intensive treatment of concepts, methodology, and current developments in the field of learning. Prereq: PSY 550 or equivalent.

**PSY 622 PROSEMINAR IN PERSONALITY. (3)**

An intensive treatment of theories, methods of investigation and current developments in the area of personality. Prereq: PSY 532 or equivalent.

**PSY 623 PROSEMINAR IN SENSATION AND PERCEPTION. (3)**

An intensive examination of the facts, methods and concepts involved in the study of sensory and perceptual processes. Prereq: Consent of instructor.

**PSY 624 PROSEMINAR IN SOCIAL PSYCHOLOGY. (3)**

An intensive examination of the methods and data of social psychology with emphasis on social attitudes. Prereq: PSY 444G or equivalent.

**PSY 625 PROSEMINAR IN DEVELOPMENTAL PSYCHOLOGY. (3)**

An intensive treatment of theoretical and experimental literature, both classical and contemporary, in developmental psychology. Prereq: Admission to the graduate program in psychology or consent of instructor.

**PSY 626 SURVEY OF HEALTH PSYCHOLOGY. (3)**

A survey of the field of health psychology. It will explore the ways in which social and psychological research contribute to an understanding of health and illness behavior. Prereq: Graduate or professional standing and consent of instructor. (Same as BSC 626.)

**PSY 627 PROSEMINAR IN PHYSIOLOGICAL PSYCHOLOGY. (3)**

An intensive examination of theories, methods of investigation, and current developments in the field of physiological psychology. Prereq: Graduate standing or permission of instructor. (Same as PGY 627.)

**PSY 628 PROSEMINAR IN COGNITIVE PROCESSES. (3)**

An intensive examination of theoretical and empirical evidence concerning mental processes in the adult human, including attention, memory, language, and problem-solving. Prereq: Graduate standing in psychology, or consent of instructor.

**PSY 629 INTRODUCTION TO CLINICAL PSYCHOLOGY. (2)**

Offered conjointly by the clinical faculty; covers the broad perspectives of clinical psychology, methods, history, ethics, and professional issues. Prereq: Enrollment in the graduate program in psychology.

**PSY 630 CLINICAL METHODOLOGY I. (2)**

An intensive survey and evaluation of tests of intelligence and objective methods of assessment of normal and abnormal personality. Special emphasis is given to major theoretical issues and relevant quantitative methods. Prereq: PSY 216, 532, 533, 535, or equivalent, and enrollment in graduate program in psychology.

**PSY 631 PRACTICUM IN CLINICAL METHODOLOGY I. (2)**

Clinical interviewing and practice in writing reports on behavioral observations, content of verbalization, and case history data. Practice in administration, scoring and interpretation of intelligence tests and objective personality tests. Laboratory, four hours. Prereq: PSY 532, 533, and 535, or the equivalent, and enrollment in the graduate program in clinical psychology. Prereq or concur: PSY 630.

**PSY 632 CLINICAL METHODOLOGY II. (2)**

Theoretical issues, quantitative methods and research findings on the projective methods of assessment of normal and abnormal personality. Prereq: PSY 630, and enrollment in graduate program in psychology.

**PSY 633 PRACTICUM IN CLINICAL METHODOLOGY II. (2)**

Practice in the administration and scoring of projective techniques and batteries of clinical tests. Laboratory, four hours. Prereq: PSY 630 and 631, and enrollment in graduate program in clinical psychology. Prereq or concur: PSY 632.

**PSY 636 SYSTEMS OF PSYCHOTHERAPY. (3)**

An intensive examination of the major theoretical and research approaches to therapeutic behavior change. Prereq: PSY 632 and 633, and enrollment in graduate program in clinical psychology.

**PSY 637 PRACTICUM IN PSYCHOTHERAPY AND BEHAVIOR CHANGE. (1-3)**

Supervised experience in the techniques of psychotherapy with adults, children and groups, and in community mental health approaches. Laboratory, two to six hours. Each clinical student must have a cumulative minimum of three different supervisors. May be repeated to a maximum of six credits. Prereq: PSY 636 and enrollment in graduate program in clinical psychology.

**PSY 638 DEVELOPMENTAL NEUROBIOLOGY. (3)**

An explanation of the processes which contribute to the development of the nervous system. Neurophysiological, cell biological and molecular approaches to cell differentiation, neuronal pathfinding and synapse formation and stabilization will be explored and discussed. Examples will be drawn from both vertebrate and invertebrate preparations. Prereq: BIO 535 or consent of instructor. (Same as ANA/BIO/PGY 638.)

**PSY 664 CULTURAL ISSUES IN MENTAL ILLNESS. (3)**

An in-depth discussion of theory and method of the various approaches to cultural and social factors in the etiology, distribution, and treatment of mental illness. Data from non-Western and Western cultures are examined. Prereq: Enrollment in graduate program in anthropology, sociology, psychology, educational and counseling psychology, or consent of instructor. (Same as ANT/BSC 664.)

**PSY 710 TOPICAL SEMINAR IN CLINICAL PSYCHOLOGY. (3)**

A selected topics course designed to cover content areas which are not being met by the current faculty; may be taught by persons with special qualifications from the community or by existing faculty exploring new areas. The topics, which may be offered as the need arises, may include on a semester basis mental retardation, intensive psychoanalytic theory, psychopharmacology, etc. May be repeated to a maximum of six credits. Prereq: As specified by instructor.

**PSY 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PSY 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**PSY 767 TOPICAL SEMINAR IN BEHAVIORAL NEUROSCIENCE. (3)**

A study of selected topics in behavioral neuroscience with emphasis on recent research and theory. May be repeated to a maximum of nine credits. Prereq: Consent of instructor. This course may be elected to fulfill requirements in the psychology and physiology graduate programs. (Same as PGY 767.)

**PSY 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**PSY 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.

**PSY 772 TOPICAL SEMINAR IN LEARNING.** (3)  
The study of selected topics in the learning area with emphasis on the recent experimental and theoretical literature. May be repeated to a maximum of six credits. Prereq: PSY 550 and consent of instructor.

**PSY 776 SEMINAR IN DEPENDENCY BEHAVIOR.** (3)  
The course is designed to explore theories of dependency behavior by examining the concept of dependency as it can be applied to the study of various phenomena including alcohol use and abuse; dependence on other psychoactive substances; institutional dependency; dependency in work settings; and poverty and welfare. Prereq: Consent of instructor. (Same as ANT/SOC/BSC 776.)

**PSY 778 TOPICAL SEMINAR IN DEVELOPMENTAL PSYCHOLOGY.** (3)  
An advanced seminar in selected topics in human development, including cognition, learning, language, personality, socialization, life span issues, and developmental aspects of psychopathology. Prereq: PSY 625 and enrollment in graduate psychology program, or consent of instructor. May be repeated a maximum of six credits.

**PSY 779 TOPICAL SEMINAR IN SOCIAL PSYCHOLOGY.** (3)  
Each semester some topic in the field of social psychology, such as attitudes and beliefs, structures and function of social groups, social determinants of behavior, leadership, and morale will be studied intensively. May be repeated to a maximum of six credits. Prereq: PSY 444G. (Same as SOC 779.)

**PSY 780 PROBLEMS IN PSYCHOLOGY.** (1-3)  
This number is used for topical seminars taught on an experimental basis or covering special material that may not be presented again. May be repeated to a maximum of six credits.

**PSY 781 RESEARCH PARTICIPATION.** (1)  
Emphasis on the team approach to research. Designed primarily for first year graduate students. May be repeated to a maximum of four credits. Laboratory, two to four hours. Prereq: Enrollment in the graduate program in psychology.

**PSY 790 RESEARCH IN PSYCHOLOGY.** (1-12)  
A minimum of three hours per credit a week is required on research conducted in consultation with the instructor. May be repeated as necessary with the approval of the Director of Graduate Studies.

## PT Physical Therapy

**PT 603 PHARMACOLOGY FOR PHYSICAL THERAPY STUDENTS.** (1)  
Fundamental concepts of pharmacology and their impact on the physical therapy management of patients. This course focuses on the integration of basic science, research, and clinical intervention. Prereq: Admission to the Physical Therapy Professional program and successful completion of the spring and summer semesters in the first year.

**PT 605 WELLNESS AND SPORTS NUTRITION.** (3)  
Emphasis is directed toward nutrition as applied to prevention of disease through lifestyle management and the application of nutrition in exercise and sport. Targeted focus areas are: body composition and energy expenditure, the metabolic basis of weight management, nutrient needs throughout the lifecycle, the metabolic changes associated with obesity, behavioral management of obesity, nutrient metabolism and exercise, water and electrolyte balance during exercise, nutritional ergogenic aids, nutrition-strength and performance enhancement. Prereq: PGY 412G, and BCH 401G or equivalent or consent of instructor. (Same as CNU 605.)

**PT 610 ETHICS IN CLINICAL SCIENCES RESEARCH.** (1)  
Students will examine ethical issues in biomedical research using a case-study approach. Representative issues addressed may include data selection and retention, plagiarism, scientific review of grants and manuscripts, scientific misconduct, and informed consent. Prereq: Graduate student status. (Same as CD/CLS/CNU/RAS 610.)

**PT 625 ADVANCED ASSESSMENT AND MANAGEMENT OF THE PATIENT WITH MUSCULOSKELETAL DISORDERS.** (3)  
Assessment and management approaches will be presented. A treatment framework will be developed from assessment approaches. The student will utilize a problem solving approach to select and implement specific therapeutic interventions. Lecture, three hours; laboratory, two hours per week. Prereq: Admission to Physical Therapy and successful completion of the first year or consent of instructor.

**PT 628 GERONTOLOGY FOR PHYSICAL THERAPY STUDENTS.** (1)  
This course is designed to provide the learner the fundamental concepts of aging which have a profound impact on the care of the geriatric patient. Concepts examined include the physiologic, medical, psychological, and behavioral changes which effect the physical therapy treatment of these patients. Students will conduct a clinical research project involving a geriatric clinic in the Lexington area. Prereq: Admission to the Physical Therapy Professional program and successful completion of the first year.

**PT 645 RESEARCH AND MEASUREMENT IN PHYSICAL THERAPY.** (3)  
An analysis of various procedures and measuring instruments used in clinical practice and research in physical therapy. Emphasis is placed on the theory, application, and interpretation of the measurements in the evaluation of published materials. Basic statistical techniques and their appropriate use will be presented. Prereq: Admission to the Physical Therapy professional program and to the Graduate School.

**PT 650 DYSFUNCTION OF PERIPHERAL JOINTS.** (3)  
This course is an advanced approach to assessment and therapeutic management of musculoskeletal problems involving peripheral joints. Lecture, two hours; laboratory, two hours per week. Prereq: Consent of instructor.

**PT 651 DYSFUNCTION OF VERTEBRAL JOINTS.** (3)  
This course concentrates on advanced theories and techniques of assessment and therapeutic management of musculoskeletal problems of the back. Lecture, two hours; laboratory, two hours per week. Prereq: Consent of instructor.

**PT 652 PATHOMECHANICS.** (3)  
An application and research oriented investigation into the science of abnormal human movement. The course involves the pathologic aspects of neural control, muscle contraction, assessment and motion analysis, joint mechanics, and noncontractile tissue as they relate to human movement and kinetics. Lecture, two hours; laboratory, two hours per week. Prereq: HPR 515 or consent of instructor.

**PT 654 MECHANISMS OF MOTOR CONTROL.** (3)  
This advanced course explores current knowledge regarding the neurophysiological mechanisms involved in motor control. Prereq: Consent of instructor.

**PT 660 ADVANCED CLINICAL PRACTICUM IN PHYSICAL THERAPY.** (1-6)  
Provides advanced supervised clinical experience appropriate to student's level of preparation in specialty. Forty to sixty clinical hours for one credit hour. May be repeated to a maximum of six credits. Prereq: Graduate standing and permission of instructor.

**#PT 668 RESEARCH PROBLEMS.** (2-3)  
This course is intended to introduce the student to methods of analyzing data and problems of writing a scientific paper for publication. Students are required to collect and analyze data as it relates to their research problems. Also required is an oral presentation of their finished manuscript. Prereq: Admission to the Physical Therapy professional program and successful completion of the second year.

**PT 676 ELECTROPHYSIOLOGICAL TESTING AND THERAPEUTICS.** (2)  
The student is introduced to the principles of electricity, how it affects the muscle and nerve, its use in physical therapy for patient assessment and management, and its safety aspects. Lectures and laboratory exercises are included. Prereq: Admission to the Physical Therapy Professional program and successful completion of the first year.

**PT 686 SPECIALTY ELECTIVES.** (2-4)  
Introduction to emerging specialty areas within the physical therapy profession. Students will select multiple specialty areas under faculty direction. Prereq: Admission to the Physical Therapy Professional program and successful completion of the first year or consent of instructor.

**PT 695 INDEPENDENT STUDY IN PHYSICAL THERAPY.** (1-3)  
Independent work devoted to specific problems or area of interest in physical therapy. Work to be supervised by a graduate faculty member proficient in the area under study. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**PT 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**PT 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.

**PT 770 SEMINAR IN PHYSICAL THERAPY. (3)**

Each semester a contemporary topic in the field of physical therapy will be studied intensively. Lecture, two to three hours per week; laboratory, zero to two hours per week. May be repeated to a maximum of nine credits.

**PT 805 NORMAL FUNCTIONAL ANATOMY. (3)**

A regional study of the normal functional aspects of the neuromusculoskeletal systems, including the basic principles of biomechanics and human locomotion. This course runs during the entire 12-week summer term. Prereq: Admission to the Physical Therapy professional program and successful completion of the spring semester (first year of the professional program).

**PT 815 BASIC CLINIC SKILLS. (4)**

Theory, techniques, rationale, physiological effects, and indications of basic physical therapeutic procedures of hydrotherapy and massage, muscle testing and goniometry evaluations, gait analysis and muscle function are presented in lecture. Techniques are demonstrated and practiced in laboratory. This course runs during the entire 12-week summer term. Prereq: Admission to the Physical Therapy Professional program and successful completion of the spring semester (first year of the professional program).

**PT 821 ASSESSMENT AND MANAGEMENT OF PATIENTS WITH ACUTE CARE DISORDERS. (2)**

The theoretic and clinical framework for physical therapy assessment and management of patients with acute care disorders, emphasizing those of the integumentary system, (i.e., wounds, burns, etc.) are discussed. These injuries will include open wounds as well as burns and their implications to the integumentary system. The student will utilize a problem solving approach to select and implement tests and measurements as well as therapeutic interventions. This course runs during the entire 12-week summer term. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 826 ORTHOTICS/PROSTHETICS. (4)**

This course will prepare the student to perform the physical therapy evaluation and provide patient management as part of a prosthetic or orthotic team. Lecture, two hours; laboratory, four hours per week. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 827 SPINAL CORD REHABILITATION TECHNIQUES. (2)**

Prepare the student as a participating member of the rehabilitation team with an emphasis on the role of the physical therapist. Patient evaluation, physical restoration, and vocational training for a variety of long-term illnesses are presented, discussed, demonstrated, and clinical techniques practiced. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 831 CLINICAL NEUROPHYSIOLOGY. (2)**

The study of the regional organization of the brain and spinal cord, the ways in which they connect and how these connectivities influence human behavior with emphasis on motor behavior. The effect of disease states on normal brain and spinal cord function will be discussed. Prereq: Admission to the Physical Therapy professional program and successful completion of the spring and summer semesters in the first year.

**PT 834 INTRODUCTION TO PHYSICAL THERAPY AND BIOETHICS. (3)**

An orientation to the profession of physical therapy including history, professional organization, role in health care, elementary patient care skills, use of the medical library and professional documentation. Bioethics will be introduced in relationship to moral issues in health care. Prereq: Admission to the Physical Therapy professional program.

**PT 835 CLINICAL CLERKSHIP I. (1)**

The student observes patient treatment by experienced staff members and is supervised in the performance of elementary procedures involved in patient care. Offered on a pass-fail basis only. This course runs during the entire 12-week summer term. Prereq: Admission to the Physical Therapy professional program and successful completion of the spring semester (first year of the professional program).

**\*PT 836 CLINICAL CLERKSHIP IA. (2)**

Continuation of PT 835 progressing students from performance of basic skills under close supervision to performance of those skills with more independence and adding more opportunities for evaluation and treatment experiences. Offered on a Pass/Fail basis only. Clinic, 40 hours per week for three weeks. Prereq: Admission to the Physical Therapy professional program and successful completion of the spring, summer and didactic portion of the fall semester (first year of the professional program).

**PT 837 CLINICAL CLERKSHIP II. (3)**

Under competent supervision, students participate clinically in the care of patients in a variety of extramural facilities: general, children's and Veteran's Administration hospitals, and special out-patient facilities. Offered on a pass/fail basis. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 838 CLINICAL CLERKSHIP III. (3)**

Continuation of PT 837 includes a unit of study planning and coordination of hospital and community services in comprehensive care of patients by way of seminars and case presentations. Offered on a pass/fail basis only. Clinic, 170 hours. This course runs during the entire 12-week summer term. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 839 CLINICAL INTERNSHIP IN PHYSICAL THERAPY. (9-16)**

Supervised internship through which the student acquires understanding and skill in physical therapy procedures. Offered on a pass-fail basis. Sixty clock hours equal one credit hour. Prereq: Admission to the Physical Therapy professional program and successful completion of the second year.

**PT 846 MEDICAL AND PHYSICAL THERAPY MANAGEMENT OF ORTHOPEDIC PROBLEMS. (3)**

An introduction to medical procedures, including history, physical exam, laboratory data, radiographic film and medical and physical therapy management of orthopedic problems, including fractures, soft tissue injuries, scoliosis, joint replacements, muscle transplants and tendon repairs, will be presented. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 847 MEDICAL AND PHYSICAL THERAPY MANAGEMENT OF NEUROLOGICAL PROBLEMS. (3)**

Medical and physical therapy management of neurological problems, including the neurological examination, seizures, degenerative and neurological diseases, will be presented. Lecture/laboratory, patient contact, and case study formats will be used. Lecture, two hours; laboratory, two hours. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 854 BIOLOGY OF DISEASE. (3)**

A study of the concept and process of disease. May be repeated for a total of five credits. Prereq: Admission to the Physical Therapy professional program and successful completion of the spring and summer semesters (first year of professional program). (Same as HSE 854.)

**PT 856 THERAPEUTIC EXERCISE I. (2)**

This introductory course provides an overview of therapeutic exercise and its relation to patient management, and development of skill in basic therapeutic exercise approaches for improving muscle performance, relaxation and mobilization. Lecture and laboratory sessions are included. This course runs during the entire 12-week summer term. Prereq: Admission to the Physical Therapy professional program and successful completion of the spring semester in the first year.

**PT 858 ADVANCED ASSESSMENT AND MANAGEMENT OF THE PEDIATRIC PATIENT. (3)**

Includes the normal and abnormal development of movement and its relation to treatment of children with central nervous system deficits. Medical and physical therapy management of patients with mental retardation and oral control problems are also presented in lecture and laboratory. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 866 ELECTROMODALITIES. (1)**

Theory and techniques of electromodalities are presented. Techniques are demonstrated and practiced in laboratory. Lab, two hours. Prereq: Admission to the Physical Therapy professional program and successful completion of the spring semester (first year of professional program).

**PT 877 CARDIO-RESPIRATORY THERAPY. (2)**

A combined lecture, laboratory series dealing with the mechanics and physiology of normal cardio-respiratory functions; medical and surgical pathologies; and physical theory evaluation and treatment techniques for respiratory problems, cardiac arrhythmias, myocardial infarction rehabilitation, and various cardiac stress tests. Prereq: Admission to the Physical Therapy Professional program and successful completion of the first year.

**PT 887 INTRODUCTION TO PHYSICAL THERAPY MANAGEMENT. (1)**

An introduction to basic management techniques including purpose, goals and objectives; contracts, task statement and analysis; position descriptions; Medicaid; quality assurance; placement services. This course runs during the entire 12-week summer term. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

**PT 888 ADVANCED PHYSICAL THERAPY MANAGEMENT. (3)**

Emphasis is placed on operational aspects of physical therapy department including relationship to total facility operation, designing and equipping a department, contracts, salaries, fees, personnel policies, records, data processing, budget process, medical-legal implication, continuing education, and the consultative process. Prereq: PT 887 or consent of instructor.

**PT 898 INDEPENDENT STUDY. (1-4)**

The student will pursue in-depth a particular aspect of physical therapy or related fields. May be repeated to a maximum of four credits. Prereq: Consent of instructor.

## RAE Russian and Eastern Studies

### RUSSIAN

- RAE 101 ELEMENTARY RUSSIAN. (4)**  
The students are introduced to the language through grammatical explanations, recitation practice, and oral as well as written exercises. The emphasis is on the spoken language of everyday use, reading of graded Russian texts, vocabulary building and accurate pronunciation. Extensive work with tape recordings. Lecture, three hours; supervised recitation, one hour per week.
- RAE 102 ELEMENTARY RUSSIAN. (4)**  
A continuation of RAE 101. Lecture, three hours; supervised recitation, one hour per week. Prereq: RAE 101 or equivalent.
- RAE 111 RUSSIAN ORAL PRACTICE. (1)**  
Supplementary oral work for students of Elementary Russian; can be taken in conjunction with RAE 101 and/or RAE 102. May be repeated to a maximum of two credits.
- RAE 115 BEGINNING KAZAKH I. (4)**  
Beginning Kazakh is designed in 14 weeks to introduce to the students the essentials of the language and start building their proficiency in the four main areas auding, speaking, reading and writing. The main focus of the course is communication in Kazakh in various fields of everyday life. The major goal of the course is to help the students speak grammatically correct Kazakh while producing as much language as possible.
- RAE 116 BEGINNING KAZAKH II. (4)**  
This course is designed in 14 weeks to continue developing the students' skills in auding, speaking, reading and writing in Kazakh. Expansion of knowledge of Kazakh grammar and vocabulary. Prereq: RAE 115 or equivalent.
- RAE 201 INTERMEDIATE RUSSIAN. (4)**  
Systematic study of grammar. Introduction through simplified texts to the life and culture of Tsarist and Soviet Russia. Dictation, composition, conversation, and extensive oral practice. Lecture, three hours; recitation, one hour per week. Prereq: RAE 102 or the equivalent. (Required.)
- RAE 202 INTERMEDIATE RUSSIAN. (4)**  
A continuation of RAE 201. Lecture, three hours; recitation, one hour per week. Prereq: RAE 201 or equivalent. (Required.)
- RAE 205 RUSSIAN PHONOLOGY AND PRONUNCIATION. (1)**  
A practical review of the Russian sound system with emphasis on practicing intonation in conversational situations. Lecture, one hour; laboratory, one hour per week. May be repeated to a maximum of two credits. Prereq: RAE 102.
- RAE 261 SURVEY OF RUSSIAN LITERATURE. (3)**  
A study of Russian literature from its beginning to the present using selected major works of prose, poetry and drama. No knowledge of Russian is required.
- \*RAE 270 INTRODUCTION TO RUSSIAN CULTURE. (3)**  
A general introduction to Russian culture from its origins through the early 20th century designed to acquaint students with the roots of Russian religion, art, architecture, music, folklore, and everyday life.
- RAE 280 RUSSIAN AND SOVIET CULTURE OF THE 20TH CENTURY. (3)**  
A broad survey of Russian civilization as it has developed in the arts, law, and in its socio-religious values. Taught in English.
- RAE 303 RUSSIAN PRONUNCIATION AND CONVERSATION. (3)**  
Practical phonetics of Russian and intensive practice in conversational Russian. Prereq: RAE 101, 102, 201, 202.
- RAE 304 RUSSIAN PRONUNCIATION AND CONVERSATION. (3)**  
Practical phonetics of Russian and intensive practice in conversational Russian. Continuation of RAE 303. Prereq: RAE 101, 102, 201, 202.
- RAE 305 ADVANCED RUSSIAN GRAMMAR. (3)**  
Detailed study of advanced points of Russian grammar, such as verbal aspect, verbs of motion, participles, conditional constructions, time expressions. Prereq: RAE 202 or equivalent.

