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 three times 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 101 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 101 number. Students may not repeat under the same title. Offered pass/fail only. 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 INSTRUCTIONIN 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 300 SPECIAL COURSE (SUBTITLE REQUIRED). (1-6)
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 three times under the A&S 300 number, and no A&S 300 course may be given for more than six credits per semester. Open to all University students, subject to such limits or prerequisites as set by the instructor. May be repeated to a maximum of 12 credit hours under different subtitles.

A&S 500 SPECIAL COURSE (SUBTITLE REQUIRED). (1-6)
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 three times under the A&S 500 number. Open to all university students, subject to such limitations or prerequisites as set by the instructor. May be repeated to a maximum of six credits under different subtitles. 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 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 576 ART IN MIDDLE SCHOOLS. (2)
Study of perceptual and aesthetic awareness in Middle School level children/adolescents. Field and practicum experiences with methods and materials appropriate to the teaching of art in the middle school. Lesson planning, curriculum design, evaluation, teaching skills, classroom safety, and multicultural activities. Included: readings, lecture, discussion, demonstration, micro-teaching laboratory and studio experiences. Prereq: Major in art education, admission to the Teacher Education Program (TEP), or consent of instructor.

A-E 577 ART IN SECONDARY SCHOOLS. (2)
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, admission to the Teacher Education Program (TEP), or consent of instructor.

A-E 578 ART IN ELEMENTARY SCHOOLS. (2)
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, admission to the Teacher Education Program (TEP), or consent of instructor.

A-E 579 ARTS AND HUMANITIES 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, admission to the Teacher Education Program (TEP), or consent of 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 670 SCHOOL AND COMMUNITY ART. (3)
Analysis of the social function of art; organization of school and community related programs in art; case studies of existing programs. Field experience, educational involvement. Lectures and demonstrations. Prereq: Major in Art Education or consent of instructor.

A-E 675 AESTHETICS AND DESIGN. (3)
Focuses on advancing aesthetic awareness, developing an understanding of the principles of visual design, and the application of aesthetic design to human-computer interaction in order to integrate an artistic approach to the examination of technological innovation.

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 104 INTRODUCTION TO AFRICAN ART. (3)
Study of African art in which sculpture, painting, pottery, textiles, architecture, altar arts, human adornment and performance are approached on the basis of style, iconography and function, and in relation to religious, political, market and daily contexts. This course examines the ways in which "Africa" has been conceived and deconstructs the assumptions shaping each approach. The processes (and problems) of collecting and displaying African art will be addressed throughout the course.

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 STUDIES IN AFRICAN ART (SUBTITLE REQUIRED). (3)
Focus upon a particular medium, region, period or theme within African art studies. Visual materials, research, reading and discussion to address one or more of the following topics: arts by region (central, east, north, south, or west Africa, or the African diaspora), by medium (such as ceramics, performance, or architecture), by time period (such as ancient or "contemporary"), or by theme (such as gender or politics). May be repeated under a different subtitle to a maximum of six credits. Prereq: A-H 104 recommended.

A-H 312 STUDIES IN GREEK ART (SUBTITLE REQUIRED). (3)
Study of the arts of Greece. According to subtitles, attention may focus on particular periods or media from Bronze Age through Hellenistic Greece in the context of political, social and intellectual developments. May be repeated under a different subtitle to a maximum of six credits. Prereq: A-H 105 recommended. (Same as CLA 312).

A-H 313 STUDIES IN ROMAN ART (SUBTITLE REQUIRED). (3)
Study of the art and architecture of Rome. According to subtitles, attention will focus on various aspects of public or private painting, sculpture and architecture as reflections of political, social and cultural developments in the Roman world from the early Republic through the age of Constantine. May be repeated under a different subtitle to a maximum of six credits. Prereq: A-H 105 recommended. (Same as CLA 313.)

†A-H 322 BYZANTINE ART.