- RAE 306 ADVANCED RUSSIAN GRAMMAR. (3)**  
Continuation of RAE 305. Detailed study of advanced points of Russian grammar such as reflexives, passives, complex/compound sentences, word formation, word order, syntax. Prereq: RAE 305 or consent of instructor.
- RAE 310 RUSSIAN LISTENING AND ORAL PROFICIENCY. (1)**  
Intensive practice with listening comprehension based on Soviet audio materials, conversation, and practice in word formation. Lecture, one hour; laboratory, one hour per week. Prereq: RAE 202.
- RAE 340 KAZAKH CULTURAL HISTORY I. (3)**  
A chronological description of Kazakh cultural history from its origins through the nineteenth century.
- RAE 342 KAZAKH CULTURAL HISTORY II. (3)**  
A description of Kazakh cultural history immediately before, during, and after Soviet Power.
- RAE 370 RUSSIAN FOLKLORE (in English). (3)**  
Central issues of Russian folk culture, particularly related to ritual, material culture, and oral lore; patterns and functions of folk architecture, clothing, and crafts in 19th C. peasant life.
- RAE 380 SURVEY OF 19th CENTURY RUSSIAN LITERATURE (in English). (3)**  
A survey of Russian literature of the 19th Century. Emphasis is on the development of romanticism, the rise of realism, and end-of-century decadence. All readings, lectures, and discussions are in English. Students taking the course for Russian major credit are expected to do outside work in Russian.
- RAE 390 MODERN RUSSIAN LITERATURE (in English). (3)**  
Russian literature of the 20th Century, including modernist trends, Socialist Realism, non-conformist trends, Russian literature abroad. Students taking the course for Russian major credit will be assigned outside work in Russian.
- RAE 395 INDEPENDENT WORK IN RUSSIAN. (1-3)**  
Students who have the proper qualifications may undertake a special problem in reading and research. May be repeated to a maximum of six credits. (Recommended.)
- RAE 400G SEMINAR ON SPECIAL TOPICS IN RUSSIAN. (3)**  
Detailed investigation of a given topic, author or theme. Research to be conducted at least in part using Russian materials. Subject will be announced prior to preregistration. May be repeated to a maximum of six credits.
- RAE 410 STRUCTURE AND STYLISTICS OF RUSSIAN. (3)**  
A concise structural study of Russian grammar combined with readings illustrating the relationship between grammar and style in Russian prose and verse. Attention is also given to techniques and elements of formal textual analysis. Prereq: Third year knowledge of Russian.
- RAE 411 STRUCTURE AND STYLISTICS OF RUSSIAN. (3)**  
A continuation of RAE 410. Prereq: RAE 410 or equivalent. (Recommended.)
- RAE 420 RUSSIAN TRANSLATION. (3)**  
Translation of unadapted texts from Russian to English, theory of translation, practice translation of Russian texts of various kinds, both technical and literary, focus on specific stylistic requirements, translation of short texts from English to Russian, introduction to oral interpretation. Prereq: RAE 303-304 or equivalent.
- RAE 430G BUSINESS RUSSIAN. (3)**  
Development of written and oral skills in Russian needed to conduct business activities in Russian-speaking areas of the former Soviet Union using various materials from banking, advertising, law, economics and industry. Prereq: Third year knowledge of Russian.
- RAE 460G TOLSTOY (in English). (3)**  
The study of Tolstoy, his art and life. All readings, lectures, and discussions are in English. Students taking the course for Russian major credit are expected to do outside work in Russian.
- RAE 462G ADVANCED READING IN THE SCIENCES AND TECHNOLOGY (in Russian). (3)**  
Technical reading in a broad variety of Russian literature in the natural and social sciences to improve language skills enabling the student to read, write on and discuss technical subjects. Prereq: Third year knowledge of Russian.

**RAE 480 RUSSIAN POETRY (in Russian).** (3)  
Reading of selected major Russian poems as a basis for perfection of language skills, involving class discussions, compositions and translation practice. Prereq: A third-year knowledge of Russian or consent of instructor.

**RAE 495G ADVANCED INDEPENDENT WORK IN RUSSIAN AND EASTERN STUDIES.** (1-3)  
Independent research in Russian and Eastern Studies on an advanced level for undergraduate and graduate students. Students will be required to establish a written contract with the relevant faculty member describing the tasks to be completed in the course. May be repeated to a maximum of six credits, or a total of six credits of RAE 395 and 495G.

#### HEBREW

**\*RAE 130 ELEMENTARY HEBREW.** (4)  
Coverage of Hebrew grammar designed to prepare students to use Hebrew for their particular needs and programs.

**\*RAE 131 ELEMENTARY HEBREW.** (4)  
Continuation of RAE 130. Prereq: RAE 130 or consent of instructor.

**RAE 230 INTERMEDIATE HEBREW.** (3)  
Hebrew grammar and introduction to the reading of specimens of Hebrew prose. Prereq: RAE 131 or consent of instructor.

**RAE 231 INTERMEDIATE HEBREW.** (3)  
Readings in selected Hebrew authors. Prereq: RAE 230 or consent of instructor.

**RAE 324 JEWISH THOUGHT AND CULTURE I: FROM ANCIENT ISRAEL TO THE MIDDLE AGES.** (3)  
A survey of Jewish intellectual and material civilization from its beginnings in ancient Israel to its efflorescence in the medieval period.

**RAE 325 JEWISH THOUGHT AND CULTURE II: FROM THE EXPULSION FROM SPAIN TO THE PRESENT.** (3)  
A survey of Jewish intellectual and material civilization from the expulsion from Spain in 1492 to the destruction of European Jewry in the Holocaust and the re-establishment of Israel.

#### ARABIC

**\*RAE 140 ELEMENTARY MODERN STANDARD ARABIC.** (4)  
An introduction to the standard written language of the Arab World. Initial emphasis upon the phonology and script, followed by gradual coverage of the grammar, with exercises in reading, writing, pronunciation, and vocabulary building.

**\*RAE 141 ELEMENTARY MODERN STANDARD ARABIC.** (4)  
Continuation of RAE 140. Prereq: RAE 140.

**RAE 240 INTERMEDIATE MODERN STANDARD ARABIC.** (3)  
A continuation of RAE 141, stressing comprehension of written and oral material, the ability to read Arabic aloud and to compose written material, and the ability to speak. Prereq: RAE 141.

**RAE 241 INTERMEDIATE MODERN STANDARD ARABIC.** (3)  
A continuation of RAE 240, stressing comprehension of written and oral material, the ability to read Arabic aloud and to compose written material, and the ability to speak. Prereq: RAE 240.

#### OTHER DEPARTMENTAL OFFERINGS

**RAE 260 CLASSICS OF NEAR EASTERN LITERATURE IN TRANSLATION.** (3)  
A survey of Near Eastern literature, mainly Islamic. Some selections are chosen on the basis of their universal interest, while others demonstrate literary values and ideals with which Western readers are not ordinarily familiar. Occasional recordings and slide-illustrated lectures are included.

**\*RAE 328 ISLAMIC CIVILIZATION I.** (3)  
The rise of Islam and its classical development.

**\*RAE 330 ISLAMIC CIVILIZATION II.** (3)  
The Islamic world's response to westernization and the resultant reassertion of its cultural role in the modern world.

**RAE 401 SEMINAR IN RUSSIAN AND EAST EUROPEAN STUDIES I (Subtitle required).** (3)  
Interdisciplinary seminar on a topic in Russian and East European Studies in the period before 1800. Prereq: Junior standing.

**RAE 402 SEMINAR IN RUSSIAN AND EAST EUROPEAN STUDIES II (Subtitle required).** (3)  
Interdisciplinary seminar on a topic in Russian and East European Studies in the 19th Century. Prereq: Junior standing.

**RAE 403 SEMINAR IN RUSSIAN AND EAST EUROPEAN STUDIES III (Subtitle required).** (3)  
Interdisciplinary seminar on a topic in Russian and East European Studies in the late 19th Century through the Revolution. Prereq: Junior standing.

**RAE 404 SEMINAR IN RUSSIAN AND EAST EUROPEAN STUDIES IV (Subtitle required).** (3)  
Interdisciplinary seminar on a topic in Russian and East European Studies in the Soviet period. Prereq: Junior standing.

### RAS Radiation Sciences

**RAS 395 INDEPENDENT WORK IN MEDICAL PHYSICS AND RADIOLOGICAL HEALTH.** (1-3)  
Students may select an approved topic for study under the direction of a faculty member in Radiation Sciences. May be repeated to a maximum of six credits. Prereq: Upper division standing in Radiological Health or a related field, and consent of faculty adviser.

**RAS 540 FUNDAMENTALS OF RADIATION BIOLOGY.** (2)  
Fundamental aspects of radiation biology. Radiation effects on macromolecules, cells, tissues, organs, and organisms. Prereq: One year of biological sciences, one year of chemistry, one year of physics, and MA 113, or equivalent. (Same as BIO 540.)

**RAS 541 RADIOISOTOPE METHODOLOGY.** (2)  
Radioisotope techniques and their application in the biological and medical sciences. Radiation safety, calibration and use of radiation detectors, counting statistics, uptake and assay methods, and applications. Laboratory, five hours per week. Prereq: One year biology, CHE 115, PHY 213, and MA 113, or equivalent. (Same as BIO 541.)

**RAS 545 RADIATION HAZARDS AND PROTECTION.** (3)  
An analysis of common radiation hazards encountered in medicine, research, industry, and the environment. Regulations and procedures for the safe use of ionizing and nonionizing radiations. Lecture, two hours; laboratory, two and one-half hours. Prereq: PHY/RM 472G or consent of instructor. (Same as PHY/RM 545.)

**RAS 546 GENERAL MEDICAL RADIOLOGICAL PHYSICS.** (3)  
The uses and dosimetric aspects of radiation in medicine will be analyzed, including many basic applications in the fields of diagnostic radiology physics, therapy physics, and nuclear medical physics. Prereq or concur: RM/PHY 472G or consent of instructor. (Same as PHY/RM 546.)

**RAS 575 APPLIED HEALTH PHYSICS LABORATORY.** (2)  
Advanced laboratory analysis of common applied health physics problems. Laboratory, four hours per week. Prereq: PHY/RM/RAS 545 and upper division or graduate standing in a physical science, or consent of instructor.

**RAS 601 ADVANCED RADIATION DOSIMETRY.** (2)  
Advanced aspects of the interaction of radiation with matter and specialized topics in the dosimetry of ionizing radiations. Modifications of Bragg-Gray theory for application to megavoltage sources. Beta dosimetry. Specialized calibration techniques. Relative response functions of various media. Nontraditional techniques. Dosimetry of radiation fields including complex spectra. Prereq: PHY 472G, RM 546, or equivalent. (Same as RM 601.)

**RAS 610 ETHICS IN CLINICAL SCIENCES RESEARCH.** (1)  
Students will examine ethical issues in biomedical research using a case-study approach. Representative issues addressed may include data selection and retention, plagiarism, scientific review of grants and manuscripts, scientific misconduct, and informed consent. Prereq: Graduate student status. (Same as CD/CLS/CNU/PT 610.)

**RAS 647 PHYSICS OF DIAGNOSTIC IMAGING I.** (3)  
Specialized and advanced topics in diagnostic imaging, including modulation transfer function analysis, image processing algorithms, acceptance testing, CT, NMR, ultrasound, etc. Prereq: PHY/RM/RAS 546 or consent of instructor. (Same as RM 647.)



**RAS 648 PHYSICS OF DIAGNOSTIC IMAGING II. (3)**

A continuation of RAS/RM 647. Specialized and advanced topics in nuclear medicine imaging physics, including positron emission tomographic procedures, emerging new modalities, and quality control. Prereq: RM/RAS 647 or consent of instructor. (Same as RM 648.)

**RAS 649 PHYSICS OF RADIATION THERAPY. (3)**

Specialized external beam and brachytherapy treatment planning; advanced Bragg-Gray cavity applications, including Ngas and TG-21; calibration, acceptance testing, and quality control of therapy physics equipment. Prereq: RAS/RM/PHY 546 and RAS/RM 601, or consent of instructor. (Same as RM 649.)

**RAS 651 ADVANCED LABORATORY IN DIAGNOSTIC IMAGING PHYSICS. (1-3)**

Specialized experiments involving the use, calibration, and quality control of x-ray and other diagnostic imaging equipment, and the appropriate use of radiation detectors in diagnostic physics measurements. Laboratory, approximately 30 hours per credit. May be repeated to a maximum of three credits. Prereq: RM/PHY 472G, RAS/RM 546; and concurrent: RAS/RM 647, or equivalent, plus graduate standing in the radiation science program.

**RAS 695 RESEARCH IN THE HEALTH-RELATED RADIATION SCIENCES. (1-4)**

Independent directed research on theoretical and practical problems in the health-related radiation sciences. May be repeated to a maximum of eight credits. Prereq: Graduate standing in one of the radiation-related sciences, plus consent of instructor. (Same as RM 695.)

**RAS 710 RADIATION SCIENCE SEMINAR (Subtitle required). (1)**

Topics of current interest relating to radiation and its applications in the areas of radiological medical physics and health physics. May be repeated to a maximum of four credit hours with consent of instructor. Prereq: Graduate standing in a radiation-related science.

**RAS 715 ADVANCED PROBLEMS IN HEALTH-RELATED RADIATION SCIENCES. (1-4)**

Directed study and analysis of problems and their solutions, in areas of major concern to the health-related radiation sciences. May be repeated for a total of up to four semester hours. Prereq: Advanced standing with graduate radiation sciences, plus consent of instructor.

**RAS 849 RADIATION SCIENCES PRACTICUM. (1-6)**

Applied practicum experiences in the radiation sciences. Laboratory, 40 hours per week equals one credit hour. Prereq: Advanced graduate standing in the radiation sciences.

**RBM Physical Medicine and Rehabilitation**

**RBM 815 FIRST-YEAR ELECTIVE, REHABILITATION MEDICINE. (1-3)**

The student will be assigned to a faculty member and will attend inpatient rounds and staff conferences on the Spinal Cord Injury, Brain Injury or Stroke units at Cardinal Hill Hospital. Student will attend OT and PT Clinics with assigned patients; a brief discussion paper will be required on an assigned topic.

**RBM 825 SECOND-YEAR ELECTIVE, REHABILITATION MEDICINE. (1-4)**

The student will be assigned to a faculty member and will attend inpatient rounds and staff conferences on the Spinal Cord Injury, Brain Injury or Stroke units at Cardinal Hill Hospital. Student will attend OT and PT Clinics with assigned patients; a brief discussion paper will be required on an assigned topic.

**RBM 835 THIRD-YEAR ELECTIVE, REHABILITATION MEDICINE. (1-6)**

The student with specific interests in brain injury, stroke or spinal cord injury will be assigned to follow appropriate patients selected from the Rehabilitation Medicine service at Cardinal Hill Hospital. Student will interview, examine and study those cases in-depth to gain an expanded understanding of the selected area. Brief presentation at the end of the rotation.

**RBM 850 ACTING INTERNSHIP IN REHABILITATION MEDICINE. (1-6)**

Acting internship in Rehabilitation Medicine. May be repeated to a maximum of eight credits. Prereq: Medicine and/or surgery clerkship.

**RC Rehabilitation Counseling**

**RC 510 ORIENTATION TO REHABILITATION RESOURCES. (3)**

A study of the breadth of agencies involved in the rehabilitation process: medical, educational, vocational, institutional, and community services for handicapped adults. Relationships among agencies, staffing patterns, funding resources, and gaps and overlaps in services. Two hours lecture per week; two hours laboratory per week. Prereq: Twelve hours of social or behavioral sciences, or graduate standing, or consent of instructor.

**RC 515 MEDICAL AND PSYCHOSOCIAL ASPECTS OF DISABILITIES I. (3)**

This course is designed to prepare rehabilitation counselors and social workers to become interpreters of medical information concerning major disabilities and to provide an understanding of the psychosocial factors encountered by the disabled. Focus will be on how these factors affect adjustment to a disability, and on professional practice with the disabled. Topics include concepts of medical and psychosocial aspects of disability which relate to conditions that impair bodily systems and/or structures due to illness or accident that result in permanent and/or chronic functional limitations. Prereq: College level courses in biology and psychology or consent of instructor. (Same as SW 515.)

**RC 516 MEDICAL AND PSYCHOSOCIAL ASPECTS OF DISABILITIES II. (3)**

This course is designed to prepare rehabilitation counselors and social workers to become interpreters of medical information concerning major disabilities and to provide an understanding of the psychosocial factors encountered by the disabled. Focus will be on how these factors affect adjustment to a disability, and on professional practice with the disabled. Topics include concepts of medical and psychosocial aspects of disability which relate to conditions that impair bodily systems and/or structures due to illness or accident that result in permanent and/or chronic functional limitations. Prereq: College level courses in biology and psychology or consent of instructor. (Same as SW 516.)

**RC 520 PRINCIPLES OF REHABILITATION COUNSELING. (3)**

A comprehensive introduction to rehabilitation as a human service system in modern America. Philosophical, historical, legislative, and organizational structures; rehabilitation programs and related specialties; referral and delivery systems; the rehabilitation process; and professional issues and ethics. Prereq: Twelve hours of social or behavioral science, or graduate standing, or consent of instructor.

**RC 550 SPECIAL TOPICS IN REHABILITATION. (1-3)**

Study of a selected topic within the field of rehabilitation. Topic to be chosen annually in accordance with student needs and interests. May be repeated to a maximum of six credits.

**RC 610 CASE MANAGEMENT IN REHABILITATION COUNSELING. (3)**

Development of rehabilitation counseling skills and techniques. Understanding of behavior, and implementation of appropriate intervention strategies for facilitating persons with disabilities through the rehabilitation process. Case management techniques, ethics, consultation strategies, and specialized counseling skills development. Prereq: EDP 652 and RC 520 or consent of instructor.

**RC 620 VOCATIONAL EVALUATION AND WORK ADJUSTMENT FOR THE SEVERELY DISABLED. (3)**

Methods and techniques used in determining and enhancing the vocational potential of persons with disabilities. Commercial evaluation systems, work adjustment techniques, personal adjustment training, the role of evaluation in rehabilitation. Laboratory experience will include administration and interpretation of vocational tests. Lecture: two hours; laboratory: two hours per week. Prereq: A vocational theories course and RC 520 or consent of instructor.

**RC 630 PLACEMENT SERVICES AND TECHNIQUES IN REHABILITATION COUNSELING. (3)**

Development of skills for placement of persons with disabilities into a variety of settings—competitive employment, supported employment, independent living, philosophy of placement, preplacement analysis, client readiness techniques, job development, job engineering, employer attitudes, business rehabilitation, and social security disability. Occupation information and its use in the placement process. Labor market analysis and procedures for analyzing client residual and transferable work skills. Procedures for employability skills development. Prereq: A vocational theories course, RC 520 and 620 or consent of instructor.

**RC 640 REHABILITATION IN BUSINESS AND INDUSTRY. (3)**

This course is designed to provide students with a comprehensive knowledge of rehabilitation in business environments. Skills to develop a professional working relationship between the rehabilitation professional, employers, the insurance industry, and other professionals will be taught. A thorough overview of worker compensation, related legislation, and other insurance will be presented. The roles and functions of the rehabilitation professional in business rehabilitation counseling will be discussed. Prereq: Twelve hours of study in rehabilitation counseling or consent of instructor.

**RC 710 PRACTICUM IN REHABILITATION COUNSELING. (3)**

Learning experiences under faculty supervision in a community-based or state rehabilitation agency. Application of rehabilitation counseling methods, techniques, and vocational knowledge in working with persons with disabilities. Lecture, two hours; laboratory, 14 hours per week. May be repeated to a maximum of six credits with consent of instructor. Prereq: A minimum of 12 graduate hours in rehabilitation counseling and consent of instructor.

**RC 720 INTERNSHIP IN REHABILITATION COUNSELING. (3,6,9)**

Advanced learning experiences in a rehabilitation setting or agency. Lecture, two hours; laboratory, 14, 28 or 42 hours per week. May be repeated once for a maximum of nine credits. Prereq: A minimum of successful completion of one year in the Rehabilitation Counseling Program and RC 710 and consent of instructor.

**RC 740 ADMINISTRATION, SUPERVISION AND PROGRAM EVALUATION IN REHABILITATION COUNSELING. (1-3)**

Administrative and supervisory aspects of rehabilitation service delivery. Administration, clinical and technical supervision, staffing, and organizational structure(s) of the rehabilitation service delivery system (state, local, and federal). Research, program evaluation, political and ethical aspects of rehabilitation administration and supervision are overviewed. Prereq: A minimum of 12 graduate hours in rehabilitation counseling or consent of instructor.

**RC 750 REHABILITATION RESEARCH. (1-3)**

Application of basic research principles to the field of rehabilitation. Specific focus on client characteristics, constructs of disability, rehabilitation outcomes, counselor-client variables, and rehabilitation service components. Rehabilitation research and utilization projects, research funding and related grant mechanisms. Prereq: A basic research course and RC 520 or consent of instructor.

**RC 760 CONTEMPORARY PRACTICES IN REHABILITATION. (1-3)**

Contemporary practices including supported employment, independent living, engineering and technology, family matters, client rights, ethical practices, cultural diversity, aging, and present and future trends in the field of rehabilitation. Analysis of legislation, value systems, political and economic fluctuations and research. Prereq: A minimum of 12 graduate hours in rehabilitation counseling or consent of instructor.

**RC 782 DIRECTED INDEPENDENT STUDY. (1-3)**

Study of an individually selected topic relevant to a student's academic development. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

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**RM Radiation Medicine**


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**RM 472G INTERACTION OF RADIATION WITH MATTER. (3)**

Basic aspects of the interaction of ionizing radiation with matter. Bohr atom, atomic spectra, radioactivity, energetics of decay. Sources of radiation, penetration of charged particles, electromagnetic radiation, and neutrons through matter; excitation and ionization processes; selected nuclear reactions; basic radiation detection and dosimetry. Prereq: PHY 213 or 232; MA 114 (may be taken concurrently); or equivalent. (Same as PHY 472G.)

**RM 545 RADIATION HAZARDS AND PROTECTION. (3)**

An analysis of common radiation hazards encountered in medicine, research, industry, and the environment. Regulations and procedures for the safe use of ionizing and non-ionizing radiations. Lecture, two hours; laboratory, two and one-half hours. Prereq: PHY/RM 472G or consent of instructor. (Same as PHY/RAS 545.)

**RM 546 GENERAL MEDICAL RADIOLOGICAL PHYSICS. (3)**

The uses and dosimetric aspects of radiation in medicine will be analyzed, including many basic applications in the fields of diagnostic radiology physics, therapy physics, and nuclear medical physics. Prereq or concur: RM/PHY 472G or consent of instructor. (Same as PHY/RAS 546.)

**RM 601 ADVANCED RADIATION DOSIMETRY. (2)**

Advanced aspects of the interaction of radiation with matter and specialized topics in the dosimetry of ionizing radiations. Modifications of Bragg-Gray theory for application to megavoltage sources. Beta dosimetry. Specialized calibration techniques. Relative response functions of various media. Nontraditional techniques. Dosimetry of radiation fields including complex spectra. Prereq: PHY 472G, RM 546, or equivalent. (Same as RAS 601.)

**RM 647 PHYSICS OF DIAGNOSTIC IMAGING I. (3)**

Specialized and advanced topics in diagnostic imaging, including modulation transfer function analysis, image processing algorithms, acceptance testing, CT, NMR, ultrasound, etc. Prereq: PHY/RM/RAS 546 or consent of instructor. (Same as RAS 647.)

**RM 648 PHYSICS OF DIAGNOSTIC IMAGING II. (3)**

A continuation of RAS/RM 647. Specialized and advanced topics in nuclear medicine imaging physics, including positron emission tomographic procedures, emerging new modalities, and quality control. Prereq: RM/RAS 647 or consent of instructor. (Same as RAS 648.)

**RM 649 PHYSICS OF RADIATION THERAPY. (3)**

Specialized external beam and brachytherapy treatment planning; advanced Bragg-Gray cavity applications, including Ngas and TG-21; calibration, acceptance testing, and quality control of therapy physics equipment. Prereq: RAS/RM/PHY 546 and RAS/RM 601, or consent of instructor. (Same as RAS 649.)

**RM 660 GRADUATE PRACTICUM IN RADIATION MEDICINE. (1-6)**

Applied field work at the graduate level in the sciences relating to radiation medicine. May be repeated to a maximum of six credits. Prereq: Graduate standing in the bioradiation or medical sciences, plus consent of instructor.

**RM 695 RESEARCH IN THE HEALTH-RELATED RADIATION SCIENCES. (1-4)**

Independent directed research on theoretical and practical problems in the health-related radiation sciences. May be repeated to a maximum of eight credits. Prereq: Graduate standing in one of the radiation-related sciences, plus consent of instructor. (Same as RAS 695.)

**RM 740 MAMMALIAN RADIATION BIOLOGY. (2)**

The physical and biological sequelae of radiation effects will be discussed emphasizing human and mammalian responses and radiation health. Emphasis will be for health and medical workers. Prereq: Consent of instructor; BIO/RM 540 or RM 546 or equivalent background. (Same as BIO 740.)

**RM 815 FIRST-YEAR ELECTIVE, RADIATION MEDICINE. (1-3)**

With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Radiation Medicine. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**RM 825 SECOND-YEAR ELECTIVE, RADIATION MEDICINE. (1-4)**

With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Radiation Medicine. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**RM 842 RADIATION ONCOLOGY. (1)**

Use of radiation therapy in clinical treatment of malignancy. Staging, histology, spread, treatment techniques, acute and late effects of radiation therapy. Prereq: RM 740 and an introductory anatomy course, or equivalent, and consent of instructor.

**RM 848 PRACTICUM IN BRACHYTHERAPY PHYSICS. (1-3)**

This course offers practicum training in the clinical use of therapy physics and health physics in brachytherapy. May be repeated to a maximum of three credits. Laboratory: 40 hours per week. Prereq: RM/HRS 649, or equivalent, and consent of instructional staff.

**RM 849 PRACTICUM IN EXTERNAL BEAM THERAPY PHYSICS. (1-6)**

This course offers practicum training in the professional use of therapy physics in external beam radiation therapy. May be repeated to a maximum of six credits. Laboratory: 40 hours per week. Prereq: RM/HRS 649, or equivalent, and consent of instructor.

**RM 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**  
 With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

**Approved electives:**

**RM 850 RADIATION ONCOLOGY**

**RM 852 RESEARCH IN RADIATION MEDICINE**

**RS Religious Studies**

**RS 130 INTRODUCTION TO COMPARATIVE RELIGION. (3)**  
 Comparative study of major world and selected regional religions with emphasis on analysis of belief, ritual, artistic expression and social organization. Eastern and Western religions are considered. (Same as ANT 130.)

**RSD Restorative Dentistry**

**RSD 812 PRINCIPLES OF OCCLUSION AND TOOTH MORPHOLOGY. (6)**  
 This course includes a detailed study of the teeth, individually and collectively. The significance of tooth form and function is emphasized as is the relationship of this knowledge to preventive clinical dentistry. Those principles of occlusion and mandibular physiology which are common to all disciplines of clinical dentistry are coordinated to provide the student with a basic understanding of the fundamentals involved. Lecture, 24 hours; laboratory, 118 hours; self-instruction, 25 hours. Prereq: Admission to College of Dentistry or consent of course director.

**RSD 814 PRECLINICAL RESTORATIVE DENTISTRY I. (5)**  
 This course is a preclinical introduction to the etiology, pathology, prevention and treatment of dental caries. Fundamentals of dental hard-tissue surgery and the restoration of these tissues with silver amalgam, intermediate restorative materials, composite restorative material, and acrylic resin are presented. The materials science and correct manipulation of these materials are emphasized. Procedures are done on manikins and extracted teeth in a laboratory setting. Lecture, 37 hours; laboratory, 91 hours. Prereq: Admission to the College of Dentistry or consent of course director.

**RSD 821 CLINICAL RESTORATIVE DENTISTRY I. (3)**  
 This course emphasizes clinical application of the principles taught in preclinical courses. Concepts of diagnostic and therapeutic procedures as well as preventive measures are applied in the clinic with emphasis on the demonstration of competency in rendering primary care type treatment procedures. Prereq: RSD 814; coreq: RSD 824.

**RSD 822 DIAGNOSIS AND TREATMENT OF TEMPOROMANDIBULAR DISORDERS. (3)**  
 This course is directed toward the examination, diagnosis, treatment planning and treatment of functional disturbances of the masticatory system. Primary emphasis will be placed on acute muscle disorders and disc-interference disorders. The course emphasizes both theory and practice and includes clinical experience in the examination and treatment of functional disturbances in the masticatory system. The student will gain experience in using articulators, fabrication of occlusal splints and preclinical experiences in selective grinding. Lecture, 31 hours; clinic, 29 hours; laboratory, 27 hours. Prereq: CDS 811, RSD 812.

**RSD 824 PRECLINICAL RESTORATIVE DENTISTRY II. (6)**  
 This course is a preclinical continuation of RSD 814, placing emphasis on dental hard tissue surgery for extensively damaged teeth and on their restoration to meet the biological needs of the patient. Tooth preparation and restoration using dental casting alloys are performed on manikins and extracted teeth. The materials science and correct manipulation of investments, alloys and cements used to make cast restorations are emphasized. Knowledge gained in dental morphology and occlusion is applied in this course. Lecture, 42 hours; laboratory, 114 hours. Prereq: RSD 814 or consent of course director.

**RSD 830 PRINCIPLES OF FIXED PROSTHODONTICS. (2)**  
 This course is a lecture series concerning diagnosis and treatment planning for fixed prosthodontics care and the principles of providing that care. The relationship of tooth restoration and replacement to occlusion, periodontics, orthodontics and removable prosthodontics in both treatment planning and treatment is emphasized. Lecture, 33 hours; self-instruction, 11 hours. Prereq: RSD 821 and RSD 824.

**RSD 831 CLINICAL RESTORATIVE DENTISTRY II. (4)**  
 A continuation of RSD 821 as well as some clinical application of principles taught in RSD 824. The emphasis continues to be on the delivery of primary care type treatment with increasing competency and proficiency. Some emphasis is directed toward elementary experiences in rehabilitative type treatment procedures and occlusal dysfunctions. Clinic, 120 hours. Prereq: RSD 821 and RSD 824; coreq: RSD 830 and RSD 834.

**RSD 832 DENTAL BIOMATERIALS. (2)**  
 In this course, the materials science, proper manipulation and biocompatibility of a wide variety of dental biomaterials are examined. The durability and biocompatibility of similarly utilized materials are compared. Diagnosis of the causes of clinical materials-related failures is emphasized. Lecture, 40 hours. Prereq: PRO 820 and RSD 824 or consent of course director.

**RSD 834 PRECLINICAL RESTORATIVE DENTISTRY III. (3)**  
 This is a preclinical course with emphasis on dental hard tissue surgery and restorative procedures for anterior and posterior fixed prosthodontics. A preventive orientation is stressed as theory is applied in practice using manikins. Knowledge gained in RSD 822 and RSD 824 is applied to more extensive restorations. Lecture, 10 hours; laboratory, 78 hours. Prereq: RSD 821 and RSD 824.

**RSD 840 RESTORATIVE DENTISTRY UPDATE. (1)**  
 Students are provided current information on advanced restorative dentistry clinical procedures and materials. Emphasis will be given to diagnosis, treatment planning and treatment of the complex restorative dentistry patient. The format of the course will be "clinical case presentation." Prereq: RSD 830 and RSD 834.

**RSD 841 CLINICAL RESTORATIVE DENTISTRY III. (3)**  
 As the final phase in the undergraduate clinical continuum, this course continues to emphasize primary care concepts and proficiency. In addition, more complicated rehabilitative type care and occlusal dysfunction problems are encountered by the student under faculty supervision. Clinic, 145 hours. Prereq: RSD 830, RSD 831 and RSD 834.

**RSD 850 RESTORATIVE DENTISTRY ELECTIVE. (1-10)**  
 Elective courses offered by the Department of Restorative Dentistry provide opportunities for further study of or experience in various aspects of restorative dentistry. Topics may include occlusion in oral reconstruction, philosophies of occlusion, complex restorative dentistry, dental ceramics and esthetics, and dental physical sciences. Hours variable, ranging from a minimum of 16 hours lecture/discussion to a maximum of 10 weeks clinical experience. May be repeated to a maximum of 10 credits. Prereq: The minimum year in dental school and any course prerequisites will be announced for each topic.

**SCI Science****SCI 101 SCIENTIFIC REASONING. (3)**

A lecture/recitation course that stresses quantitative and logical reasoning skills that form the basis of science courses. The course will emphasize how to take verbally presented problems, recognize the mathematical patterns within them, and solve them. Lecture, one hour; recitation, four hours per week. Prereq: Math ACTE greater than or equal to 18, or MA 108R, or Math Placement Test.

**SOC Sociology****SOC 101 INTRODUCTORY SOCIOLOGY. (3)**

Introduction to the concepts and methods of sociology. Investigation of socialization, group processes, social institutions and social change. Student may not receive credit for both this course and GEN 102.

**SOC 151 SOCIAL INTERACTION. (3)**

Explores the fundamental sociological and social psychological processes underlying human interaction. Focuses on the dynamics of symbolic exchange, the social context and processes shaping it, and examines its effects in the formation and maintenance of social and personality systems. Prereq: SOC 101 or PSY 100 or PY 110 or equivalent social science background.

**SOC 152 MODERN SOCIAL PROBLEMS. (3)**

An introductory course involving an examination of selected social problems of the day. Topics may include family, poverty, education, crime, race, housing, population, health care, industrial development, and power. Prereq: SOC 101 or SOC 151 or equivalent social science background.

**SOC 220 THE COMMUNITY. (3)**

Social organization and process in modern communities; social techniques of community improvement. Prereq: Three hours or equivalent social science background.

**SOC 235 INEQUALITY IN SOCIETY. (3)**

Analysis of the nature, development, and persistence of inequality in various societies. Diverse dimensions of inequality are viewed as the basis for a number of specific social problems in Western and non-Western societies. Social origins of inequality are emphasized. Policy implications are addressed. Prereq: Three hours of sociology or equivalent social science background.

**SOC 249 MASS MEDIA AND MASS CULTURE. (3)**

An examination of the interplay between the technology and content of the mass communications media and culture. Prereq: COM 101 or SOC 101 or its equivalent. (Same as COM 249.)

**SOC 260 POPULATION, RESOURCES AND CHANGE. (3)**

The interrelationships among population variables (size, composition, change), social systems, and environmental conditions will be explored from an issues or problems approach. The tools of population studies will be introduced and used to examine how population influences society and mankind's use of the environment. Prereq: Three hours of sociology or equivalent social science background.

**SOC 299 SPECIAL INTRODUCTORY TOPICS IN SOCIOLOGY (Subtitle required). (3)**

An introductory study of a selected topic in sociology. Topics may include, but are not limited to, industrial sociology, sociology of aging, sex roles, criminology, stratification and urban sociology. May be repeated to a maximum of six credits under different subtitle. Prereq: Three hours of introductory level sociology or consent of instructor.

**SOC 302 SOCIOLOGICAL RESEARCH METHODS I. (3)**

Introduction to the research methods as applied to sociological problems. Issues addressed include theory construction, conceptualization, measurements, data presentation, and problems of analysis. Required for majors. Prereq: The introductory level sociology course or GEN 102.

**SOC 303 SOCIOLOGICAL RESEARCH METHODS II. (3)**

Research methods and designs used in sociology. Sociological problems will be analyzed through readings, discussion, use of measurement and analytical procedures, and projects or field work. Required for majors. Prereq: SOC 302 or consent of instructor.

**SOC 335 WOMEN AND MEN IN SOCIETY. (3)**

A sociological study of the sexual division of society with special emphasis on social, structural, and cultural influences. Prereq: SOC 101 or WS 200 or permission of instructor.

**SOC 340 SOCIOLOGY OF U.S. AGRICULTURE. (3)**

A survey of the issues, methodology, and theory related to the sociology of U.S. agriculture. Topics include agrarian social movements, agricultural science and technology, comparative commodity systems, environmental issues and the role of gender in agricultural production. Prereq: Six hours of social science or consent of instructor.

**SOC 342 ORGANIZATIONS IN SOCIETY. (3)**

The roles of formal organizations including bureaucratic structures in society are examined with special attention given to linkages to contemporary social conditions. Relationships among such organizations and basic internal organizational processes are also studied. Prereq: Six hours of social science or consent of instructor.

**SOC 350 TOPICS IN SOCIOLOGY. (3)**

Discussion, readings, and papers focusing on topics in sociology. Directed by a staff member having specific competence in the topics under study. Current research developments in particular sociological subfields will be stressed. May be repeated to a maximum of nine credits. Prereq: Six hours of social science or consent of instructor.

**SOC 354 THE FAMILY IN CROSS-CULTURAL PERSPECTIVE. (3)**

This course approaches the study of the family from a comparative perspective, emphasizing cross-cultural variability in the structure and function of family. Kinship, household formation, sex roles, and socialization are examined in the context of the family, as well as patterns of interaction, personality formation, and family pathology. Prereq: Introductory social science course. (Same as ANT/FAM/SW 354.)

**SOC 362 PRACTICUM IN VOCATIONAL EDUCATION, AGRICULTURAL COMMUNICATIONS, AND LEADERSHIP. (3)**

Supervised experiences in schools, businesses and agencies. Required of all Agricultural Education, Communications, Leadership and Home Economics Education majors. Includes observation, participation, experience, field trips, inspection of programs and professional organizations. May be repeated to a maximum of nine credits. Prereq: Junior standing. (Same as AED/AGC/HEE 362.)

**SOC 380 DEVELOPMENT OF NON-WESTERN SOCIETIES. (3)**

An introduction to the sociological study of the development process in non-Western societies. Primary focus is placed on the social, structural, cultural, ecological and demographic factors that differentiate the development of non-Western from Western societies. Prereq: Six hours in social sciences.

**SOC 395 INDEPENDENT WORK. (1-3)**

Study of some special topic by duly authorized students. May be repeated to a maximum of four credits. Prereq: Major or minor, a standing of 3.0 in the department, and learning contract filed with department chair.

**SOC 399 FIELD BASED/ COMMUNITY BASED EDUCATION. (1-15)**

A community-based or field-based experience in sociology under the supervision of a faculty member. May be repeated to a maximum of 15 credits. Pass-fail only. Prereq: Consent of instructor and department chairperson; completion of departmental learning agreement.

**SOC 409 THE FAMILY. (3)**

A study of the institutions of marriage and the family and an analysis of the various factors and forces at work in our time which are affecting the individual marital relationships. Prereq: Six hours of social science or consent of instructor.

**SOC 418 SOCIAL CHANGE. (3)**

A sociological analysis of the sources, processes and consequences of social change. Prereq: Six hours of social science or consent of instructor.

**SOC 420 COMMUNITY ANALYSIS. (3)**

A study of communal structure and processes with special emphasis on strategies of field investigation of particular communities. Prereq: Six hours of social science or consent of instructor.

**SOC 425 DIMENSIONS OF AGING. (3)**

Analysis of demographic and institutional patterns, social roles, psychological and physiological changes, and social policies and programs associated with aging. Prereq: Six hours of social science or permission of instructor. (Same as PSY/ANT 425.)

**\*SOC 432 RACE AND ETHNIC RELATIONS. (3)**

Analysis of relationships between racial and ethnic groups and the behavioral products thereof. Sources and consequences of prejudice and discrimination. Situation and prospects of minorities. Strategies of change and tension reduction. Prereq: Six hours of social science or consent of instructor.

**SOC 434 SOCIAL CLASSES. (3)**

A systematic treatment of the factors underlying social differentiation and stratification, with particular attention to class and caste; social mobility in American society. Prereq: SOC 101 or consent of instructor.

**SOC 435 POWER AND POLITICS IN SOCIETY. (3)**

Course examines social antecedents and consequences of the distribution of power in society, the institutions in which power is pursued and exercised and the way in which the political arena relates to other institutions. Prereq: Six hours of social science or consent of instructor.

**SOC 436 SOCIOLOGY OF DEVIANT BEHAVIOR. (3)**

A systematic examination of the various types of social disorganization with particular emphasis upon the sociological explanation of underlying factors. Prereq: Six hours of social science or consent of instructor.

**SOC 437 CRIMINOLOGY. (3)**

A study of general conditions as to crime and delinquency, of measures of punishment and reform of offenders, of criminal procedure and its possible reform and of measures for the prevention of crime. Prereq: Six hours of social science or consent of instructor.

**SOC 438 JUVENILE DELINQUENCY. (3)**

Studies of the extent, ecological distribution, and cause of delinquency in contemporary American society, including a critical examination of trends and methods of treatment. Prereq: Six hours of social science or consent of instructor.

**SOC 439 SPECIAL TOPICS IN CRIME AND DELINQUENCY (Subtitle required). (3)**

An analysis of issues and problems central to the study of crime, deviance, and social control in society. Topics may include the analysis of law and society, organized crime, the professional criminal, corrections, or substance abuse. May be repeated once for credit under different subtitle. Prereq: Introductory level sociology course plus one of the following: SOC 436, SOC 437, SOC 438G or consent of instructor.

**SOC 442G TOPICS IN WORK AND SOCIETY (Subtitle required). (3)**

An analysis of major occupational categories and their relationships to technological, organizational, and societal conditions. Topics may include studies of worker and societal attitudes toward work, problems in occupational mobility and status attainment, alternatives to work in bureaucratic settings, labor/management relations, or the professionalization of the work force. May be repeated once for credit under a different subtitle. Prereq: Six hours of social science or consent of instructor.

**SOC 444 SOCIAL PSYCHOLOGY. (3)**

Theoretical and empirical analysis of individual behavior in the social setting with particular emphasis on social learning, motivation, and the measurement, formation, and changing of social attitudes. Prereq: One of the following: PSY 100, SOC 101, or GEN 102. (Same as PSY 444.)

**SOC 448 APPLIED SOCIAL PSYCHOLOGY. (3)**

Application of social-psychological knowledge, both theoretical and empirical, to contemporary social issues. Coverage includes application to such diverse topics as health, education, business, law, and international relations. Prereq: PSY 100. (Same as PSY 448.)

**SOC 449 SOCIAL PROCESSES AND EFFECTS OF MASS COMMUNICATION. (3)**

The relationship between the organization of modern society and its communication media. Special emphasis is given the way in which cultural processes and social change have an impact upon the mass media, and upon the way in which the mass media influence cultural processes and social change. The social-psychological bases of communication are studied within a context of theory and research. Prereq: SOC/COM 249 or its equivalent. (Same as COM/EDC 449.)

**SOC 451G FOUNDATIONS OF SOCIOLOGICAL THEORY. (3)**

A survey of the development of scientific and humanistic theories in the study of human social interaction and society from The Enlightenment to the present. Works of theorists such as Durkheim, Marx, Weber and Mead will be considered. Emphasis is on the growth of sociology as a discipline. Required for majors. Prereq: Six hours of social science or consent of instructor.

**SOC 452G CONTEMPORARY SOCIAL THEORY. (3)**

A survey and analysis of the major schools of contemporary sociological theory. Works of major theorists are included. Emphasis is on the conceptual structure of the different theories and the way in which they are applied in contemporary sociological analysis. Prereq: SOC 451G.

**SOC 499 TOPICAL SENIOR SEMINAR (Subtitle required). (3)**

Course is especially designed for seniors. Readings, discussions and papers will focus on current research dealing with selected issues of significance in American society. May be repeated to a maximum of six credits under different subtitles. Prereq: Consent of instructor, senior standing, and one introductory level sociology course.

**SOC 501 POPULATION ANALYSIS. (3)**

Distribution and composition, fertility and mortality, migration, ecological relationships and growth of population. Prereq: Six hours of social science or consent of instructor.