***A-H 323 STUDIES IN MEDIEVAL ART (SUBTITLE REQUIRED). (3)**
Considers the interrelationships of art and architecture with religion, literature, politics, and other expressive forms as they shape and are shaped by medieval patrons and artists between the fourth and fifteenth century C.E., according to subtitle. May be repeated under a different subtitle to a maximum of six credits. Prereq: A-H 105 recommended.

A-H 334 RENAISSANCE ART. (3)
Study of the historical context of the visual arts produced in Europe, particularly in Italy, between 1390-1500, with attention given to aesthetic traditions and principles, cultural functions, economic factors, and institutional practices. Includes examination of the role of patronage, art theory, and the changing status of the artist. Prereq: A-H 106 recommended.

A-H 335 STUDIES IN EARLY MODERN ART, 1500-1700 (SUBTITLE REQUIRED). (3)
Study of the art produced in Europe in one or more of the following contexts: High Renaissance, Venetian Renaissance, 16th century N. European art, Mannerism, and Baroque. May be repeated under a different subtitle to a maximum of six credits. Prereq: A-H 106 recommended.

A-H 339 TOPICS IN EUROPEAN ART 1700-1840. (3)
Study of the historical, aesthetic and philosophical contexts of painting and sculpture produced in Europe between 1700 and 1840. Prereq: A-H 105 or A-H 106 recommended.

A-H 340 EUROPEAN ART 1840-1900: REALISM, IMPRESSIONISM AND POST-IMPRESSIONISM. (3)
Study of the artistic movements of Realism, Impressionism, and Symbolism in Europe between 1804-1900 with focused interdisciplinary attention to their historical context, including institutional practices and aesthetic theory. Prereq: A-H 106 recommended.

A-H 341 20TH CENTURY MODERNISM. (3)
An historical and critical introduction to the development of modernist art practices in Europe and North America from the beginning of the 20th century to the collapse of the modernist paradigm in the 1960s. Works of art from across this span are examined in their private and public contexts. Prereq: A-H 106 recommended.

A-H 342 STUDIES IN AMERICAN ART (SUBTITLE REQUIRED). (3)
Readings, research and discussions in a lecture format on American visual arts in one or more of the following contexts: colonial America, ante-bellum America, the Gilded Age, 20th C. Modernism, the Depression, and America during the Cold War. May be repeated under a different subtitle to a maximum of six credits. 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 415G TOPICAL STUDIES IN ART HISTORY (SUBTITLE REQUIRED). (3)
The study of a single artist or combination of artists in the social, political, and cultural contexts of their day or the study of a particular genre or subject developed over a broader period of history. Classes presented in a lecture format with critical study of texts, research, and discussion components. May be repeated under a different subtitle to a maximum of six credits. Prereq: A-H 105 or A-H 106 recommended.

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 603 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 of objects, period, or artist. May be repeated up to six credits with different subtitles. Prereq: Graduate status in Art History.

A-H 625 PROBLEMS 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 six credits when identified by a different subtitle. Prereq: Graduate standing.

A-H 626 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 six credits when identified by a different subtitle. Prereq: Graduate standing.

A-H 627 INTERDISCIPLINARY APPROACHES TO ART HISTORY: (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, philosophy, classics, political science, anthropology, etc. May be repeated to a maximum of six credits when identified by a different subtitle. Prereq: Graduate standing.

A-H 628 ART HISTORY TOPICAL SEMINAR: (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 to a maximum of six credits when identified by a different subtitle. Prereq: Graduate standing.

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)
Fundamental instruction in digital media as a creative tool. Students will learn the basics of digital collage using Adobe Photoshop or like program, flatbed and slide scanners. Basics of digital video editing and sound design. Nine studio hours per week. Prereq: A-S 102 and 103.

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: THE FUNDAMENTALS. (3)
Students use the basic principles of design to create thumbnails, roughs, and clear, accurate comprehensives which are essential in the problem solving process. Prereq: A-S 102, A-S 103, and A-S 215.