**SOC 509 THE U.S. FAMILY IN HISTORICAL PERSPECTIVE. (3)**

A study of American family experience and values from its preindustrial Anglo-European roots to the present. Using an interdisciplinary focus, the course will examine the shifting boundary between family and community and the interaction between domestic life and demographic, religious, and economic influences in American history. Prereq: FAM 353 or SOC 409 or equivalent, or consent of instructor. (Same as FAM 509, HIS 596.)

**SOC 525 RELIGION, SOCIETY AND CULTURE. (3)**

An analysis of the structure, function, and process of religion in its societal and cultural context. Major emphasis is placed on the interaction between religious organizations and the societies in which they operate. Prereq: Six hours of social science or consent of instructor.

**SOC 527 SOCIETY AND HEALTH. (3)**

The study of human behavior in illness and of medicine as a complex form of social organization from historical, cross-cultural and contemporary perspectives. Prereq: Consent of instructor. (Same as BSC 527.)

**SOC 533 SOCIAL ANTHROPOLOGY. (3)**

History and theory of social anthropology with special emphasis on the comparative approach to analysis of structure, function, and change in social and cultural systems. Prereq: Six hours of social science or consent of instructor. (Same as ANT 533.)

**SOC 534 THE SOUTHERN APPALACHIANS: A SOCIOLOGICAL INTERPRETATION. (3)**

A sociological interpretation of the Southern Appalachians, emphasizing the great diversity—social, cultural, economic—in the various parts of this area by study of the major institutions, value orientations, and social and cultural changes affecting both the whole area and its sections. Prereq: Six hours of social science or consent of instructor. (Same as ANT 534.)

**SOC 542 HUMAN RELATIONS IN ADMINISTRATION OF ORGANIZATIONS. (3)**

Sociological and social psychological analysis of social structure and environment, leadership, power, authority, decision making, communication, satisfaction, and stress in organizational and administrative activity. Prereq: Six hours of social science or consent of instructor.

**SOC 546 SOCIAL FACTORS IN MENTAL HEALTH. (3)**

The significance of social, psychological and cultural factors in the recognition and course of mental health problems; the organization of mental health services in society. Prereq: Consent of instructor. (Same as BSC 546.)

**SOC 547 SOCIAL AND PSYCHOLOGICAL ASPECTS OF APPAREL. (3)**

An advanced study of the social, psychological factors which influence apparel and apparel use with particular emphasis on research. Prereq: HET 247 for majors only. Non-majors: three hours in sociology or anthropology and three hours in psychology. (Same as DMT 547.)

**SOC 555 GEOGRAPHIC INFORMATION SYSTEMS AND LANDSCAPE ANALYSIS. (3)**

An introduction to the concepts and methods of compilation, management, analysis, and display of spatially-referenced data. Lectures will be complemented with computer based laboratory exercises. Lecture, two hours; laboratory, four hours per week. Prereq: Fourth/fifth year LA major, upper division or graduate student, or permission of instructor. (Same as LA 855/NRC 555.)

**\*SOC 556 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND LANDSCAPE ANALYSIS. (3)**

Advance concepts in data base analysis, model development, and ancillary functions in geographic information systems. Lecture, two hours; laboratory, four hours per week. Prereq: LA 855, LAAR major, upper division, graduate student, or permission of instructor. (Same as LA 956/NRC 556.)

- SOC 565 SPECIAL PROBLEMS IN SOCIOLOGY.** (1-3)  
Supervised individual study in selected subfields of sociology, population, community, organizations, social attitudes, deviant behavior, and social change are among the fields for investigation. May be repeated to a maximum of six credits. Prereq: Six hours of social science and learning contract filed with department chair.
- SOC 603 SEMINAR IN TEACHING SOCIOLOGY.** (3)  
The purpose of this course is to aid the development of student's teaching styles and strategies. Topics for class readings and discussions include philosophies and theories of teaching as well as specific teaching strategies and techniques. Seminar members each design a course they someday hope to teach, constructing a course syllabus, choosing readings and designing assignments, exercises, and examinations. In addition, seminar members prepare and deliver presentations to the seminar as well as to ongoing undergraduate classes. Prereq: Graduate standing in sociology, or consent of instructor.
- SOC 605 VALUES, RESEARCH, AND PUBLIC POLICY.** (1)  
Discussion-oriented course focusing on the following issues: the role of knowledge in policy-making; conflicts between the production of "expert" knowledge and democratic participation in the public sphere; ethical and professional value commitments; implicit "knowledge interest" of methodological styles. Lecture, three hours per week for five weeks. Prereq: Consent of instructor.
- SOC 606 APPLIED SOCIAL RESEARCH: AN OVERVIEW OF TYPES, USES AND DESIGNS.** (1)  
An introduction to the requirements and major types and methods of applied social research. Lecture, three hours per week for five weeks. Prereq: Consent of instructor.
- SOC 607 ADMINISTERING APPLIED SOCIAL RESEARCH PROGRAMS.** (1)  
A case study approach to examining administrative and management issues and skills confronted in the conduct of applied social research, including proposal development, client-researcher relationships, budgeting, staffing, ethical and legal issues. Lecture, three hours per week for five weeks. Prereq: Consent of instructor.
- SOC 608 INTERPRETING APPLIED SOCIAL RESEARCH.** (1)  
Overview of principles and techniques for communication of sociological research findings to nonacademic audiences. Experts in various fields will present short lectures and multi-media displays. Time will be provided for student exercises. Lecture, three hours per week for five weeks. Prereq: Consent of instructor.
- SOC 610 PROSEMINAR IN COMPLEX ORGANIZATION.** (3)  
A systematic examination of the sociological concepts, literature and current developments in the field of complex organizations. Prereq: Consent of instructor.
- SOC 622 TOPICS AND METHODS OF EVALUATION.** (3)  
An examination of a subset of evaluation methods, topics, and problems. An introductory course in the area with minimal emphasis on quantitative methods. The course is designed to: provide a perspective from which evaluation studies may be viewed; and, to provide experiences for those who will learn from or conduct evaluations. Prereq: Consent of instructor, and a basic course in statistics or research. (Same as ANT/EDP/EPE 620.)
- SOC 630 PROSEMINAR IN DEVIANT BEHAVIOR.** (3)  
A systematic examination of the sociological concepts, literature, and current developments in the field of deviant behavior. Prereq: Graduate standing; SOC 436 or equivalent.
- SOC 635 PROSEMINAR IN WORK, GENDER, AND INEQUALITY.** (3)  
A systematic examination of the sociological concepts, literature and current developments in the sociology of work, gender, and inequality. Prereq: Consent of instructor.
- SOC 637 SOCIOCULTURAL DIMENSIONS OF ECONOMIC DEVELOPMENT.** (3)  
Examination of social, cultural and economic conditions in lesser developed countries. Discussion of the various socioeconomic and cultural theories of change and developments, and of alternative policies for the world of the future. Considers the possible roles for social scientists in policy formulation and application. Prereq: Six graduate credits in social sciences or consent of instructor. (Same as ANT 637.)
- SOC 638 FOOD SYSTEMS AND AGRARIAN CHANGE.** (3)  
An examination of the way in which the organization of food procurement, distribution, and consumption in developing countries has affected and been affected by agrarian change. Prereq: Consent of instructor. (Same as ANT 638.)
- SOC 640 SCIENCE, AGRICULTURE, AND DEVELOPMENT.** (3)  
An in-depth examination of the interrelations between science, agriculture, and development. Both domestic and international issues are explored. Prereq: Graduate standing in the social or agricultural sciences. (Same as ANT 640.)

- SOC 641 GENDER ISSUES IN DEVELOPMENT.** (3)  
An examination of gender issues in domestic and international development. Prereq: Graduate standing in the social or agricultural sciences or permission of the instructor. (Same as ANT 641.)
- SOC 650 CONCEPTS AND THEORIES IN SOCIOLOGY.** (3)  
Consideration of central conceptual issues underlying the construction of various sociological theories and their explanatory frameworks. A systematic exploration of the development and application of central conceptual frameworks of the discipline. Prereq: Consent of instructor.
- SOC 651 SOCIOLOGICAL THEORY IN TRANSITION.** (3)  
Intensive examination of the ideas and continuing significance of leading nineteenth century sociological theorists. The work of Marx, Weber, Durkheim, and Simmel is given particular attention. Discussion concerns the contents of their writings, the sociohistorical context in which they were developed, and their applicability to contemporary society. Prereq: SOC 650 or consent of instructor.
- SOC 653 FAMILY THEORY.** (3)  
A survey and critical evaluation of family macro and micro theories. The course will include (a) a historical perspective on the development of family theory; (b) the prevalent macro theories/conceptual frameworks in use in the field; and (c) current trends in the development of micro, or middle-range, family theories. Prereq: FAM 652. (Same as FAM 653.)
- SOC 661 SOCIOLOGY OF EDUCATION.** (3)  
A study of schooling and education using basic analytic paradigms of sociology. Emphasis on schools as formal organizations and education in a changing, technologically oriented and stratified society. Prereq: SOC 101 or equivalent. (Same as EPE 661.)
- SOC 680 METHODS OF SOCIAL INVESTIGATION.** (4)  
An overview of the various methods and techniques, both quantitative and qualitative, used by sociologists, including experience in the use of various methods. Lecture, three hours; laboratory, two hours per week. Prereq: Six graduate hours in sociology or consent of instructor.
- SOC 681 RESEARCH DESIGN AND ANALYSIS.** (3)  
Problem definition and delimitation, design appropriate to problem and data, and selection of appropriate analysis techniques; critical examination of representative research studies. Prereq: Elementary statistics.
- SOC 682 SPECIAL TOPICS IN ADVANCED SOCIOLOGICAL METHODS.** (1-3)  
A focused treatment of one or more issues, topics, or problems in sociological methods such as time-series analysis, causal analysis, participant observation, conduct of experiments, sociohistorical methods, scale construction, etc. May be repeated to a maximum of nine credits. Prereq: SOC 681 or equivalent.
- SOC 684 FARMING SYSTEMS RESEARCH METHODS.** (3)  
A critical analysis of the concepts, methods, and practices of farming systems research. Design and carry out an FSR project. Prereq: Graduate standing in the social or agricultural sciences. (Same as ANT 684.)
- SOC 691 STRUCTURE OF U.S. AGRICULTURE.** (3)  
This seminar will analyze the structural transformation of U.S. agriculture in the 19th and 20th centuries in the context of sociological theory. Emphasis is given to key historical transitions, changing social relations of production and state policy. Such emphases provide a framework for understanding the historical roots and future prospects for the socioeconomic problems confronting contemporary U.S. agriculture. Prereq: Graduate standing in sociology/agricultural economics or consent of instructor. (Same as AEC 691.)
- SOC 710 SPECIAL TOPICS IN SOCIAL ORGANIZATION.** (1-3)  
A focused treatment of one or more issues, topics, or problems in the field of social organization such as selected aspects of political organization, inequality, opportunity structures, complex organization or social movements. May be repeated to a maximum of nine credits. Prereq: SOC 610 or equivalent or consent of instructor.
- SOC 730 SPECIAL TOPICS IN DEVIANT BEHAVIOR.** (1-3)  
A focused treatment of one or more issues, topics, or problems in the field of deviant behavior such as delinquency, sociology of law, criminal justice and corrections, radical criminology, or methodological issues in deviance research. May be repeated to a maximum of nine credits. Prereq: SOC 630 or equivalent or consent of instructor.

**SOC 735 TOPICAL SEMINAR IN WORK, GENDER, AND INEQUALITY (Subtitle required).** (3)  
Advanced study of topics of current importance in the sociology of work, gender, and inequality, such as labor force participation, work organization and process structure of labor markets, gender, and work, social classes, race and ethnic stratification, and theories of work, gender, and inequality. May be repeated under different subtitles to a maximum of 12 credits. Prereq: SOC 635 or consent of instructor.

**SOC 748 MASTER'S THESIS RESEARCH.** (0)  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**SOC 749 DISSERTATION RESEARCH.** (0)  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**SOC 750 SPECIAL TOPICS IN SOCIAL CHANGE AND DEVELOPMENT.** (1-3)  
A focused treatment of one or more issues, topics, or problems in the field of social change and development, such as modernization, dependency, the role of science and technology in development, or alternative futures. May be repeated to a maximum of nine credits. Prereq: SOC 650 or equivalent or consent of instructor.

**SOC 751 SEMINAR IN SOCIOLOGICAL THEORY.** (3)  
A survey of major theoretical perspectives in modern sociology, focusing on twentieth century developments in European and American sociological theory. The principal contributions of selected theorists are considered and their role in the establishment of contemporary sociology is assessed. Prereq: SOC 650 or consent of instructor.

**SOC 752 SEMINAR IN FAMILY THEORY CONSTRUCTION.** (3)  
An advanced seminar focusing on the definition, evaluation and construction of family theory. Inductive and deductive theory construction strategies are surveyed, evaluated and applied. Prereq: FAM 652. (Same as FAM 752.)

**SOC 766 CONCEPTS IN MEDICAL SOCIOLOGY.** (3)  
A review of sociological concepts and methods which have been applied to the study of health and medicine; the contributions of medical sociology to general sociological theory and to concepts and research on health-related problems of society. Prereq: Consent of instructor. (Same as BSC 766.)

**SOC 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE.** (1-6)  
May be repeated to a maximum of 12 hours.

**SOC 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE.** (0-12)  
May be repeated indefinitely.

**SOC 772 TOPICAL SEMINAR IN SOCIOLOGY.** (3)  
Advanced study of topics of current importance in sociology, such as structural strain and social change, game theory, decision processes, communication and power structure. May be repeated under different subtitles to a maximum of 12 credits. Prereq: At least nine hours in the social sciences, preferably in sociology.

**SOC 773 TOPICAL SEMINAR.** (3)  
Analysis of topics of scientific interest in rural sociology, selected from such fields as the following: criticism of research; sociological factors in land use; migration; rural social ecology of the South; highland societies. May be repeated to a maximum of six credits.

**SOC 776 SEMINAR IN DEPENDENCY BEHAVIOR.** (3)  
The course is designed to explore theories of dependency behavior by examining the concept of dependency as it can be applied to the study of various phenomena including alcohol use and abuse; dependence on other psychoactive substances; institutional dependency; dependency in work settings; and poverty and welfare. Prereq: Consent of instructor. (Same as ANT/PSY/BSC 776.)

**SOC 777 SEMINAR IN MENTAL ILLNESS CONCEPTS, RESEARCH AND POLICY.** (3)  
Advanced study of contemporary concepts of mental health and mental illness, and their historical development; major forms of response to mental illness. Prereq: Consent of instructor. (Same as BSC 777.)

**SOC 779 TOPICAL SEMINAR IN SOCIAL PSYCHOLOGY.** (3)  
Each semester some topic in the field of social psychology such as attitudes and beliefs, structure and function of social groups, social determinants of behavior, leadership, and morale will be studied intensively. May be repeated to a maximum of six credits. Prereq: PSY 444G. (Same as PSY 779.)

**SOC 780 SPECIAL PROBLEMS IN SOCIOLOGY.** (1-6)  
May be repeated to a maximum of 10 credits.

**SOC 785 COMPARATIVE HEALTH CARE SYSTEMS.** (3)  
This seminar will focus on concepts, issues, and research pertaining to health care systems in comparative perspective. It will deal with the following questions. (1) What are the core analytical dimensions of a health care system? (2) How do health care systems connect with the other institutional domains of a society, with its value-system, and with its major cultural and historical trends? and (3) Within the health care system, how are the main constituents of modern medicine related to each other? Prereq: Consent of instructor. (Same as BSC 785.)

**SOC 790 RESEARCH IN RURAL SOCIOLOGY.** (1-3)  
Individual graduate research with correlated study of rural social research types and methods. May be repeated for a maximum of six credits.

**SOC 792 RESEARCH IN SOCIOLOGY.** (1-6)  
Individual research and reading in particular fields of sociology, under staff supervision. Open to advanced students who are prepared for intensive study beyond that offered in regular classes in each field. May be repeated to a maximum of 10 hours.

**SOC 797 COMMUNITY DEVELOPMENT PRACTICUM.** (1-9)  
Supervised experiences in the application of sociological concepts and techniques to problems of program development in a community or state agency, organization, or department. Learning contract required. May be repeated to a maximum of 9 credits. Prereq: Approval of the Director of the Community Development Program.

## SPI Spanish and Italian Languages and Literatures

### SPANISH

**SPI 011 SPANISH READING FOR GRADUATE STUDENTS.** (0)  
Designed for those graduate students who wish to acquire a rapid reading knowledge of Spanish. Emphasis on rapid vocabulary building, the Spanish idiom, and the verb systems. Lecture, three hours.

**SPI 101 ELEMENTARY SPANISH I (spoken approach).** (4)  
This course is designed to introduce basic modes of communication in Spanish. The emphasis is on everyday language which the students will learn by applying essential grammatical structures to vocabulary. Both listening and reading comprehension are stressed. The textbook provides instructional assignments and self-correctional exercises. Not open to students who have credit for SPI 141.

**SPI 102 ELEMENTARY SPANISH II (spoken approach).** (4)  
A continuation of SPI 101. Not open to students who have credit for SPI 142. Prereq: SPI 101 or consent of the department and placement test.

**SPI 115 CULTURE OF MEXICO FOR NON-SPANISH SPEAKERS.** (3)  
A course designed to introduce students to the basic cultural patterns of Mexico through readings and travel. To be offered only during the intersession or summer session in Mexico. Appropriate faculty leadership is provided.

**SPI 141 ELEMENTARY SPANISH I (reading approach).** (3)  
The study of the basic principles of the language through grammar, with emphasis on rapid development of reading and comprehension skills. Offered by correspondence only. Not open to students who have credit for SPI 101.

**SPI 142 ELEMENTARY SPANISH II (reading approach).** (3)  
A continuation of SPI 141. Selected readings. Offered by correspondence only. Not open to students who have credit for SPI 102. Prereq: SPI 141 or consent of department and placement test.

**SPI 201 INTERMEDIATE SPANISH III (spoken approach).** (3)  
Review and reinforcement of grammatical and phonological patterns. Emphasis will be given to developing reading, listening and speaking skills based on contemporary texts. Not open to students who have credit for SPI 241. Prereq: SPI 102 or consent of department and placement test.

**SPI 202 INTERMEDIATE SPANISH IV (spoken approach).** (3)  
Continuation of SPI 201. Not open to students who have credit for SPI 242. Prereq: SPI 201 or consent of department and placement test.

**SPI 210 SPANISH COMPOSITION. (3)**

This course is designed for Spanish majors and minors and for those students who wish to perfect their knowledge of Spanish grammar. Concentration on more sophisticated structures of Spanish syntax, and further vocabulary expansion. Prereq: SPI 202 or equivalent or consent of chair.

**SPI 211 SPANISH CONVERSATION. (3)**

Sections limited to no more than 15 students each. Oral-aural practice in the spoken language. Special emphasis placed on the acquisition of idioms and fundamental conversational vocabulary. Prereq: SPI 202 or equivalent or consent of chair.

**SPI 215 CULTURE OF MEXICO. (3)**

A course designed to introduce students to the basic cultural patterns of Mexico and to improve their oral proficiency in Spanish. To be offered only during the intersession or summer session in Mexico. Appropriate faculty leadership is provided. Prereq: SPI 201 or equivalent or consent of chair. With permission of the chair, SPI 102 may also be considered a prerequisite.

**SPI 241 INTERMEDIATE SPANISH III (reading approach). (3)**

Readings of selected Spanish and Spanish American works and rapid review of principles of grammar. Emphasis on reading comprehension. Not open to students who have credit for SPI 201. Prereq: SPI 142 or consent of department and placement test.

**SPI 242 INTERMEDIATE SPANISH IV (reading approach). (3)**

A continuation of SPI 241. Several options will be offered, including culture, literature and contemporary problems. Topics for each section to be announced in the *Schedule of Classes*. Not open to students who have credit for SPI 202. Prereq: SPI 241 or consent of department and placement test.

**SPI 261 MASTERPIECES OF HISPANIC LITERATURE IN TRANSLATION. (3)**

A study of selected writers of Spain and Latin America from the Middle Ages to the present.

**SPI 263 MASTERPIECES OF ITALIAN LITERATURE IN TRANSLATION. (3)**

A study of representative Italian writers and their works in a European context, using anthologies and complete texts where necessary.

**SPI 302 BUSINESS AND TECHNICAL SPANISH. (3)**

A course designed to acquaint the student with Spanish language as used in business, and may include discussion of Spanish vocabulary for the social sciences and technical fields such as agriculture, engineering, medicine, and nursing. Prereq: SPI 210 or equivalent.

**SPI 310 STYLISTIC STUDIES IN SPANISH. (3)**

Practice in translation of English prose into Spanish, including treatment of advanced grammar and style. Prereq: SPI 210, 211 or equivalent.

**SPI 311 ADVANCED SPANISH CONVERSATION. (1)**

Intensive practice in oral Spanish, emphasizing refinement of intonation, and idiomatic expression. Designed to increase and maintain oral fluency in Spanish. May be repeated to a maximum of three credits. Not open to native speakers of Spanish. Prereq: SPI 211 or equivalent.

**SPI 312 CIVILIZATION OF SPAIN. (3)**

This course is designed to acquaint students with Spain's intellectual, cultural and historical development. Conducted primarily in Spanish. Prereq: SPI 210 and 211, or consent of instructor.

**SPI 314 CIVILIZATION OF SPANISH AMERICA. (3)**

This course is designed to acquaint students with Spanish America's intellectual, cultural and historical development. Conducted primarily in Spanish. Prereq: SPI 210 and 211, or consent of instructor.

**SPI 320 LITERATURE, LIFE AND THOUGHT OF SPAIN. (3)**

A study of the literature that reflects the life and thought of Spain from the Middle Ages to the present. Lecture and discussion in Spanish. Prereq: SPI 210 and SPI 211, or consent of instructor.

**SPI 322 LITERATURE, LIFE AND THOUGHT OF SPANISH AMERICA. (3)**

A study of the literature that reflects the life and thought of Spanish America from the Colonial period to the present. Lecture and discussion in Spanish. Prereq: SPI 210 and SPI 211, or consent of instructor.

**SPI 324 THE THEATRE IN SPAIN AND SPANISH AMERICA. (3)**

A study of the theatre in Spain and Spanish America, stressing developments in the dramatic arts as seen in the works of major dramatists of the Golden Age, Modern Period, and twentieth century Spanish America. Conducted primarily in Spanish. Prereq: SPI 210 and 211.

**SPI 326 HISPANIC POETRY. (3)**

Introduction to Spanish metrics and versification, and the forms and techniques of Hispanic poetry with analysis, explication, and interpretation of poetic texts by major poets from Spain and Spanish America. Conducted primarily in Spanish. Prereq: SPI 210 and 211.

**SPI 397 INDEPENDENT WORK IN SPANISH. (3)**

May be repeated once. Prereq: Major and standing of 3.0 in the department.