A-S 341 GRAPHIC DESIGN: LAYOUT. (3)
Students prepare professional quality assignments in lettering, pictogram systems, logos, and corporate identity design, line art, and cartoons for advertising illustration, as well as solutions for posters, billboards, folders, storyboards, and cover illustration. Nine studio hours per week. Prereq: A-S 340 (with a grade of B or better) and Portfolio Review.

A-S 345 WEB DESIGN. (3)
An intermediate level course designed to prepare students to create web pages. Emphasis is on creating functional and aesthetic web content within the current design parameters of the internet. Navigation strategies, directory structures and familiarity with networks is stressed. Nine studio hours per week. Prereq: A-S 200 or consent of instructor.

A-S 346 DIGITAL VIDEO. (3)
An intermediate level course in which students learn advanced video compositing methods, image control and key effects in the digital world specific to the Final Cut Pro or like environments. Basic and advanced titling and graphic animation are explored as well as storyboarding, sound design and title effects. This course explores various video editing styles. Work is collaborative and individual. Nine studio hours per week. Prereq: A-S 200 or consent of instructor.

A-S 347 MULTIMEDIA. (3)
An intermediate level course to teach students to author interactive media projects. Emphasis is on creating original, interactive, 2-D animation, time-based projects that are output to CDROM or like media. Previous intermediate level work with Adobe Photoshop or Illustrator is required. Projects will integrate graphics, audio and video. Nine studio hours per week. Prereq: A-S 200 or consent of instructor.

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 385 DIGITAL METHODS FOR PHOTOGRAPHY. (3)**
An intermediate level course designed to help students integrate traditional silver-based photography processes with new digital computer imaging tools such as Adobe Photoshop or like program. Students are required to produce original photographic imagery for use in creating digital artwork output to printed material with inkjet printers. Advanced methods of input and output calibration, as well as advanced methods of image manipulation, are covered. Emphasis is placed on the aesthetics and ethics of digital photographic art and creating meaningful and effective images. Nine studio hours per week. Prereq: A-S 200 and A-S 380.

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 discussions in art. Selection, preparation, and presentation of senior exhibitions and portfolios. To be taken during the student's final semester 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: PUBLICATION DESIGN. (3)
Students develop innovative concepts in advertising layout and design through brochures, direct mailers, magazine and newspaper ads. Contemporary techniques in design and production emphasized. Printing techniques, and paper selection introduced as design elements. Nine studio hours per week. Prereq: A-S 341 (with a grade of B or better) and Portfolio Review.

A-S 541 GRAPHIC DESIGN: ADVANCED DESIGN. (3)
Provides an opportunity for the advanced study of artistic and technical solutions for graphic design problems. Prospecting for employment, working conditions, avenues for advancement, pricing work, and the legal responsibilities of the artist-designer to the client-agency discussed. Students conclude this course with he presentation of a portfolio demonstrating their ability to do quality work which meets the highest professional standards. Nine studio hours per week. Prereq: A-S 540 (with a grade of B or better) and Portfolio Review.

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.

AAD Arts Administration

AAD 101 ARTS ADMINISTRATION PROFESSIONS. (1)
The primary intent of this course is to make students aware of the opportunities open to them in the field of Arts Administration, and to network with other students in the program, faculty, program graduates and working arts administrators. Course activities will include program and announcements regarding the availability of grants and awards. Students will also become aware of employment and volunteer opportunities while they are in school, and how to pursue professional positions upon graduation. Pass/fail only. Majors are required to enroll a minimum of 4 semesters.

AAD 200 ARTS ADMINISTRATION COMMUNICATIONS. (3)
The purpose of this course is to introduce students to the primary writing styles that they will be using throughout the remainder of their arts administration courses. For example, business letters, education and program guides, print and electronic advertisements, publicity materials, sales brochures, invitations and advocacy letters, all require mastering a different writing style. Additionally, students will learn how to make effective public presentations, based upon their writing assignments. Completion of USP English requirements. Prereq: Completion of ENG 104. Enrollment restricted to AAD pre-majors during primary windows.

AAD 202 ARTS ADMINISTRATION TECHNOLOGIES. (3)
The purpose of this course is for students to gain the basic skills to design and produce materials utilized by arts organizations to communicate with their patrons. Additionally, the course will familiarize students with a number of design-related computer applications. Prereq: AAD 200 or consent of the instructor.

AAD 310 MARKETING THE ARTS. (3)
The course will examine methods used by arts organizations to sell admissions to their events and to sell other arts products. Emphasis is placed on marketing concepts related to product, price, placement and promotion. Prereq: Completion of AAD 200, AAD 202 and one of the following: COM 181, COM 287, TA 225, 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: Completion of AAD 200, AAD 202 and one of the following: COM 181, COM 287, TA 225, or consent of the instructor.

AAD 340 ARTS MANAGEMENT ISSUES. (3)
This course examines management issues facing arts organizations in the contemporary environment. Topics covered will include the role of artists and arts organizations in society, the differing motives behind nonprofit and for-profit corporations, freedom of expression and censorship, planning and leadership, intellectual property rights, issues related to race, class, sexuality and gender, plus other topics which may arise based on current events. Prereq: Completion of AAD 200, AAD 202 and one of the following: COM 181, COM 287, TA 225, or consent of the instructor.

AAD 350 FINANCIAL MANAGEMENT OF ARTS ORGANIZATIONS. (3)
This course provides an overview of the financial management practices used primarily by nonprofit arts organizations. It begins by examining the process of contracting an artist and a facility, and then building a budget for the resulting arts event. It then examines how arts organizations establish, track, adjust and evaluate organizational budgets. Additionally it explores governmental financial and reporting requirements unique to nonprofit arts organizations, and the annual audit process. Prereq: Completion of ACC 201, ACC 202, AAD 200, AAD 202 and one of the following: COM 181, COM 287, TA 225, or consent of the instructor.

AAD 399 ARTS ADMINISTRATION PRACTICUM. (1)
Under the supervision of a faculty member, students complete on-campus arts administration service projects. At least one of the two projects must be in service to the student's primary art discipline's department or school. Examples of projects might include conducting a publicity campaign for an event, working on a fundraiser, producing a publication, conducting research, updating a website, etc. Pass/fail option only. Learning contract required. Prereq: Arts Administration major or consent of instructor.

AAD 402 TOPICS IN ARTS ADMINISTRATION (SUBTITLE REQUIRED). (3)
A seminar which covers special topics in arts administration. May be repeated to a maximum of 12 credits when identified by different subtitles. Prereq: Completion of AAD 200, AAD 202 and one of the following: COM 181, COM 287, TA 225, 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. Pass/fail only. Prereq: Completion of AAD 200, AAD 202 and one of the following: COM 181, COM 287, TA 225, or consent of instructor.

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 235 INEQUALITIES IN SOCIETY. (3)**
Analysis of the social origins, development, and persistence of inequality in various societies. Prereq: SOC 101 or RSO 102. (Same as SOC 235.)

AAS 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. (Same as HIS 254.)

AAS 260 AFRICAN 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. (Same as HIS 260.)

AAS 261 AFRICAN 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. (Same as HIS 261.)

AAS 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. (Same as FR 263.)

AAS 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). (Same as ENG 264.)

AAS 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. (Same as MUS 300.)

AAS 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. (Same as GEO 328.)

AAS 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. (Same as GEO 336.)

AAS 360 RACE AND SPORTS IN AMERICA. (3)
This reading seminar examines the history of race and sport in America. (Same as HIS 360.)

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.

AAS 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. (Same as PS 417G.)

AAS 420 AFRICAN-AMERICAN RELIGIOUS EXPERIENCE. (3)
This course explores and examines how African Americans shaped and fashioned their religion to meet their own peculiar needs as they responded to historical occurrences.