**SPI 399 FIELD BASED/COMMUNITY BASED EDUCATION. (1-15)**

A community- or field-based experience in Spanish under the supervision of a faculty member. Approval of the Arts and Sciences dean required for credits above six per semester. May be repeated to a maximum of 15 credits. Pass-fail only. Prereq: Permission of the instructor and departmental chairperson; completion of departmental learning agreement.

**SPI 400 SPECIAL TOPICS IN HISPANIC LITERATURES AND LANGUAGES (Subtitle required). (3)**

Detailed investigation of a given topic, author, or theme. Topics announced the preceding semester. Conducted in Spanish. May be repeated to a maximum of six credits when identified by different subtitles. Prereq: One 300-level Spanish literature course.

**SPI 411 ADVANCED SPANISH LANGUAGE. (3)**

A course designed to practice language skills at an advanced level. Preparation of oral and written presentations in Spanish. Selected readings will be treated for their language content. Conducted primarily in Spanish. Prereq: SPI 210 and 211, and a 300-level Spanish course.

**SPI 430 THE WORKS OF CERVANTES. (3)**

Study and analysis of Miguel de Cervantes' *Don Quijote*, the *Novelas ejemplares*, and selected dramatic works. Conducted in Spanish. Prereq: One 300-level Spanish literature course.

**SPI 434 SPANISH LITERATURE OF THE 20TH CENTURY. (3)**

A study of the works of the Generation of 1898 and representative works of recent writers. Conducted in Spanish. Prereq: One 300-level Spanish literature course.

**SPI 438G LITERATURE OF SOCIAL PROTEST IN SPANISH AMERICA. (3)**

Analysis and study of the use of sociopolitical elements in selected works by Spanish-American poets, novelists and dramatists. Conducted in Spanish. Prereq: One 300-level Spanish literature course.

**SPI 501 SPANISH PHONETICS, PRONUNCIATION AND PHONEMICS. (3)**

Introduction to Spanish descriptive linguistics with intensive study of variant speech sounds and established norms in the major cultural areas of the Hispanic world with discussions of the theory and isolation of phonemes. Prereq: SPI 210 and SPI 211, and a 300-500 level Spanish course.

**SPI 502 SURVEY OF THE SPANISH LANGUAGE. (3)**

The development of the Spanish language from the Vulgar Latin stages to the modern period. Special emphasis is placed on the Spanish of the 12th through the 14th centuries. Representative texts are analyzed. Prereq: SPI 210 and 211, and a 300-500 level Spanish course.

**SPI 504 ADVANCED SPANISH GRAMMAR AND COMPOSITION. (3 ea.)**

A study of the finer points of Spanish grammar. Prereq: SPI 210 and 211, and a 300-500 level Spanish course.

**SPI 506 INTRODUCTION TO COMPARATIVE SPANISH, PORTUGUESE, AND ITALIAN LINGUISTICS. (3)**

An introduction to the historical development of Spanish, Portuguese and Italian from a common source, with an emphasis on the comparison of related lexical, phonological and morphological items. Prereq: Reading knowledge of Spanish or Italian (fourth semester of course work).

**SPI 512 SPANISH CULTURE THROUGH THE 17TH CENTURY. (3)**

A study of the major historical, social, cultural, and intellectual movements in Spain from the Middle Ages through the Golden Age. Prereq: Three credits of Spanish on the 300 level, or equivalent.



- SPI 513 MODERN SPANISH CULTURE. (3)**  
A study of the historical, social, cultural, and intellectual trends in Spain from 1700 to the present. Prereq: Three credits of Spanish on the 300 level or equivalent.
- SPI 514 STUDIES IN SPANISH AMERICAN CULTURE. (3)**  
A study of the major historical, social, cultural, and intellectual movements in Spanish America from pre-Columbian times to the present. Prereq: Three credits of Spanish on 300 level, or equivalent.
- SPI 518 HISPANIC FILM. (3)**  
A history of Spanish and Latin American film from the beginnings to the present, emphasizing the political, social, economic and cultural contexts of the Hispanic world. Viewing of films (in Spanish) outside of class is required. Class taught in Spanish. Prereq: Three credits of Spanish on the 300-500 level or equivalent.
- SPI 522 SURVEY OF THE COMEDIA. (3)**  
A survey of the masterworks of Lope de Vega and his contemporaries. Prereq: One 300-level Spanish literature course.
- SPI 532 THE GENERATION OF 1898. (3)**  
Studies in intellectual thought, literary work and special contributions of the writers of the generation of 1898. Prereq: One 300-level Spanish literature course.
- SPI 541 SPANISH AMERICAN SHORT STORY. (3)**  
A study of the Spanish-American short story throughout its development. Prereq: One 300-level Spanish literature course.
- SPI 553 TEACHING OF SPANISH. (3)**  
The course is designed for teachers and prospective teachers of modern foreign languages, with emphasis on Spanish. Modern methodology, theory and practice of language pedagogy.
- SPI 603 CRITICAL AND HISTORICAL PERSPECTIVES ON MEDIEVAL, RENAISSANCE AND GOLDEN AGE SPANISH LITERATURE. (3)**  
Studies of selected Medieval and Golden Age Spanish works in light of their literary, historical, and cultural importance. Emphasis on critical approaches to text.
- SPI 604 CRITICAL AND HISTORICAL PERSPECTIVES ON MODERN SPANISH LITERATURE. (3)**  
Studies of selected modern Spanish works (18th century to the present) in light of their literary, historical, and cultural importance. Emphasis on critical approaches to text.
- SPI 605 CRITICAL AND HISTORICAL PERSPECTIVES ON SPANISH AMERICAN LITERATURE. (3)**  
Studies of selected Spanish American works (Colonial Period to the present) in light of their literary, historical, and cultural importance. Emphasis on critical approaches to text.
- SPI 611 MEDIEVAL SPANISH LITERATURE I. (3)**  
A survey of Medieval Spanish literature from the beginning to the end of the 13th century. (SPI 612 is intended to cover the 14th and 15th centuries.)
- SPI 612 MEDIEVAL SPANISH LITERATURE II. (3)**  
A survey of Medieval Spanish literature of the 14th and 15th centuries.
- SPI 615 SPANISH POETRY OF THE 13th, 14th and 15th CENTURIES. (3)**  
Development of lyric poetry from the earliest beginnings to the 15th Century. The *harchas*, Galician-Portuguese, lyric, sacred lyric and the poets of the *concioneros*, exclusive of the ballad.
- SPI 616 EARLY BRIEF NARRATIVE – 13th, 14th, 15th CENTURIES. (3)**  
The rise and development of the brief narrative in prose and rise of the oriental apologue, hagiographical tales and Greco-Roman fables.
- SPI 617 SPANISH MEDIEVAL AND RENAISSANCE DRAMA. (3)**  
Readings, lectures and discussions on the origin of the Spanish vernacular drama and its growth through the 16th century.
- SPI 622 CERVANTES I. (3)**  
A study of *Don Quixote*: collateral readings in Cervantine scholarship and criticism.
- SPI 624 THE SPANISH NOVEL FROM CERVANTES TO ROMANTICISM. (3)**  
The post-Cervantine novel, including works by Lope, Tirso, Quevedo, Gracián, Isla and lesser novelists and novella-writers of 17th and 18th centuries.
- SPI 625 MYSTIC AND ASCETIC WRITERS OF THE 16th AND 17th CENTURIES. (3)**  
A survey of ascetic and mystic writers including among others: Juan de Avila, Luis de León, Luis de Granada, Santa Teresa, San Juan de la Cruz.
- SPI 626 LOPE DE VEGA AND TIRSO DE MOLINA. (3)**  
Selected dramatic and nondramatic works of Lope de Vega and Tirso de Molina.
- SPI 628 THE THEATRE OF CALDERON DE LA BARCA. (3)**  
The dramatic works and techniques of Calderón de la Barca.
- SPI 629 SPANISH POETRY OF THE 16th AND 17th CENTURIES. (3)**  
An examination of several schools and forms of poetry, both lyric and narrative, in this period.
- SPI 631 THE ROMANTIC MOVEMENT IN SPAIN. (3)**  
An examination of the meaning of the term “romanticism,” with a study of representative Spanish works of the Romantic period. Prereq: Graduate standing.
- SPI 632 SPANISH DRAMA FROM THE GENERATION OF 1898 TO THE PRESENT. (3)**  
Representative works of the major dramatists and dramatic trends from Benavente and his contemporaries through García Lorca, Casona and Buero Vallejo.
- SPI 633 THE SPANISH NOVEL OF THE 19th CENTURY. (3)**  
A study of the major Spanish novelists of the 19th century; particular attention to the aims and techniques of literary realism and naturalism.
- SPI 634 PROSE FICTION FROM THE GENERATION OF 1898 TO THE PRESENT. (3)**  
Studies in most important novels and short stories of the later part of the modern period, produced from 1930 to the present.
- SPI 636 SPANISH POETRY FROM THE 18th CENTURY THROUGH THE GENERATION OF 1898. (3)**  
A study of the major poets, trends and approaches to Spanish poetry from the Neoclassical period through Unamuno and Antonio Machado. Prereq: Graduate standing.
- SPI 637 SPANISH POETRY FROM THE GENERATION OF 1927 TO THE PRESENT. (3)**  
Studies of the poetry of the later part of the modern period, from Jiménez, Salinas and Guillén to current poets. Prereq: Graduate standing.
- SPI 641 SPANISH AMERICAN DRAMA. (3)**  
A study of dramatic production in Spanish America from the missionary theater to the present, accentuating the work of later authors beginning with Florencio Sánchez.
- SPI 642 SPANISH AMERICAN POETRY: COLONIAL PERIOD TO INDEPENDENCE. (3)**  
Representative works of the principal poets from the Colonial Period through the Neo-Classical.
- SPI 643 SPANISH AMERICAN POETRY: 1800-1910. (3)**  
Poetry from Romanticism through Modernism.
- SPI 644 SPANISH AMERICAN POETRY: 1910 TO PRESENT. (3)**  
Post-Modernism, the Vanguardia, and contemporary poets.
- SPI 645 SPANISH AMERICAN NOVEL: 1800-1910. (3)**  
The major writers from Romanticism through Modernism.
- SPI 646 SPANISH AMERICAN NOVEL: 1910-1940. (3)**  
The novel of the Mexican Revolution, the *criollistas*, *indigenistas*, *novela gauchesca*, and the psychological novel.
- SPI 647 SPANISH AMERICAN NOVEL: 1940 TO PRESENT. (3)**  
The new novel in Spanish America; Asturias, Fuentes, Carpentier, Cortázar, García Márquez and others.
- SPI 648 LITERARY CURRENTS IN CONTEMPORARY SPANISH AMERICAN FICTION. (3)**  
An examination of the outstanding works of Spanish American authors during the past ten years, with emphasis on literary innovations and new currents in the novel, short story, poetry and drama.
- SPI 649 SPANISH AMERICAN ESSAY. (3)**  
A comprehensive study of the principal currents of thought in the Spanish American essay, with special attention to the *americanistas*.

- SPI 651 BIBLIOGRAPHY AND METHODS OF RESEARCH. (3)**  
Investigation of Spanish bibliography and modern methods of research designed to provide guidance to the graduate student leading to an understanding of research methods and publication. Taught by various members of the staff, with each member dealing with his own specialty.
- SPI 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.
- SPI 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.
- SPI 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.
- SPI 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.
- SPI 770 SEMINAR IN SPANISH STUDIES. (3)**  
A seminar designed to provide intensive study of a literary, scholarly, or intellectual problem of Spanish letters not covered as such in any of the above listed offerings. May be repeated to a maximum of six credits. Prereq: 21 semester hours of college Spanish.
- SPI 772 SEMINAR IN MEDIEVAL SPANISH LITERATURE. (3)**  
Special and intensive study of a single problem in medieval Spanish literature. May be repeated to a maximum of six credits. Prereq: SPI 601-602 or equivalent.
- SPI 775 SEMINAR IN MODERN SPANISH LITERATURE. (3)**  
Special and intensive study of a specific problem or area in modern Spanish literature.
- SPI 776 SEMINAR IN SPANISH AMERICAN LITERATURE. (3)**  
Special and intensive study of particular areas of Spanish American literature. May be repeated to a maximum of six credits.
- SPI 782 SPECIAL STUDIES IN SPANISH. (1-3)**  
Selected studies and investigations in the Spanish language and Hispanic literature, permitting the student to work in areas of special interest and providing opportunity for original endeavor. May be repeated to a maximum of six credits. Prereq: Graduate standing.
- ITALIAN**
- SPI 191 ELEMENTARY ITALIAN. (3)**  
A study of the grammar and composition of Italian.
- SPI 192 ELEMENTARY ITALIAN. (3)**  
A continuation of SPI 191. Prereq: SPI 191.
- SPI 263 MASTERPIECES OF ITALIAN LITERATURE IN TRANSLATION. (3)**  
A study of representative Italian writers and their works in a European context, using anthologies and complete texts where necessary.
- SPI 291 INTERMEDIATE ITALIAN. (3)**  
Review of grammatical principles and readings of selected Italian works. Prereq: SPI 192.
- SPI 292 INTERMEDIATE ITALIAN. (3)**  
A continuation of SPI 291. Prereq: SPI 291.
- SPI 295 ITALIAN CONVERSATION AND COMPOSITION. (3)**  
Italian conversation and composition. Prereq: SPI 292 or equivalent.
- SPI 296 ITALIAN CIVILIZATION. (3)**  
A study of Italian civilization, with emphasis on historical and cultural developments. Prereq: SPI 292 or equivalent.
- SPI 395 INDEPENDENT STUDIES IN ITALIAN. (3)**  
Directed study in Italian literature, culture, and linguistics. May be repeated once. Prereq: 3.0 standing in the department and consent of instructor.

- SPI 417 ADVANCED ITALIAN LANGUAGE. (3)**  
A course designed to practice language skills at an advanced level. Both oral and written presentations are required. Readings of contemporary Italian prose will be selected to illustrate grammatical and stylistic concerns and to stimulate discussion. Prereq: SPI 295 or SPI 296.
- SPI 443G SURVEY OF ITALIAN LITERATURE I. (3)**  
A survey of Italian literature from its beginnings to the 17th century. Prereq: SPI 292.
- SPI 444G SURVEY OF ITALIAN LITERATURE II. (3)**  
A survey of Italian literature from the 17th century to the present. Prereq: SPI 292.
- SPI 566 LITERATURE OF THE ITALIAN RENAISSANCE. (3)**  
A study of the major literary trends and figures of the Italian Renaissance, from the literary and humanistic successors of Petrarch and Boccaccio to the writers of the Cinquecento. Prereq: SPI 543 or 544 or consent of instructor.
- SPI 569 TOPICS IN ITALIAN LANGUAGE, LITERATURE, OR CULTURE (Subtitle required). (3)**  
Intensive study of an author, genre, period or movement of Italian literature or an aspect of Italian language or culture. May be repeated once under a different subtitle. Prereq: Variable; given when topic identified.
- SPI 593 MODERN ITALIAN LITERATURE IN TRANSLATION. (3)**  
A study of the major trends and figures of 19th and 20th century Italian literature.

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## ST Social Theory

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- ST 500 INTRODUCTION TO SOCIAL THEORY. (3)**  
Multidisciplinary introduction to social theory for advanced undergraduate and graduate students. Overall goal is to substantiate the idea that social theory comprises a set of ontological and epistemological issues about human coexistence which are nondisciplinary-specific. The course will (1) examine what different social fields take as their central theoretical issues and concerns, and (2) conduct multidisciplinary explorations of key problem areas in contemporary social thought such as the nature of objectivity, the construction of gender, the role of space and time in social life, and modernity and postmodernity. Prereq: Either a prior theory course in any social discipline or a prior course in such a discipline that discussed theoretical issues. Exceptions will be permitted only after consultation with the instructor.
- ST 600 MULTIDISCIPLINARY PERSPECTIVES IN SOCIAL THEORY (Subtitle required). (3)**  
An advanced multidisciplinary seminar in social theory for graduate students taught by a team of faculty members. Topics change from year to year; examples include: individual and society, the social construction of gender, modernity and postmodernity, space and time in social life, objectivity and its other, etc. Focus is on the cross-disciplinary investigation of such issues in the social sciences and humanities. May be repeated to a maximum of nine credits under different subtitles. Prereq: ST 500 or permission of instructors.
- ST 610 *dis*CLOSURE EDITORIAL COLLECTIVE. (1)**  
Course provides editorial experience in the production of *disClosure*, a multidisciplinary social theory journal operated by students. Activities include: soliciting manuscripts, overseeing the external review process, communicating with authors, accepting and rejecting manuscripts, producing and distributing a single issue. May be repeated to a maximum of three credits. Lecture, two hours per week. Prereq: ST 500 or permission of instructor.
- #ST 690 TRANSDISCIPLINARY PERSPECTIVES IN SOCIAL THEORY. (3)**  
An advanced seminar in transdisciplinary social theory, taught jointly by a faculty member representing the humanities and the social sciences, respectively. Social Theory encompasses the theoretical study of social life and the substantive knowledge informed by such theory. Transdisciplinary Social Theory seminars may focus on such topics as Space and Representation, Frankfurt School and Contemporary Critical Theory, or The University in Theory and in a Global Context. In each case, the seminar substantially and theoretically links the articulation of that particular topic as has occurred within both the social sciences and humanities. Prereq: Successful completion of ST 500 or ST 600 or permission of the instructors.

## STA Statistics

### STA 200 STATISTICS: A FORCE IN HUMAN JUDGMENT. (3)

This course is concerned with the interaction of the science and art of statistics with our everyday lives emphasizing examples from the social and behavioral sciences. The student will not be required to learn mathematical formulas. Topics include the nature of statistics, uses and misuses of statistics, the scope and limitations of statistics, criteria by which published statistics may be judged, interpretation of probability and the art of decision making. Prereq: Completion of the mathematics basic skills requirement.

### STA 281 PROBABILITY AND STATISTICS USING INTERACTIVE COMPUTER TECHNIQUES. (3)

The role of chance in experimental outcomes. Simple discrete and continuous probability distributions; combinatorics; moments and expectations; normal and binomial distributions; computer simulation and simple Monte Carlo methods. Descriptive statistics, charts, and graphs, and elements of statistical inference using interactive statistical packages (e.g., SCSS and/or MINITAB). Prereq: CS 150, CS 102, or CS 221; Coreq: MA 114, MA 132, or MA 118.

### STA 291 STATISTICAL METHOD. (3)

Introduction to principles of statistics. Statistical description of sample data including frequency distributions, measures of central tendency, and measures of dispersion. Theoretical distributions, statistical estimation, and hypothesis testing. Introduction to simple linear regression and correlation. Prereq: MA 113, MA 123, or MA 131 or equivalent.

### STA 292 DESCRIPTIVE STATISTICS. (1)

Graphical and tabular description of data; measures of central tendency and variation, scattergrams, correlation and best-fitting lines; index numbers. Prereq: MA 113, MA 123, or MA 131, or consent of instructor.

### STA 293 PROBABILITY. (1)

Experiments and sample spaces; elementary and conditional probability; counting principles; random variables; distribution and expectation; normal and binomial distributions. Prereq: STA 292.

### STA 294 SAMPLING AND INFERENCE. (1)

Sampling; sampling behavior of  $\bar{X}$  and  $S^2$ ; confidence intervals and tests of hypotheses about the mean and variance of a normal population; the  $\chi^2$  and  $t$ -distributions. Prereq: STA 292 and 293.

### STA 320 INTRODUCTORY PROBABILITY. (3)

Set theory; fundamental concepts of probability, including conditional and marginal probability; random variables and probability distributions (discrete and continuous); expected values and moments; moment-generating and characteristic functions; random experiments; distributions of random variables and functions of random variables; limit theorems. Prereq: MA 213 or equivalent. (Same as MA 320.)

### STA 321 BASIC STATISTICAL THEORY I. (3)

Simple random sampling; point and interval estimation; hypothesis testing. Prereq: STA/MA 320.

### STA 381 INTRODUCTION TO ENGINEERING STATISTICS. (3)

Probability; population and sample distributions; sampling; hypothesis testing; regression on one variable; quality control. Prereq: MA 213.

### STA 417G PRINCIPLES OF OPERATIONS RESEARCH II. (3)

A continuation of MA 416G with topics selected from stochastic models, decision making under uncertainty, inventory models with random demand, waiting time models and decision problems. Prereq: CS/MA 416G and MA/STA 320, or consent of instructor. (Same as MA 417G.)

### STA 422G BASIC STATISTICAL THEORY II. (3)

Theory of least squares; regression; analysis of variance and covariance; experimental design models; factorial experiments; variance component models. Prereq: STA 321.

### STA 424G BASIC PROBABILITY AND DISTRIBUTION THEORY. (3)

Basic set theory and probability; random variables; discrete and continuous probability distributions; expected values, moments and moment-generating functions; distributions of functions of random variables; limiting distributions. Prereq: MA 114.

### STA 503 INTRODUCTION TO STATISTICAL METHODS. (4)

Summary statistics, graphical methods, point and interval estimation, hypothesis testing, experimental design, simple and multiple regression, covariance and ANOVA as a special case of regression, categorical data analysis. Lecture, three hours; laboratory, two hours per week. Prereq: MA 322.

### \*STA 515 MATHEMATICAL PROGRAMMING AND EXTENSIONS. (3)

Mathematical and computational aspects of linear programming, large scale structures, quadratic programming, complementary pivoting, introduction to nonlinear programming. Applications to engineering and economics. Additional topics selected in geometric programming, stochastic programming. Prereq: A course in linear algebra or consent of instructor. (Same as MA 515.)

### STA 524 PROBABILITY. (3)

Sample space, random variables, distribution functions, conditional probability and independence, expectation, combinatorial analysis, generating functions, convergence of random variables, characteristic functions, laws of large numbers, central limit theorem and its applications. Prereq: MA 432G or 471G or consent of instructor. (Same as OR 524.)

### STA 525 INTRODUCTORY STATISTICAL INFERENCE. (3)

Simple random sampling, statistics and their sampling distributions, sampling distributions for normal populations; concepts of loss and risk functions; Bayes and minimax inference procedures; point and interval estimation; hypothesis testing; introduction to nonparametric tests; regression and correlation. Prereq: STA 320 or STA 524 or STA 424G. (Same as OR 525.)

### STA 531 THEORY OF PROBABILITY. (3)

Probability, spaces, conditional probability, law of total probability, Bayes Theorem, independence, random variables and their distributions, multivariate distributions, transformations, moment generating functions, Chebyshev's inequality, modes of convergence, Slutsky's Theorem, Borel-Cantelli, Law of large numbers, Central Theorem. Must be taken concurrently with STA 532. Prereq: MA 471G.

### STA 532 THEORY OF STATISTICAL INFERENCE I. (3)

Sampling distributions, sufficiency, exponential families, likelihood and information, Consistency, efficiency, point and interval estimation, Neyman-Pearson Lemma, Likelihood ratio. Must be taken concurrently with STA 531. Prereq: MA 471G.

### STA 570 BASIC STATISTICAL ANALYSIS. (4)

Primarily in biological, behavioral and social sciences. Introduction to methods of analyzing data from experiments and surveys; the role of statistics in research, statistical concepts and models; probability and distribution functions; estimation; hypothesis testing; regression and correlation; analysis of single and multiple classification models; analysis of categorical data. Lecture, three hours; laboratory, two hours. Prereq: MA 109 or equivalent. For graduate students; undergraduates must have consent of instructor.

### STA 600 COMMUNICATING IN STATISTICS. (0)

Pedagogical skills for teaching assistants in undergraduate statistics courses and effective communication skills for professional statisticians. Topics include: basic teaching techniques, use of writing assignments to increase understanding of statistical concepts, writing and grading effective exams, and recording and analyzing grades with the aid of software. Videotaped sessions will be conducted and critiqued. May be repeated a maximum of three times. Prereq: STAT major.

### STA 601 THEORY OF STATISTICAL INFERENCE II. (3)

Elements of decision theory; properties of estimators; point and interval estimation; hypothesis-testing; sequential testing; inference from categorical data; linear regression as conditional expectation; multivariate normal distribution. Prereq: STA 531.

### STA 603 INTRODUCTION TO LINEAR MODELS AND EXPERIMENTAL DESIGN. (4)

Review of topics from matrix and vector algebra; multivariate normal distribution and its properties; distribution of quadratic forms. The noncentral  $\chi^2$ ,  $F$  and  $T$  distributions; the general linear model and related inference; elementary computational methods; applications of the theory-experimental design and covariance analysis; a. One-Way Layout, CRD, b. Two-Way Layout, RCB, c. Latin Squares - (1) Crossover designs, (2) Reversal, Double-reversal designs, (3) Other related designs, d. Factorials. Prereq: STA 503, STA 531; coreq: STA 601.

### STA 616 DESIGN AND ANALYSIS OF SAMPLE SURVEYS. (3)

Sampling from finite populations; estimation of sample size; stratification; ratio and regression estimators; systematic sampling; cluster sampling; multistage sampling (selection of sampling units with probability proportional to size); double sampling; response errors. Prereq: STA 531 or consent of instructor.

### \*STA 619 PROBLEMS SEMINAR IN OPERATIONS RESEARCH. (3)

In this course the student is exposed to the art of applying the tools of operations research to "real world" problems. The seminar is generally conducted by a group of faculty members from the various disciplines to which operations research is applicable. Prereq: MA 617 and STA 525 or consent of instructor. (Same as EE 619 and MA 613.)

**STA 621 NONPARAMETRIC INFERENCE. (3)**

Estimation and testing when the functional form of the population distribution is unknown; rank and sign tests; tests based on permutations of observations; power of nonparametric tests; optimum nonparametric tests and estimators. Prereq: STA 601.

**STA 624 APPLIED STOCHASTIC PROCESSES. (3)**

Definition and classification of stochastic processes, renewal theory and applications, Markov chains, continuous time Markov chains, queueing theory, epidemic processes, Gaussian processes. Prereq: STA 524 or consent of instructor. (Same as OR 624.)

**STA 626 TIME SERIES ANALYSIS. (3)**

Time series and stochastic processes, auto-correlation functions and spectral properties of stationary processes; linear models for stationary processes, moving average, autoregressive and mixed autoregressive-moving average processes; linear nonstationary models, minimum mean square error forecasts and their properties; model identification, estimation and diagnostic checking. Prereq: STA 422G or equivalent. (Same as ECO 626.)

**STA 635 SURVIVABILITY AND LIFE TESTING. (3)**

Life Table Analysis. Estimation of survival rates with censored data. Competing Risk Theory. Parameter estimation for commonly encountered reliability distribution with complete censored and truncated data. Maximum likelihood and order statistics techniques. Survivability growth models, comparison of survival distribution, and sample size determination in clinical trials. Extreme value theory. Prereq: STA 525 or STA 601.

**STA 641 DESIGN AND ANALYSIS FOR VARIANCE COMPONENT MODELS. (3)**

Expected values, variances and covariances; balanced and nonbalanced designs; comparison of estimators; reduction of product variability; compositing; sequential designs; Bayesian estimation; confidence limits; negative estimates; finite populations. Prereq: STA 603.

**STA 643 ADVANCED EXPERIMENTAL DESIGN. (3)**

Advanced topics in analyses of incomplete block designs; confounding and change-over designs; data collected at several places and times; principles of design construction. Prereq: STA 603.

**STA 644 ADVANCED LINEAR AND NONLINEAR MODELS. (3)**

Review of the general linear model. Regression methodology using Ridge, Bayes, and Stein estimators. The use of PRESS, Cp, and R2 statistics as selection criteria. Modern computational methods. Nonlinear models and their methodology. Robust Regression. Prereq: STA 603.

**STA 661 MULTIVARIATE ANALYSIS I. (3)**

Characterization and properties of the multivariate normal distribution, random samples from this distribution; multivariate analysis of variance, related distribution theory; factor analysis. Prereq: STA 603.

**STA 665 ANALYSIS OF CATEGORICAL DATA. (3)**

Multinomial and product-multinomial models; large-sample theory of estimation and testing; Pearson chi-square and modified chi-square statistics, Pearson-Fisher Theorem, Wald Statistics and generalized least squares technique; applications to problems of symmetry, association and hypotheses of no interaction in multi-dimensional contingency tables. Prereq: STA 603.

**STA 671 REGRESSION AND CORRELATION. (2)**

Simple linear regression, elementary matrix algebra and its application to simple linear regression; general linear model, multiple regression, analysis of variance tables, testing of subhypotheses, nonlinear regression, step-wise regression; partial and multiple correlation. Emphasis upon use of computer library routines; other special topics according to the interests of the class. Lecture, three hours per week; laboratory, two hours per week for seven and one half weeks. Offered the first or second half of each semester. Prereq: STA 570 or EDP 557.

**STA 672 DESIGN AND ANALYSIS OF EXPERIMENTS. (2)**

Review of one-way analysis of variance; planned and unplanned individual comparisons, including contrasts and orthogonal polynomials; factorial experiments; completely randomized, randomized block, Latin square, and split-plot designs: relative efficiency, expected mean squares; multiple regression analysis for balanced and unbalanced experiments, analysis of covariance. Lecture, three hours per week; laboratory, two hours per week for seven and a half weeks. Offered the first or second half of each semester. Prereq: STA 671.

**STA 673 DISTRIBUTION-FREE STATISTICAL INFERENCE AND ANALYSIS OF CATEGORICAL DATA. (2)**

Inference for population quantiles, sign tests, Wilcoxon tests, Kruskal-Wallis and Friedman tests, Kendall and Spearman rank correlation. Goodness-of-fit tests for completely and partially specified distributions, rxc contingency tables, McNemar and Cochran's Q tests for matched proportions; three dimensional tables and tests of partial and multiple associations. Lecture, three hours per week; laboratory, two hours per week for seven and a half weeks. Offered the first or second half of each semester. Prereq: STA 570 or EDP 557.

**STA 675 SURVEY SAMPLING. (2)**

Simple random sampling and stratified random sampling, ratio and regression estimators, cluster sampling, systemic sampling, and multi-stage sampling. Specific problems associated with running a survey: non-response, call-backs, questionnaire construction, mail questionnaires, and area sampling. Lecture, three hours per week; laboratory, two hours per week for seven and a half weeks. Offered the first or second half of each semester. Prereq: STA 570 or EDP 557.

**STA 676 QUANTITATIVE INHERITANCE IN PLANT POPULATIONS. (3)**

After a brief review of population genetics theory, the course is divided into two sections which cover methods of estimating genetic variances and selection methods in population improvement. The course will focus on handling and interpretation of actual data sets through data analysis and discussion of current literature. Prereq: STA 570, STA 671, STA 672, and ASC 662. (Same as AGR 676.)

**STA 677 APPLIED MULTIVARIATE METHODS. (3)**

Survey of multivariate statistical techniques. The multivariate normal distribution; the general linear model; general procedures for parameter estimation and hypothesis testing in the multivariate case; Hotelling's T2, multivariate analysis of variance and covariance; structural models for the covariance matrix; utilization of existing computer programs. Prereq: STA 671 and 672, and a knowledge of linear algebra equivalent to MA 262.

**STA 679 DESIGN AND ANALYSIS OF EXPERIMENTS II. (3)**

A continuation of STA 672. Multiplicative models in two-factor experiments. Partial factorials. Extensions and modifications of split plots and Latin squares. Confounding in factorial experiments. Response surface methods. Estimation of variance components. One restriction and two restriction lattice and incomplete block designs. Combining analyses of similar experiments. Prereq: STA 671 and 672 or equivalent.

**STA 690 SEMINAR IN STATISTICS. (1)**

May be repeated to a maximum of three credits.

**STA 691 SPECIAL TOPICS IN THE PLANNING AND ANALYSIS OF EXPERIMENTS (Subtitle required). (1-3)**

Place of statistics in experimentation; topics in experimental design; response surfaces; departures from usual assumptions in analysis of variance; other selected topics. May be repeated to a maximum of nine credits. Prereq: STA 603 or consent of instructor.

**STA 692 STATISTICAL CONSULTING. (3)**

Basic principles of statistical consulting including how to manage a consulting session, how to formulate and solve problems and how to express results both orally and in writing. Students will be expected to analyze data from a current consulting project. Lecture, two hours; laboratory, two hours per week. Coreq: STA 643 or 644 or consent of instructor.

**STA 695 SPECIAL TOPICS IN STATISTICAL THEORY (Subtitle required). (1-3)**

To be selected by staff. May be repeated to a maximum of nine credits. Prereq: STA 601.

**STA 701 ADVANCED STATISTICAL INFERENCE I. (3)**

Basic concepts of decision theory, sufficiency and completeness; completeness of multiparametric exponential family; unbiasedness and invariance of decision rules; Bayes, minimax and invariant estimators; testing of hypotheses and optimality properties. Prereq: MA 571 and STA 601.

**STA 702 ADVANCED STATISTICAL INFERENCE II. (3)**

UMP and UMP unbiased tests for multiparametric exponential families; locally best tests; invariance and permutation tests, UMP invariant tests for linear hypotheses; asymptotic aspects of classical statistics, ML estimation and concepts of efficiency; sequential probability ratio test; confidence set, UMA unbiased and invariance confidence sets. Prereq: STA 701.

**STA 703 ADVANCED PROBABILITY. (3)**  
Probability spaces, extension theorem, random variables; independence, conditional probability, conditional expectation; laws of large numbers, law of the iterated logarithm; convergence in distribution; characteristic functions; central limit theorems; martingales. Prereq: MA 571 and STA 524 or consent of instructor.

**STA 704 ADVANCED PROBABILITY – STOCHASTIC PROCESSES. (3)**  
Random functions; jump Markov processes; processes with independent increments; stationary stochastic processes; diffusion processes; limit theorems; applications of stochastic processes. Prereq: STA 703.

**STA 715 READINGS IN STATISTICS AND PROBABILITY (Subtitle required). (1-6)**  
Supervised reading and discussion at the graduate level, of a selected bibliography of the essential literature of various special topics. May be repeated to a maximum of nine credits. Coreq: STA 702 or STA 704, and consent of instructor.

**STA 748 MASTER'S THESIS RESEARCH. (0)**  
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**STA 749 DISSERTATION RESEARCH. (0)**  
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**STA 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**  
May be repeated to a maximum of 12 hours.

**STA 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**  
May be repeated indefinitely.

## **SUR Surgery**

**SUR 815 FIRST YEAR ELECTIVE, SURGERY. (1-3)**  
With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Surgery. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

**SUR 825 SECOND-YEAR ELECTIVE, SURGERY. (1-4)**  
With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Surgery. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

**SUR 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)**  
With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.

### **Approved electives:**

- SUR 851 ACTING INTERNSHIP IN ORTHOPEDIC SURGERY**
- SUR 852 ACTING INTERNSHIP IN PEDIATRIC SURGERY**
- SUR 853 ACTING INTERNSHIP IN OTOLARYNGOLOGY-HEAD AND NECK SURGERY**
- SUR 854 ACTING INTERNSHIP IN UROLOGY**
- SUR 855 ACTING INTERNSHIP IN PLASTIC SURGERY**
- SUR 857 ACTING INTERNSHIP IN TRANSPLANTATION SURGERY**
- SUR 862 ACTING INTERNSHIP IN GENERAL SURGERY**
- SUR 863 ACTING INTERNSHIP IN CARDIOTHORACIC SURGERY**
- SUR 864 ACTING INTERNSHIP IN NEUROSURGERY**

- SUR 865 ACTING INTERNSHIP IN SURGICAL INTENSIVE CARE**
- SUR 867 ELECTIVE IN MICROSURGERY**
- SUR 869 ACTING INTERNSHIP IN TRAUMA SURGERY**
- SUR 870 ELECTIVE IN HEARING, SPEECH AND LANGUAGE**
- SUR 871 FOURTH YEAR CLERKSHIP IN SURGERY**
- SUR 872 OUTPATIENT MANAGEMENT IN SURGICAL SPECIALTIES**
- #SUR 873 HAND/UPPER EXTREMITY SURGERY**
- SUR 890 SURGERY OFF-SITE**

## **SW Social Work**

**SW 124 INTRODUCTION TO SOCIAL SERVICES. (3)**  
Introduction to social welfare concepts and philosophies. Examination of the profession of social work and its philosophy and value commitments within social welfare. Public and private service delivery systems will be studied. Required of social work majors and recommended it be taken the first year. Two class hours and two laboratory hours per week.

**SW 222 DEVELOPMENT OF SOCIAL WELFARE. (3)**  
Study of the cultural traditions, value orientations, and political and economic forces which have contributed to the emergence of present social welfare policies and systems in the United States. Required of social work majors and open to all others.

**SW 300 SOCIAL WORK PRACTICE I. (4)**  
An introduction to generalist social work practice theory, a study of skills in professional practice with individuals and families, and an examination of social work functions in the direct delivery of social services. Special attention is paid to the NASW Code of Ethics and to the social worker's obligations towards populations-at-risk. Class includes four hours per week of laboratory in health or welfare settings, and three lecture hours. Prereq: SW 124. Open only to social work majors.

**SW 320 GLOBAL POVERTY: RESPONSES ACROSS CULTURES. (3)**  
An examination of poverty in various non-Western cultures. The course will cover the nature, scope, and distribution of poverty, definitions of poverty, common characteristics of the poor, as well as cultural traditions and folkways which contribute to the problem. Social welfare responses and humanitarian efforts which address the problem are examined.

**SW 322 SOCIAL WORK AND SOCIAL WELFARE. (4)**  
Designed for transfer students of junior rank. Study of social welfare development, social work philosophy and value commitment and with an examination of social service agencies and programs. Lecture, three hours; laboratory, two hours; options of agency visitation, group experiences, social service. Not open to those having SW 124 and 222. Prereq: For majors only.

**SW 354 THE FAMILY IN CROSS-CULTURAL PERSPECTIVE. (3)**  
This course approaches the study of the family from a comparative perspective, emphasizing cross-cultural variability in the structure and function of family. Kinship, household formation, sex roles, and socialization are examined in the context of the family, as well as patterns of interaction, personality formation, and family pathology. Prereq: Introductory social science course. (Same as ANT/FAM/SOC 354.)

**SW 395 INDEPENDENT WORK. (1-4)**  
Organized study research and/or tutorial work focused on special issues or problems. May be repeated to a maximum of four credits. Prereq: Major, standing of 3.0 overall GPA, or consent of dean, and consent of adviser and instructor.

**SW 400 SOCIAL WORK PRACTICE II. (4)**  
Emphasizing an ecological and systems framework, the course explores theories and practice approaches appropriate for work with groups, organizations, and community systems. The impact of discrimination and oppression on populations-at-risk is discussed, along with problem-solving and interventive strategies. The ethical and legal strategies of the generalist practitioner are studied. Prereq: SW 300. Open only to social work majors.

**SW 401 PRACTICE WITH CHILDREN AND FAMILIES. (3)**  
The critical examination of social work practice with children and families with emphasis on social service interventions to strengthen family life. Prereq: SW 354.

**SW 420 HUMAN BEHAVIOR AND THE SOCIAL ENVIRONMENT. (3)**

This course provides the social work student with knowledge of behavioral science at the individual, family, small group, community, and societal levels in the context of diversity of ethnic background, race, gender, social class, sexual orientation and culture in a pluralistic society. The course will deal with the interrelatedness of the biological, psychological, social, cultural and environmental factors influencing human behavior, and their relevance and application to generalist social work practice. Theoretical approaches are presented to describe, explain, and predict human behavior and development, as well as to inform and guide social work practice. A variety of learning experiences are provided students, including lecture, small group discussion, observational exercises, and case analyses. The course utilizes social work knowledge as well as sources from other fields, including human development, personality, family theory, small groups, organizations, communities, and cultural diversity. The ecological perspective provides the unifying framework for the integration of these areas of study. Prereq: Open to social work majors.

**SW 421 SOCIALIZATION AND RESOCIALIZATION GROUPS IN PRACTICE. (3)**

This course develops social work practice skills for conducting socialization and resocialization groups. Leadership activities include member selection, contracting, direct and indirect change techniques, and terminating. Application is made to a variety of settings and member characteristics. Prereq: Social work majors or consent of instructor.

**SW 430 SOCIAL WELFARE POLICY: THEORY AND IMPLEMENTATION. (3)**

The study and demonstration of different analytic models utilized in analysis of social welfare policy. The course also introduces content in the areas of organizational theory, management tools necessary to the understanding of implementation and evaluation of social welfare policy. Prereq: SW 222 or 322. Open only to social work majors.

**\*SW 444 EDUCATIONAL PRACTICUM I. (8)**

Introduction to social work practicum under faculty direction in a Teaching-Learning Center. Students will begin to apply knowledge from prerequisite (and concurrent) courses in experiences which utilize social work practice skills with emphasis on individuals, families and small groups, toward the goals of prevention, restoration and enhancement of social functioning. Includes 24 hours per week of seminar and experiential learning. Prereq: SW 300 and SW 420.

**\*SW 445 EDUCATIONAL PRACTICUM II. (8)**

This course continues the process of social work practicum under faculty direction in a Teaching-Learning Center. Students will continue to apply knowledge from prerequisite and concurrent courses in experiences which utilize social work practice skills with individuals, families, and small groups as well as with organizations and communities toward the goals of prevention, restoration, and enhancement of social functioning. Includes 24 hours per week of seminar and experiential learning. Prereq: SW 444. Prereq or concurrent: SW 400.

**SW 450 SOCIAL WORK RESEARCH. (3)**

An introductory study of the processes of research in building social work knowledge and developing effective social work practice. Prereq: A basic course in statistics. Open only to social work majors.

**SW 470 SENIOR SEMINAR. (3)**

An integrative professional seminar for senior majors in social work, usually taken in the last semester of course work. Social work issues of an educational, professional and practice nature are examined. Prereq: SW 445 or concurrent. Open only to social work majors.

**SW 477 FIELD EXPERIENCE FOR NONMAJORS. (3-6)**

Observation and participation in a wide variety of agency settings in the delivery of social services and problem solving. Lecture, 1 to 2 hours; laboratory, 9-18 hours per week. Prereq: Consent of instructor.

**SW 505 CHILD WELFARE SERVICES. (2-3)**

A study of community and national programs for child care and protection, including aid to dependent children and other social security services.

**SW 510 MENTAL HEALTH KNOWLEDGE FOR THE SOCIAL PROFESSIONS. (2-3)**

An analysis of personality development, behavior patterns, and social structural factors with special reference to mental health, its service delivery system, and implications for practice in the social professions.

**SW 513 INTEGRATED SERVICES FOR THE HANDICAPPED. (3)**

This course will focus on interdisciplinary teamwork practices and integrated services for individuals with handicapping conditions. A variety of interdisciplinary models of service delivery will be reviewed and experiential opportunities will be provided.

**SW 514 ALCOHOLISM AND PROBLEM DRINKING. (2-3)**

This course will examine traditional and emerging concepts of alcoholism and problem drinking with special attention to problems in definition. The contributions of recent research to our understanding of risk factors associated with various populations will be reviewed. Selected strategies for identification of and intervention into alcoholism and problem drinking will be discussed with particular attention to the unique problems and needs of racial minorities, youth, female, and other populations.

**SW 515 MEDICAL AND PSYCHOSOCIAL ASPECTS OF DISABILITIES I. (3)**

This course is designed to prepare rehabilitation counselors and social workers to become interpreters of medical information concerning major disabilities and to provide an understanding of the psychosocial factors encountered by the disabled. Focus will be on how these factors affect adjustment to a disability, and on professional practice with the disabled. Topics include concepts of medical and psychosocial aspects of disability which relate to conditions that impair bodily systems and/or structures due to illness or accident that result in permanent and/or chronic functional limitations. Prereq: College level courses in biology and psychology or consent of instructor. (Same as RC 515.)

**SW 516 MEDICAL AND PSYCHOSOCIAL ASPECTS OF DISABILITIES II. (3)**

This course is designed to prepare rehabilitation counselors and social workers to become interpreters of medical information concerning major disabilities and to provide an understanding of the psychosocial factors encountered by the disabled. Focus will be on how these factors affect adjustment to a disability, and on professional practice with the disabled. Topics include concepts of medical and psychosocial aspects of disability which relate to conditions that impair bodily systems and/or structures due to illness or accident that result in permanent and/or chronic functional limitations. Prereq: College level courses in biology and psychology or consent of instructor. (Same as RC 516.)

**SW 523 SOCIAL PERSPECTIVES ON RACISM AND ETHNIC PREJUDICES IN AMERICA. (2-3)**

The course is designed to provide the knowledge needed in understanding the dynamics of institutional racism from a broader perspective of five specific ethnic minorities in rural and urban America. Particular emphasis is placed upon planned community change and strategies pertinent to minority group communities. Students who wish to make a special, in-depth study of one of the specified content areas may take this course for one additional credit. Prereq: Consent of instructor.

**SW 560 SOCIAL WORK PRACTICE IN JUVENILE JUSTICE. (3)**

An examination of the history, organization and processes within the juvenile justice system, including the roles of the police, courts, and helping professionals. The impact on social work practice within the juvenile justice system is the major focus.

**SW 571 SOCIAL WORK AND THE LAW. (3)**

The course examines the lawyer's method and the legal system; the organization and ethics of the practicing bar; the impact of legal decision-making and lawyers on society in such selected situations as civil rights, juvenile and criminal justice and consumer debtor-creditor relationships; and working relationships between social workers and lawyers.