AAS 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 220, or consent of instructor. (Same as ANT 431G.)

AAS 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.

#AAS 433 TOPICS IN SOCIAL INEQUALITIES (SUBTITLE REQUIRED). (3)
A sociological study of topics relevant to social inequalities and stratification. May be repeated under different subtitles to a maximum of six credits. Prereq: SOC 101 or RSO 102; SOC 235; and either SOC 302 or 304. (Same as SOC 433.)

AAS 471 RACE, ETHNICITY AND POLITICS. (3)
An examination of the role that race and ethnicity play in the political arena. Students will explore the nature of race, racism, and ethnocentrism, as well as their impact on political institutions and public policy. Particular attention will be given to elections, public opinion, mass media and social movements in the United States. (Same as PS 471.)

AAS 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. (Same as SW 523.)

***AAS 535 ADVANCED TOPICS IN SOCIAL INEQUALITIES (SUBTITLE REQUIRED). (3)**
A sociological study of topics relevant to social inequalities and stratification. May be repeated to a maximum of six credits under different subtitles. Prereq: Sociology senior major; Sociology or African American Studies senior minor; graduate student status; or consent of instructor. (Same as SOC 535.)

AAS 550 EDUCATION IN A CULTURALLY DIVERSE SOCIETY. (3)
This course assists future educators in developing strategies to create an equitable teaching/learning environment where all students are validated, stimulated, and nurtured. Course participants explore the rationale for their current belief systems and perceptions of other cultures; investigate how and why their personal attitudes, behaviors, and expectations affect the academic and social development of children and youth, and examine contemporary educational issues. (Same as EDC 550.)

AAS 616 MULTICULTURAL PSYCHOLOGY. (3)
This course is designed to increase one's sensitivity to and respect for individual differences. Models, frameworks, techniques and experiential exercises are presented to increase one's skill level in working with persons from racially and ethnically diverse backgrounds. Prereq: EDP 600 or equivalent or consent of instructor. (Same as EDP 616.)

AAS 635 SEMINAR IN SOCIAL INEQUALITIES. (3)
This course provides a graduate-level introduction to sociological theory and research on social inequalities and stratification. It includes both classic and contemporary works on topics such as political economy, the state, domination, democracy, work, poverty, welfare, resistance, class, race, ethnicities, and gender. The course serves as a foundational course for graduate students with interests in social inequalities, and is required for Sociology graduate students seeking a specialization in this area. Prereq: SOC 650 or SOC 651 or consent of instructor. (Same as SOC 635.)

AAS 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. (Same as HIS 654.)

AAS 656 BLACK AMERICAN LITERATURE. (3)
An in-depth study of black American literature, with concentration on major texts by major black writers. (Same as ENG 656.)

AAS 657 RACE RELATIONS IN THE UNITED STATES. (3)
This seminar focuses on the African American experience in the United States from Reconstruction to the present. Using primary documents and secondary readings, this course will examine the construction of race relations and the individuals, organizations, events, and issues significant to the shaping of the black experience. (Same as HIS 657.)

AAS 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. (Same as SW 720.)

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 301 WRITING AND PRESENTATIONS IN THE LIFE SCIENCES. (2)
The goals of this course are to expose students to current scientific literature in the life sciences, develop skills for the evaluation of primary research literature and presentations, prepare students to write an independent research proposal, and develop oral communication skills. Student participation is a key component of activities, and students are required to provide both oral and written evaluations of research publications, presentations, and proposals. A major part of the course involves students developing, writing, and presenting an independent research proposal in coordination with a research mentor. This course should be taken prior to ABT 395 or ABT 399, and students must identify a research mentor early during the semester. Prereq: Agricultural Biotechnology major or consent of instructor.

ABT 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.)

ABT 361 GENETICS LAB ONLINE. (1)
Analysis and interpretation of genetics problems using interactive computer programs. Prereq: ABT/ASC/ENT 360 (should be taken concurrently).