**SW 580 TOPICAL SEMINAR IN SOCIAL WORK. (2-4)**

Study of issues of current and special significance for social work practice. Issues selected in accordance with the needs and interests of students enrolled. May be repeated to a maximum of eight credits. Prereq: Open to the student of social work or consent of instructor.

**SW 600 SOCIAL WORK PRACTICE I. (4)**

Emphasizing an ecological and systems framework, this course utilizes the problem-solving method as the generalist's methodological approach for work with individuals and families. Special attention is paid to socializing students into the profession and to the social worker's obligations toward populations-at-risk. Students examine the NASW Code of Ethics, and ethical issues and dilemmas in social work practice. Prereq: Open only to students admitted to graduate school Social Work program.

**SW 601 SOCIAL WORK PRACTICE II. (2)**

This course builds on the knowledge base developed in SW 600. Ecological/systems framework provides a basis for practice with small groups, organizations, and communities. The impact of social and economic injustice is explored in depth. The effect of discrimination and oppression on populations-at-risk is discussed. Prereq: SW 600. Open only to students admitted to graduate school Social Work program.

**SW 603 SOCIAL WORK PRACTICE WITH CHILDREN AND YOUTH. (2)**

Study and analysis of developmental crises and problems of children and youth. Emphasis upon social work strategies of intervention for prevention, amelioration or resolution. Prereq: SW 600 or 601 or consent of instructor.

**SW 604 SOCIAL WORK PRACTICE WITH THE AGING. (2 or 3)**

This course will develop the framework of knowledge and skills necessary for effective social work practice in a variety of primary and host settings which deal with problems and issues confronting the aging citizen in contemporary society. Prereq: SW 600 or 601 or consent of instructor.

**SW 605 SOCIAL WORK PRACTICE IN HEALTH SERVICES. (2)**

Examination and analysis of the role of social work in health care delivery systems. Prereq: SW 600 or 601 or consent of instructor.

**SW 606 SEMINAR IN CRIMINAL JUSTICE PROCESSES. (2)**

Criminal justice processes are studied and evaluated emphasizing system aims, theories of criminality and societal reaction, the consequences and costs to offenders and to society of current policies to control and prevent crime. Traditional and innovative community and institutional programs for adult and juvenile offenders will be examined.

**SW 607 SOCIAL WORK PRACTICE WITH FAMILIES. (2)**

The presentation and critical examination of theory as it relates to the study of contemporary marriage and family life and professional social work practice skills intended to strengthen family life. Seminar, two hours. Prereq: SW 600 or 601 or consent of instructor.

**SW 609 CLINICAL SOCIAL WORK PRACTICE. (2)**

The presentation and critical examination of specific treatment modalities as they relate to individuals, families, marital couples, and groups. Specific emphasis will be placed on the application and evaluation of specific interventive techniques. Prereq: SW 600 or 601 or consent of instructor.

**SW 610 SOCIAL SERVICES IN BLACK COMMUNITIES. (3)**

Study of the diversity of relationships, structures, and processes in Black communities, of particular problems and human service needs of ethnic clients, and of implications for social service practice.

**SW 611 SOCIAL WORK PRACTICE IN MENTAL HEALTH. (2-3)**

Description, analysis, and examination of social work practice in the mental health service delivery system, with particular emphasis on social work interventions and roles.

**SW 612 SEMINAR ON SOCIAL WORK PRACTICE WITH WOMEN. (2-3)**

This seminar focuses on the special problems and practice strategies relevant to selected groups of women served by social work.

**SW 613 URBAN ECOLOGY AND AGING. (2 or 3)**

Effects of an urban environment upon the aging population, including community design, city planning, housing, transportation, relocation, and mobility. The impact of technological advances will be examined from the point of view of theory, current research, and the process of man-environmental relationships.

**SW 614 SOCIAL WORK PRACTICE WITH PEOPLE WITH AIDS. (2-3)**

A clinically-based study of the impact of AIDS upon individuals and families and the implications of the epidemic for social work practice. Emphasis will be on case analysis and examination of intervention strategies using experiential and case history techniques.

**SW 615 SOCIAL WORK IN WORK SETTINGS. (2-3)**

The course will provide an overview and introduction of social work practice and policy in work settings. Major issues and concerns will be identified and discussed. Guidelines for practice and skills required for practice will be examined. Direct services, policy, and primary prevention will be studied.

**SW 616 SOCIAL WORK PRACTICE IN SCHOOL SETTINGS. (2-3)**

A presentation and examination of school social work practice. Emphasis will be placed on roles, competencies and skills necessary for effective service provision. The differences in services to children in schools will be contrasted with those in primary social service settings. Focus will also be given to the impact of school legislation and regulations on the choice of populations served and programs provided.

**SW 617 FAMILY VIOLENCE: SOCIAL WORK INTERVENTIONS. (2-3)**

The development of a knowledge based framework for understanding, preventing and intervening in family violence as seen in child, spouse and elder abuse.

**SW 618 SOCIAL WORK PRACTICE WITH GAY AND LESBIAN PEOPLE. (2-3)**

This course is designed to expand the knowledge and understanding of students about the theory and dynamics of homophobia, heterosexism, and homonegativity. The effects of living with prejudice and discrimination among the gay and lesbian support systems available. Micro and macro social work intervention strategies will be studied as they relate to overall themes. Prereq: SW 600 or 601 or consent of instructor.

**SW 620 HUMAN BEHAVIOR AND THE SOCIAL ENVIRONMENT. (4)**

The general purpose of this foundation course is to develop in the student an understanding of the inter-relatedness of biological, social, cultural, environmental and psychological factors in human behavior and development. The knowledge base focuses upon the interaction among six units of analysis: the individual, the family, the small group, the organization, the community, the society and culture. The course draws upon social work knowledge as well as other areas, including child and adult development, personality, organization, family theory, small group theory, learning/behavioral theory, cognitive theory. The ecological perspective provides the unifying framework which integrates the concepts from each of these areas of study. Students are expected to develop their own personal theoretical models most appropriate to generalist practice and utilized to inform and guide intervention at all system levels. Prereq: Open only to students admitted to graduate Social Work program.

**SW 623 SOCIAL WORK PRACTICE WITH GROUPS. (2-3)**

This course critically analyzes approaches to group practice in social work emphasizing socialization and resocialization purposes and leader activities. Research and practice issues are examined. Prereq: SW 600 or 601 or consent of instructor.

**SW 624 PERSPECTIVES ON HUMAN SEXUALITY. (3)**

An examination and study of historical and current perspectives of sexuality as it relates to behavioral patterns, cultural attitudes, social policy and practice. Prereq: Knowledge of human behavior and personality theory highly recommended. (Same as FAM 624.)

**SW 626 FORENSIC MENTAL HEALTH: EVALUATION AND TREATMENT. (2-3)**

An intensive analysis and study of forensic mental health including court evaluation, courtroom testimony and treatment of the victim. Students who wish to take this course for three credits will be expected to make an in-depth study of a specific content area. Lecture, two hours; laboratory (only for those taking the course for three hours), two hours per week. Prereq: Knowledge of behavior and personality theory is highly recommended.

**SW 627 SOCIAL WORK INTERVENTION IN FAMILY PROBLEMS. (2-3)**

The course involves identification of family problems encountered in social work practice and settings and presents the interventions commonly implemented in social work practice. The emphasis is on the social work approach to intervention with family problems.

**SW 630 SOCIAL WELFARE POLICY AND SERVICES. (4)**

This course emphasizes programs and policies, the historical roots of each, and the policy making process including models for policy analysis, and the components of formulation, enactment, implementation and impact. Course content reflects interdisciplinary efforts of the social, political, legal, economic and administrative processes which are vital to policy making at all levels. Prereq: Open only to students admitted to graduate Social Work program.

**SW 634 COMPARATIVE SOCIAL WELFARE POLICIES AND PROGRAMS. (2-3)**

A comparative study of income maintenance and health care delivery systems in selected foreign countries and the United States. Emphasis will be given to the problems in coverage, financing and administration.

**SW 636 MANAGEMENT SKILLS. (3)**

Practical application of relevant theories to the day-by-day operation of an organization, i.e., program objectives setting, climate setting, task identification and resource allocation, performance monitoring, decision making, etc.

**SW 637 TASK GROUPS IN AN ORGANIZATIONAL CONTEXT. (2)**

Theories and selected concepts about task groups are studied to understand the dynamics of task groups and/or to provide guidelines for changing group processes to increase effectiveness. Application of this knowledge is made to task groups such as councils, committees, teams, and boards. Class members will have the opportunity to develop skills appropriate for use as members and leaders of task groups.

**SW 640 GRADUATE EDUCATIONAL PRACTICUM I. (5)**

Introduction to social work practicum under faculty direction in a Teaching-Learning Center. Students will begin to apply and integrate knowledge from other courses in experiences which aid them in developing social work practice skills with emphasis on individuals, families, small groups, towards the goals of prevention, restoration and enhancement of social functioning. Experiential learning, 225 hours, and seminar. Prereq or concur: SW 600, SW 620 and SW 650.

**\*SW 641 GRADUATE EDUCATIONAL PRACTICUM II. (5)**

This course continues the process of introducing students to social work practicum under faculty direction in a Teaching-Learning Center. Students will continue to apply and integrate knowledge from other foundation courses in experiences which aid them developing social work practice skills with individuals, families, small groups. In addition, students will develop social work practice skills with organizations and communities toward the goals of prevention, restoration, and enhancement of social functioning. Experiential learning 225 hours and seminar. Prereq: SW 640. Prereq or concurrent: SW 601 and SW 630.

**SW 642 PSYCHOLOGICAL ASPECTS OF HUMAN AGING. (3)**

Description and explanation of behavior, socialization and personality differentiation during the post-maturation developmental period: emotional aspects of aging; perception; intelligence; learning; motivation; normal and abnormal behavior; sexuality; life style. Prereq: SW 620 or equivalent, or consent of instructor.

**SW 643 BIOMEDICAL ASPECTS OF AGING. (3)**

A survey of the normal age-associated changes in biological function, the major disease entities found in the older population, and how the health care delivery system presently addresses these issues. Prereq: Graduate status or permission of the instructor. (Same as GRN 643.)

**SW 650 RESEARCH METHODS IN SOCIAL WORK. (3)**

Introduction to systematic approaches to scientific thinking necessary for building knowledge and evaluating one's own practice. Includes ethical use of scientific inquiry, critical appreciation of quantitative and qualitative methodologies, and use of research for program evaluation. Prereq: Open only to students admitted to the graduate Social Work program.

**SW 652 PUBLIC POLICY AND AGING. (2 or 3)**

The content of this course will center around the federal/state policy-making and policy implementation process. Among the areas to be considered are the origins of policy, interaction among policy-making bodies, the legal right and access to policy influence, political attitudes and behavior, the impact of the legislative system on the aging population, resource allocation, social insurance, the Older Americans Act, and political advocacy for and by older people and groups. Prereq: SW 630 or equivalent or consent of instructor.

**SW 680 SPECIAL PROBLEMS IN SOCIAL WORK PRACTICE. (2-6)**

Current issues that have special significance for social work practice. Selected problems in accordance with the needs and interests of the students registered for the course. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

**SW 700 ADVANCED GENERALIST SOCIAL WORK PRACTICE I. (4)**

Students learn multidimensional and in-depth approaches for work with individuals, couples, families, and group systems using the advanced generalist model of practice within a systems framework. Leadership roles are emphasized, and complex ethical and legal issues analyzed. Careful consideration of diversity issues and at-risk populations is included. Prereq: SW 601 or advanced standing. Open only to students admitted to graduate Social Work program.

**SW 701 ADVANCED GENERALIST SOCIAL WORK PRACTICE II. (2)**

Students learn multidimensional approaches for work with organizations, communities, and larger systems using the advanced generalist model of practice within a systems framework. Leadership roles are emphasized, and complex ethical and legal issues analyzed. Careful consideration of diversity issues and at-risk populations is included. Prereq: SW 700 or advanced standing. Open only to students admitted to graduate social work program.

**SW 711 ADVANCED LEADERSHIP ROLES IN SOCIAL WORK. (3)**

Advanced study and analysis of leadership roles in social work practice with emphasis upon administration and supervision. Some attention is given to consultation, staff development and teaching, and review of theories of adult learning. Prereq: SW 701 or consent of instructor.

**SW 720 SOCIAL WORK PERSPECTIVES ON HUMAN AND CULTURAL DIVERSITY. (2)**

This second required course in the human behavior and social environment sequence builds upon the foundation course. The focus of this course is upon the effects of discrimination and oppression experienced by diverse population groups with special attention to the effects of racism, sexism, ageism, classism and geography upon vulnerable groups; and upon institutionalized societal and cultural themes in diversity; with implications for social work practice. Prereq: SW 620 or advanced standing in the MSW program.

**SW 722 SOCIAL WORK PERSPECTIVES ON PSYCHOPATHOLOGY. (2-3)**

This final required course in the human behavior and the social environment sequence will focus upon an intensive examination of mental disorders as they relate to the individual and the family. Emphasis will be placed upon psychopathology in childhood, adolescence and adulthood. Models for understanding abnormal behavior will be introduced. In addition, the course will focus on cultural themes, ethical, legal and gender issues. Diagnostic techniques and interventive treatment strategies will be explored. Prereq: SW 620 or advanced standing in the MSW program.

**SW 730 ADVANCED SOCIAL WELFARE POLICY AND SERVICES I. (2)**

This course examines the intended and unintended consequences of public and organizational policies on the major social problems of poverty, racism and gender inequality, the deliberate efforts by policy makers to oppress, exploit and victimize people of color, women and children, current policies, especially those under intense review, to gain a better understanding of value conflicts. Prereq: SW 630 or advanced standing in MSW program.

**SW 731 ADVANCED SOCIAL WELFARE POLICY AND SERVICES II. (2)**

This course examines the intended and unintended consequences of public and organizational policies on the major social problems involving the at-risk groups - the elderly, families and children, and those who are physically and mentally ill, current policies, especially those under intense review, to gain better understanding of value conflicts. Prereq: SW 730 and admission to graduate Social Work program.

**SW 736 ORGANIZATION AND MANAGEMENT METHODS FOR SOCIAL WORKERS. (2-3)**

This course will consider the appropriate skills and methods for effectively organizing and managing agencies, institutions, and organizations which are elements of the various social service delivery systems. Included is the study of the management process as it applies to social service settings, an examination of specific management skills, and consideration of the impact of social service programs and delivery methods on program constituents and consumers. Prereq: SW 636 or consent of instructor.

**\*SW 740 ADVANCED GRADUATE EDUCATIONAL PRACTICUM I. (5)**

Application and integration of the advanced generalist practice model in advanced methods of intervention under faculty direction in a Teaching-Learning Center. Emphasis is on the development of leadership competencies and advanced generalist practice skills with individuals, families and small groups, organizations and communities. Experiential learning, 225 hours, and seminar. Prereq: SW 641 or advanced standing in the MSW program. Prereq or concurrent: SW 700.

**\*SW 741 ADVANCED GRADUATE EDUCATIONAL PRACTICUM II. (5)**

This course provides an opportunity for students to continue to apply and integrate the advanced generalist practice model in advanced methods of intervention under faculty direction in a Teaching-Learning Center. Emphasis is on the continued development of leadership competencies and advanced generalist practice skills with individuals, families, small groups, organizations, and communities towards the goals of prevention, restoration and enhancement of social functioning. Experiential learning, 225 hours, and seminar. Prereq: SW 740. Prereq or concurrent: SW 701.

**#SW 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**SW 750 RESEARCH DESIGN AND IMPLEMENTATION IN SOCIAL WORK PRACTICE I. (2)**

Development of a research or evaluation design that will contribute to social work knowledge base or systematically evaluate a program, practice, or intervention. Prereq: SW 650 or advanced standing in the MSW program.



**SW 751 RESEARCH DESIGN**

**AND IMPLEMENTATION IN SOCIAL WORK PRACTICE II. (1)**

Continuation and completion of research designed and started in SW 750. Prereq: SW 750.

**#SW 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely. Prereq: Successful completion of qualifying exam.

**\*SW 780 INDEPENDENT WORK. (1-6)**

Organized study, research and/or tutorial focused on special issues or problems. May be repeated to a maximum of six credits. Prereq: Major, graduate standing of 3.0 overall GPA, or consent of dean, and consent of adviser and instructor.

**#SW 781 THEORY DEVELOPMENT IN THE SOCIAL WORK PROFESSION. (3)**

Explores the nature of knowledge, how it is generated and acquired. Students will distinguish explanatory from practice theory, understand paradigms as bases for ideas, recognize and formulate concepts, understand relational statements, theoretical statements, and how these relate to theory and data. Strategies for building knowledge will be discussed. Students will analyze theories into their components, construct mini-theories, and propose how they can be tested in social work practice. Prereq: Admission into the doctoral program.

**#SW 782 ADVANCED ANALYSIS OF SOCIAL PROBLEMS, POLICY AND PRACTICE. (3)**

This course provides students with a theoretical and conceptual framework for understanding social problems and their implications for macro social work practice. Critical perspectives related to social science theory will be identified, assumptions assessed, values examined, and empirical evidence analyzed. Theories covered will be drawn from sociological, socio-cultural, political, economic, historical and other perspectives. Students will be expected to develop their abilities to analyze and critique social problems and macro social work practice. Prereq: Admission into the doctoral program.

**#SW 783 HUMAN BEHAVIOR**

**AND CHANGE THEORIES IN SOCIAL WORK PRACTICE. (3)**

A critical analysis of theories which seek to explain human behavior and serve as foundations for current clinical change interventions; includes an examination of the empirical support for and efficacy of major treatment modalities used in social work practice.

**#SW 784 ETHICS, SOCIAL WORK AND SOCIETY. (3)**

This course will identify and articulate the philosophical formulations of relevant ethical traditions and their implications for social work. Students will examine approaches to ethical analysis as well as major ethical problems facing contemporary social work. The course will emphasize the development of advanced ethical reasoning and decision-making skills. Prereq: SW 781.

**#SW 785 PROSEMINAR IN SOCIAL WORK RESEARCH. (1)**

This seminar introduces beginning doctoral students to the research activities of social work faculty and advanced students. Presentations will familiarize students with practical issues in the conceptual development and conduct of current research. May be repeated to a maximum of two credits. Prereq: Admission into the doctoral program.

**\*SW 786 DOCTORAL RESEARCH PRACTICUM. (3-6)**

Provides the doctoral student opportunity to conduct social work research under the supervision of a chosen faculty member. This experience is expected to result in one or more reports suitable for submission to a scholarly journal at conclusion of the practicum. Prereq: Completion of first year of doctoral study.

**\*SW 787 DOCTORAL TEACHING PRACTICUM. (3-6)**

Supervised teaching and other classroom experiences designed to prepare doctoral students to be social work educators. Prereq: Completion of first year of doctoral study.

**#SW 788 RESEARCH IN SOCIAL WORK SEMINAR. (3)**

This course is designed to facilitate the student's completion of the dissertation prospectus and the dissertation itself. Students will make formal presentations on their research plans and will address available literature, measurement and methodological issues, analysis of data, limitations, and importance of the investigation. Prereq: Six hours doctoral level research.

**TA Theatre****TA 101 INTRODUCTION TO THEATRE: PRINCIPLES AND PRACTICE. (3)**

The cultivation of judgment, perception and creative response to theatre, with emphasis on what and how theatre communicates through examination of both the processes and product of theatre.

**TA 126 ACTING ENSEMBLE. (3)**

A broad spectrum of skills will be explored in the creative process of acting ensemble. These skills include improvisation, movement disciplines (including theatre games, modern dance, and characterization), emotional and sensory awareness, and the process of integrating these into a clearly defined stage technique. Lecture, three hours; laboratory, two hours per week.

**TA 127 ACTING TECHNIQUES. (3)**

Movement exercises, sensory work, and theatre games are used to heighten awareness, release personal blocks, and discover the experience of being truthful with fellow actors. From there, students will move on to individual work to establish techniques they will use when working on a play. Students will explore physical and emotional awareness and develop a more creative use of their imaginations. Lecture, three hours; laboratory, two hours per week. Prereq: TA 126.

**TA 150 FUNDAMENTALS OF PRODUCTION. (3)**

A comprehensive study of the basic organizational structure, processes and techniques involved in theatre design, technology and management with particular reference to the UK Theatre.

**TA 190 PRODUCTION PRACTICUM. (1)**

The study and practice of production techniques through rehearsal and performance. May be repeated to a maximum of two credits. Pass/fail only. Prereq: Consent of instructor and filing of prospectus.

**TA 191 PERFORMANCE PRACTICUM. (1)**

The study and practice of acting and directing through rehearsal and performance. May be repeated to a maximum of two credits. Pass/fail only. Prereq: Consent of instructor and filing of prospectus.

**TA 225 VOCAL PRODUCTION FOR THE STAGE I. (3)**

The theory and practice of stage diction. Mastery of these vocal techniques will lead the student to the eradication of regional speech patterns, an appreciation of vocal craft and discipline and an awareness of the diversity of vocal expression.

**TA 226 METHODS IN ACTING. (3)**

A lecture/laboratory course concentrating on several components of the acting process: preliminary study in modern acting theories, Stanislavski to the present; textual analysis, character study and scene work; studio exercises aimed at refining rehearsal skills for the actor. Lecture, two hours; laboratory, four hours per week. Prereq: TA 126 or equivalent.

**TA 227 INTRODUCTION TO ACTING STYLES. (3)**

A continuation of TA 226, with continued emphasis on developing the actor's skills in analysis and rehearsal. This course will introduce the actor to a performance style other than realism. Lecture, two hours; laboratory, four hours per week. Prereq: TA 226 or equivalent.

**TA 260 STAGECRAFT. (3)**

Study of theory, principles and techniques of stage construction. Assignments in laboratory and backstage during rehearsals and performances. Lecture, two hours; laboratory, five hours. Prereq: TA 150 or consent of instructor.

**TA 264 MAKEUP FOR THE THEATRE. (3)**

Theory and practice in the principles, materials and application of makeup. Lecture, two hours; laboratory, two hours. Prereq: TA 150 or consent of instructor.

**TA 272 PRINCIPLES OF STAGE DRAFTING. (3)**

Principles of stage drafting: tools and symbols, dimensioning, cabinet drawings, lettering, floor plans, elevations, sections, details, isometrics, obliques, orthographic projections, metrics, and conversion and perspective. Two hours lecture; two hours laboratory. Prereq: TA 150 or consent of instructor.

**TA 283 AMERICAN THEATRE. (3)**

This course surveys American theatre history, giving particular emphasis to the late nineteenth and twentieth centuries. It examines both theatre practice and dramaturgy, and places them within an historical, social, and cultural context.

**TA 300 READINGS IN THEATRE (Subtitle required). (3)**

A program of supervised readings to provide undergraduate students with an in-depth comprehension of a selected area of theatre. May be repeated once under a different subtitle.

**TA 320 THEATRE MOVEMENT I. (3)**

The study and practice of principles, techniques, and exercises employed in one or more of the following areas of theatre movement: mime, mask, stage fencing, combat, clowning and circus techniques, and period movement. Laboratory, six hours per week. Prereq: Major and consent of instructor.

**TA 321 THEATRE MOVEMENT II. (3)**

A continuation of TA 320. Laboratory, six hours per week. Prereq: TA 320 and consent of instructor.

**TA 326 INTERMEDIATE ACTING. (3)**

Concentrated training in styles of language, movement and manners from various historical periods in theatre. Representative scenes will be chosen from among the following periods: Classical Greek, *Commedia dell'Arte*, Elizabethan, French Neo-Classical, Restoration, Eighteenth and Nineteenth Centuries. Laboratory, six hours per week. Prereq: B.F.A. candidate or consent of instructor.

**TA 327 ADVANCED ACTING. (3)**

A continuation of TA 326. Intensified study of acting styles and techniques from selective major acting periods stressing their relationships to the present. Intensive and individual coaching sessions. Laboratory, six hours per week. Prereq: TA 326, B.F.A. candidate or consent of instructor.

**TA 330 PRINCIPLES OF DIRECTING. (3)**

Discussion and practice of the director's basic techniques, methods and responsibilities. Lecture, two hours; laboratory, two hours. Prereq: Major or consent of instructor.

**TA 350-352 TOPICS IN THEATRE. (3)**

Reading, research, lecture and/or discussion in various areas of theatre history, technology and practice. May be repeated three times for a maximum of 12 hours when identified by different course subtitles. Prereq: Major or consent of instructor.

**TA 360 STAGECRAFT II. (3)**

Study of theory, principles and practices of advanced problems in stage construction. Three hours lecture per week. Four hours laboratory per week. Prereq: TA 260 or consent of instructor.

**TA 365 COSTUME DESIGN I. (3)**

A lecture-laboratory course to teach basic history, theory and practical construction of costume for the stage. Lecture, three hours; laboratory, five hours.

**TA 367 STAGE LIGHTING. (3)**

Theory, practice, and design of lighting for the theatre: historic background, electricity, instrumentation, control, and aesthetics. Three hours lecture per week; three hours laboratory per week. Prereq: TA 150 or consent of instructor.

**TA 374 SCENE DESIGN. (3)**

Process of evolving a scenic design through play analysis, research, metaphysical association and the assimilation of theatrical art forms against practical prescribed limitations. Practice in developing floor plans, elevations and simple sketching techniques. Lecture, two hours; laboratory, two hours. Prereq: TA 150 or consent of instructor.

**TA 380 HISTORY OF THE THEATRE I. (3)**

A study of the theatre from primitive times through the Elizabethan period. Theatre and stage architecture, scene design, costuming and acting styles are discussed and their relation to dramatic literature analyzed.

**TA 381 HISTORY OF THE THEATRE II. (3)**

A continuation of TA 380; a study of the theatre from the Jacobean period to the present.

**TA 383 SCRIPT ANALYSIS. (3)**

A course focusing upon dramatic literature as a composition for theatrical performance. Text interpretation will cover approaches used by practitioners of theatre art directors, designers, and actors.

**TA 387 SEMINAR IN THEATRE. (3)**

Advanced reading and discussion in theatre theory and criticism. May be repeated to a maximum of 12 credits when identified by different course subtitles. Prereq: Major or consent of instructor.

**TA 390 PRODUCTION PRACTICUM. (1)**

The study and practice of production techniques through rehearsal and performance. May be repeated to a maximum of four credits. At least two hours production related activities per week. Pass/fail only. Prereq: Consent of instructor and filing of prospectus.

- TA 391 PERFORMANCE PRACTICUM. (1)**  
The study and practice of acting and directing through rehearsal and performance. May be repeated to a maximum of four credits. At least two hours performance related activities per week. Pass/fail only. Prereq: Consent of instructor and filing of prospectus.
- TA 395 INDEPENDENT WORK. (1-3)**  
For undergraduate majors in theatre arts. Pursue independent work under the guidance of a staff member. Write a paper embodying the results of his research study and take an examination. May be repeated to a maximum of 12 credits. Prereq: Major, filing of prospectus at time of registration, and consent of chairperson.
- TA 396 SUMMER THEATRE. (3)**  
Concentrated practical experience in the UK Summer Theatre program. May be repeated to a maximum of six credits. Eight hours laboratory per week. Prereq: Consent of department by audition or interview.
- TA 397 SUMMER THEATRE. (3)**  
Concentrated practical experience in the UK Summer Theatre program. May be repeated to a maximum of six credits. Eight hours laboratory per week. Prereq: Consent of department by audition or interview.
- TA 398 SUMMER THEATRE. (3)**  
Concentrated practical experience in the UK Summer Theatre program. May be repeated to a maximum of six credits. Eight hours laboratory per week. Prereq: Consent of department by audition or interview.
- TA 399 FIELD BASED/COMMUNITY BASED EDUCATION. (1-15)**  
A community-based or field-based experience in theatre, under the supervision of a faculty member. May be repeated to a maximum of 15 credits. Prereq: Consent of instructor and department chairperson; completion of departmental learning agreement. (Approval of Dean of Fine Arts required for more than six credits per semester.)
- TA 411 TEACHING OF THEATRE ARTS. (3)**  
A course designed to introduce teachers and community theatre workers to the problems of staging under circumscribed conditions; minimum essentials of play production and the means of supplying these needs. Required of all certification students.
- TA 426 INTERMEDIATE ACTING STYLES. (3)**  
An in-depth investigation of role analysis and character development culminating in material for audition and performance. Intensive, individual coaching sessions. Laboratory, six hours per week. Prereq: B.F.A. candidate or consent of instructor.
- TA 430 THEATRE DIRECTING I. (3)**  
Study of movement, interpretation of lines, creation of atmosphere, use of stage areas, use of levels, methods of achieving a climax, handling of groups, planning of mob scenes. Prereq: TA 330 or consent of instructor.
- TA 465 COSTUME DESIGN II. (3)**  
An advanced course in the area of costume design with special attention paid to individual experimentation and development. Three class hours; laboratory, five hours per week. Prereq: TA 365.
- TA 495 SENIOR PROJECT. (3)**  
An independent study project required of all senior majors. Designed to enable the student to demonstrate knowledge, skill and creativity in a particular area of theatre. Specific nature of project to be developed in collaboration with a faculty project adviser. Final product may be either a written or performed presentation. Prereq: Major/senior standing/filing of prospectus at time of registration.
- TA 516 PLAYWRITING. (3)**  
A course designed for students interested in creative drama. The completion of at least one play is required. May be repeated to a maximum of six credits. Prereq: Consent of instructor.
- TA 524 DIALECTS FOR THE STAGE. (3)**  
The theory and practice of stage dialects for the American actor as it pertains to interpreting the role. Prereq: TA 225 or consent of instructor.
- TA 525 VOCAL PRODUCTION FOR THE STAGE II. (3)**  
A continuation of TA 225. Intensified work to develop, release and expand the dynamics of the voice in relationship to the actor's needs. Individual coaching in specific roles and dialects and remedial help for individual problems. Prereq: TA 225 or consent of instructor.
- TA 530 THEATRE DIRECTING II. (3)**  
Analyses and direction of the characteristics of tragedy, comedy, melodrama, farce and their variants. Intensive application of techniques studied in TA 430. Prereq: TA 430 or consent of instructor.

- TA 590 PRODUCTION PRACTICUM. (1)**  
The study and practice of production techniques through rehearsal and performance. May be repeated to a maximum of two credits. Prereq: Consent of instructor and filing of prospectus.
- TA 591 PERFORMANCE PRACTICUM. (1)**  
The study and practice of acting and directing through rehearsal and performance. May be repeated to a maximum of two credits. Prereq: Consent of instructor and filing of prospectus.
- TA 596 SUMMER THEATRE. (1-6)**  
Concentrated experiential education in the UK Summer Theatre program. May be repeated to a maximum of 12 credits. Prereq: Consent of Department by audition or interview.
- TA 600 READINGS IN THEATRE. (3)**  
A program of supervised readings to provide graduate students with an in-depth comprehension of selective areas of theatre. May be repeated to a maximum of six credits. Prereq: Graduate standing.
- TA 625 ADVANCED STYLES OF ACTING. (3)**  
The rehearsal and performance of scenes and class exercises in improvisation to develop creative imagination as a basis for acting. Lecture, three hours; laboratory, two hours. May be repeated to a maximum of six credits. Prereq: Consent of instructor.
- TA 660 STUDIES IN TECHNICAL THEATRE: PRODUCTION. (3)**  
Problems in advanced sceno-graphic techniques including drafting for the theatre, period composition and design, translation of the design into actuality, planning and laying out the technical schedule. Prereq: Consent of instructor. May be repeated to a maximum of six credits.
- TA 661 STUDIES IN TECHNICAL THEATRE: LIGHTING. (3)**  
Investigation and critical evaluation of lighting practice and artistry in the contemporary theatre. May be repeated to a maximum of six credits. Prereq: Consent of instructor.
- TA 692 STUDIES IN DIRECTING. (1-3)**  
Experience in directing a full-length production for the Department of Theatre including the submission of a prompt book and production log. May be repeated to a maximum of six credits. Prereq: Consent of chairperson.
- TA 770 SEMINAR IN THEATRE. (3)**  
Intensive study in a designated area of theatre. May be repeated to a maximum of nine credits.
- TA 780 INDEPENDENT STUDY IN THEATRE. (1-3)**  
Study and research on specific topics and problems according to the interests and needs of individual students. Normally offered as an independent work course. May be repeated to a maximum of six credits.

## TOX

## Toxicology

- TOX 508 RESEARCH METHODS IN TOXICOLOGY. (1-3)**  
The course provides students with 'hands on' experience in research methods used to solve toxicological problems. Students will be under the direction of a GCT faculty member, who will supervise the student's efforts on a research project. The student will be trained not only in the 'hands on' techniques but also in how to independently design and interpret research experiments. Students will prepare a final report on their research project, which will be designed to provide instruction and training in preparing 'publication-style' research reports. This course is distinct from 'topical seminar' or 'library survey' courses, since such courses are not 'hands on' in experimental methods. May be repeated to a maximum of six credits. Laboratory, two-six hours per week. Prereq: Status as upperclass undergraduate, post bac, or graduate student.
- TOX 509 CONTEMPORARY TOXICOLOGY. (3)**  
Presentation of basic and advanced concepts to provide an integrated description of toxicology, its scope, the unique application of principles that characterize it as a science, and its professional practice. Emphases will include the influence of federal regulations on the practice of toxicology. Prereq: BCH 501 and PHA 522 or equivalents or consent of instructor.

**TOX 600 ETHICS IN SCIENTIFIC RESEARCH. (2)**

The course will commence with an overview of good laboratory practices and present them as the basis of good scientific research, along with an overview of quality assurance and appropriate practices in data analysis and data interpretation. The course will then move to the ethics of human and animal experimentation and discuss the concepts of data and intellectual property, their ownership and access to them. The problems of reviewing other workers' intellectual property such as grant applications, research papers and other intellectual property will be addressed. Prereq: Research experiences; consent of instructor. (Same as VS 600.)

**TOX 645 NEUROTOXICOLOGY. (2)**

Multidisciplinary discussions of the major sites and mechanisms of drug/chemical-induced nervous system toxicity. Presentations by faculty and graduate students. Prereq: BCH 501 and 502, PGY 502 and PHA 522 or equivalent and consent of instructor. (Same as PHR 645.)

**TOX 649 MOLECULAR PHARMACOLOGY. (3)**

The intent of this course is to describe the molecular aspects of a variety of physiological systems that are subject to pharmacological manipulation. Emphasis will be on the molecular genetics, biochemistry, and subcellular organization and biology of these systems, and on the pharmacological techniques used to study these systems. Genetic diseases associated with these systems will also be described. The course will focus on areas of research which represent the forefront of modern pharmacological investigation. Prereq: PHA 522, PGY 502, BCH 501, 502, or consent of instructor. (Same as PHR/PHA 649.)

**TOX 650 CELLULAR AND HISTOTOXICOLOGY. (2)**

A systematic review of morphological responses to body trauma with special reference to toxic agents. The course is planned to consist of formal presentations and of discussion sessions (primarily interpretation of microscopic preparations). Prereq: Consent of instructor. (Same as VS 650.)

**TOX 660 CLINICAL TOXICOLOGY AND DRUG MONITORING. (3)**

A lecture and demonstration course designed to acquaint the student with the two main areas of clinical toxicology. The first part of the course will cover the scope of the drug abuse problem in the U.S.A. and detail the emerging role of the clinical toxicologist in dealing with a wide variety of analytical and medicolegal problems associated with illicit drug detection. The second part of the course will cover the rapidly expanding area of clinical toxicology which deals with the monitoring of therapeutic drugs as they relate to the appropriate clinical management of patients. Prereq: BCH 501 and 502, PHA 521 and 522 or equivalent with consent of instructor. (Same as PAT 660.)

**TOX 663 DRUG METABOLISM AND DISPOSITION. (2)**

Drug metabolism and disposition. Lectures and discussion of the chemistry and biochemistry of drug biotransformation with emphasis on the mixed-function oxidase system. Prereq: BCH 401G or 501, 502 or consent of instructor. (Same as PHA 663.)

**TOX 670 CHEMICAL CARCINOGENESIS. (3)**

Lectures and discussion of the chemical and biochemical reactions of chemical carcinogens and their metabolites. Prereq: CHE 232; PHR 400; or BCH 501, 502. (Same as PHA 670.)

**TOX 680 ADVANCED TOXICOLOGY. (5)**

An intensive examination of the chemistry and action of substances which adversely affect living systems, and consideration of means of lessening their impact on man and the environment. Prereq: TOX 509 or consent of Director of Graduate Studies.

**TOX 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**TOX 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**TOX 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

May be repeated to a maximum of 12 hours.

**TOX 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**TOX 770 TOXICOLOGY SEMINAR. (0-1)**

A specialized seminar focusing on current topics of toxicological significance. Registration each fall and spring semester required of all toxicology majors until residency requirements for the degree have been completed. May be repeated to a maximum of three times during a semester and for a maximum number of two credits during entire graduate course work.

**TOX 780 SPECIAL PROBLEMS IN TOXICOLOGY. (2)**

Exposure to and actual research experience in an area of toxicology other than that encountered by students in their thesis and dissertation research. May be repeated to a maximum of six credits. Prereq: Consent of graduate adviser.

**TOX 790 RESEARCH IN TOXICOLOGY. (1-12)**

**UK University Wide**

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**UK 100 UNIVERSITY COURSE (Title to be assigned). (1-3)**

This course permits the offering at the introductory level of special courses of an interdisciplinary, topical, or experimental nature. Each proposal must be approved by the Vice Chancellor for Academic Affairs. A particular title may be offered at most twice under the UK 100 number. Students may not repeat under the same title. Prereq: Will be set by instructor.

**UK 101 ACADEMIC ORIENTATION. (1)**

This course is designed to assist undergraduates in adjusting to the academic life of the University. Through lectures, discussions, exercises, and out-of-class assignments, freshmen students will gain a better understanding of the purpose and nature of a university education, will acquire skills for achieving academic success, will learn how to make effective use of the University's resources and will engage in small group interaction with peers and with University faculty. Offered on a pass/fail basis only. Lecture, two hours per week for seven weeks.

**UK 201 ACADEMIC ORIENTATION FOR TRANSFERS. (1)**

This course is designed to assist transfer students in adjusting to the academic life at the University of Kentucky. Through lectures, discussions, exercises and out-of-class assignments, transfers will gain a better understanding of the challenges which they will encounter and, thus, will learn how to make effective use of the University's resources. Considerable attention will be directed to career planning and to the choice of a major. Offered on a pass/fail basis only. Lecture, two hours per week for seven weeks.

**UK 300 UNIVERSITY COURSE (Title to be assigned). (1-3)**

This course permits the offering of special courses of an interdisciplinary, topical, or experimental nature. Each proposal must be approved by the Vice Chancellor for Academic Affairs. A particular title may be offered at most twice under the UK 300 number. Students may not repeat under the same title. Prereq: Will be set by instructor.

**UK 301 CROSS-CULTURAL STUDIES (Subtitle required). (3)**

A study of a non-Western or Third World culture (or cultures) through an examination of its cultural, artistic, social, political, economic or religious traditions. The particular culture(s) to be studied and the approach to be adopted will be determined by the instructor. Each course proposal must be approved by the Dean of Undergraduate Studies and students may not repeat the course under the same subtitle. May be repeated to a maximum of nine credits.

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**VS Veterinary Science**


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**VS 350 INTRODUCTORY ANATOMY, PHYSIOLOGY, AND ANIMAL HYGIENE. (3)**

A study of anatomy and physiology as related to courses in livestock production, judging, nutrition, meats and diseases, and introduction to the basic mechanism of animal disease and the relationship of animal hygiene.

**VS 351 PRINCIPLES OF ANIMAL HYGIENE AND DISEASE CONTROL. (3)**

A study of animal sanitation and disease control management. The course will acquaint students with the more important infectious, toxic, metabolic and parasitic diseases of domestic animals and will emphasize preventive concepts.

**VS 395 SPECIAL PROBLEMS IN VETERINARY SCIENCE. (1-4)**

Prereq: VS 350, 351, and consent of instructor. May be repeated to a maximum of six credits.

**VS 600 ETHICS IN SCIENTIFIC RESEARCH. (2)**

The course will commence with an overview of good laboratory practices and present them as the basis of good scientific research, along with an overview of quality assurance and appropriate practices in data analysis and data interpretation. The course will then move to the ethics of human and animal experimentation and discuss the concepts of data and intellectual property, their ownership and access to them. The problems of reviewing other workers' intellectual property such as grant applications, research papers and other intellectual property will be addressed. Prereq: Research experiences; consent of instructor. (Same as TOX 600.)

**VS 650 CELLULAR AND HISTOTOXICOLOGY. (2)**

A systematic review of morphological responses to body trauma with special reference to toxic agents. The course is planned to consist of formal presentations and of discussion sessions (primarily interpretation of microscopic preparations). Prereq: Consent of instructor. (Same as TOX 650.)

**VS 748 MASTER'S THESIS RESEARCH. (0)**

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

**VS 749 DISSERTATION RESEARCH. (0)**

Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams.

**VS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)**

Residence credit while completing research and writing thesis. Prereq: Completion of course requirements for the MS. May be repeated to a maximum of 12 hours.

**VS 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)**

May be repeated indefinitely.

**VS 770 VETERINARY SCIENCE SEMINAR. (1)**

Required of graduate students in veterinary science. May be repeated to a maximum of six credits. Prereq: Consent of staff.

**VS 781 CORRELATIVE PATHOLOGY. (1-3)**

Supervised experience in the use of clinical, gross and histopathological technics in the differential and definitive diagnosis of diseases. May be repeated to a maximum of nine credits. Prereq: Pathology in D.V.M. curriculum or equivalent and consent of staff.

**VS 785 ADVANCED VETERINARY PARASITOLOGY. (3)**

Experimental methodology and host-parasite relationships of the protozoan and helminth parasites of domestic animals. Prereq: Parasitology in D.V.M. curriculum or equivalent and approval of staff.

**VS 786 ADVANCED VETERINARY PATHOLOGY. (3)**

Specialized instruction in techniques and interpretations of pathology and pathologic anatomy. Emphasis will be upon evaluation of lesions for understanding the pathogenesis of disease processes in the living animal. Prereq: Pathology in D.V.M. curriculum or equivalent and approval of staff.

**VS 791 TECHNIQUES IN VETERINARY MICROBIOLOGY. (1-9)**

Independent research in veterinary microbiology. May be repeated to a maximum of 24 credits. Prereq: Consent of staff.

**VS 792 TECHNIQUES IN GENERAL VETERINARY PATHOLOGY. (1-9)**

Independent research in veterinary pathology. May be repeated to a maximum of 24 credits. Prereq: Consent of staff.

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**WS Women's Studies**

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**WS 200 INTRODUCTION TO WOMEN'S STUDIES IN THE SOCIAL SCIENCES. (3)**

An introduction to women's studies from a social science perspective, using a cross-cultural and interdisciplinary approach. Introduces students to social science explanations for sex-typed behavior, to social perceptions of women and men, and to the roles of women in social and cultural life.

**WS 201 INTRODUCTION TO WOMEN'S STUDIES IN THE ARTS AND HUMANITIES. (3)**

An introduction to women's history in work, family and creative production. This course presents a set of organizing ideas for examining issues and problems of women in contemporary society, and gives students opportunities for writing, interviewing and discussing issues of gender, class and race from an interdisciplinary point of view. It introduces students to the basic methods of humanistic inquiry in general and humanistic women's studies in particular.

**WS 300 TOPICS IN WOMEN'S STUDIES (Subtitle required). (3)**

Selected topics in women's studies with special attention to those of contemporary relevance. May be repeated to a maximum of nine credits under different subtitles. Prereq: WS 200 or WS 201 or permission of instructor.

**WS 399 INTERNSHIP IN WOMEN'S STUDIES. (1-6)**

Provides field experiences in women's studies through work in education, industry, government, or community organizations. Offered on a pass/fail basis only. Maximum six credit hours per placement to maximum of twelve credit hours total. (Three hours can be counted toward the undergraduate Women's Studies minor requirements.) Prereq: WS 200 or WS 201 and declared minor in Women's Studies and consent of director of Women's Studies and faculty supervisor and learning contract filed with Experiential Education and Women's Studies.

**WS 400 RESEARCH IN WOMEN'S STUDIES. (3)**

The purpose of this course is to provide students the opportunity to engage in independent faculty-directed library or field research focused upon significant issues and problems confronting women in contemporary society. Prereq: WS 200.

**WS 600 TOPICS IN WOMEN'S STUDIES (Subtitle required). (3)**

Selected topics of theoretical or substantive interest in women's studies with special attention to topics of contemporary relevance. May be repeated to a maximum of nine credits under a different subtitle. Prereq: Graduate standing or permission of instructor.

**WS 650 FEMINIST THEORY. (3)**

An interdisciplinary course addressing issues in contemporary feminist theory (such as intersections of race and gender, the body, ideology and representation, sexuality, etc.).

**WS 750 READINGS IN WOMEN'S STUDIES. (1)**

This course allows graduate students to integrate readings in Women's Studies scholarship across disciplines and provides an opportunity to discuss research with faculty associated with the Women's Studies Program. May be repeated to a maximum of three credits. Prereq: WS 650 or consent of instructor.