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 460 INTRODUCTION TO MOLECULAR GENETICS. (3)
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 genome replication, prokaryotic and eukaryotic transcription, and translation of DNA, as well as RNA processing, recombination and the theoretical underpinnings of genetic engineering. Prereq: ABT/ASC/ENT 360 or BIO 304 or consent of instructor. (Same as ENT 460.)

ABT 461 INTRODUCTION TO POPULATION GENETICS. (3)
This survey course examines the population dynamics and equlibria 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: ABT 360 (or equivalent) and one course in probability/statistics. (Same as BIO/ENT/FOR 461.)

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. Prereq: ACC 201 or BE 161 and BE 162.

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. Not open to Accounting majors. 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 211 (may be taken as a corequisite) and a grade of C or better in ACC 201 and 202.

ACC 302 INTERMEDIATE ACCOUNTING II. (3)
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. Prereq: ACC 301.

***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 211 (may be taken as a co-requisite) and a grade of C or better in ACC 201 and 202.

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 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.

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 418 COST MANAGEMENT. (3)
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. Prereq: A grade of C or better in ACC 201, ACC 202, and ACC 211.

ACC 490 SPECIAL TOPICS IN ACCOUNTING: (SUBTITLE REQUIRED). (3)
Readings, projects, lecture, and/or discussion to illuminate current topics of special interest or concern in accounting. 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 three times under the ACC 490 number. Prereq: Consent of instructor.

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 418.

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 600 INQUIRY, COMMUNICATION, AND LEADERSHIP IN ACCOUNTING. (3)
This course is designed to develop the inquiry, communication, and leadership skills that are key determinants of success for many not-for-profit, business, and accounting professionals. The course uses readings, in-class exercises, case analyses, small group work, and oral presentations as vehicles for developing these skills. Class modules focus on accounting relevant professional inquiry, oral persuasion, communication, leadership, and teambuilding skills. Class sessions will include participation by and leadership from business, not-for-profit, and accounting professionals. Prereq: Admission to MSACC program, or consent of the Director of Graduate Studies.

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: Admission to MSACC program, or consent of the Director of Graduate Studies.

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 403 and admission to MSACC program, or consent of the Director of Graduate Studies.

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 617 SELECTED TOPICS IN TAXATION. (3)
A study of selected topics in taxation, including tax research, advanced individual tax matters, and other tax topics. Prereq: ACC 507 and admission to MSACC program, or consent of the Director of Graduate Studies.

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 621 UNDERSTANDING FINANCIAL STATEMENTS. (3)
Financial statements communicate information about a business and its operations. Students will gain an understanding of the information being communicated (or not communicated) by the business entity. Emphasis is on the uses of information, rather than its preparation. Prereq: Admission to MSACC program or consent of DGS.

ACC 624 ENTERPRISE INFORMATION AND CONTROL SYSTEMS. (3)
The course simultaneously examines two issues related to enterprise information systems development: 1) methodologies for designing and implementing information systems, and 2) assessment of enterprise risk and internal control systems. Case analyses and "real world" projects are used to accomplish the course objectives. Current computer technologies, including relational database systems and internet data processing, are integrated into the course content. Prereq: ACC 324, ACC 403 and admission to MSACC program, or consent of the Director of Graduate Studies.

ACC 627 CORPORATE TAXATION. (3)
A detailed study of income taxation of corporations and shareholders. Prereq: ACC 507 and admission to MSACC program, or consent of the Director of Graduate Studies.

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 in the MBA program, ACC 202 or its equivalent and MA 123 or its equivalent. Course credit will not be given to students in the MSACC program.

ACC 637 TAXATION OF FLOW-THROUGH ENTITIES. (3)
A detailed study of the income taxation of flow-through entities, including Partnerships, S corporations, and limited liability companies. Prereq: ACC 507 and admission to MSACC program, or consent of the Director of Graduate Studies.

ACC 647 MULTIJURISDICTIONAL TAXATION. (3)
A study of the taxation of taxpayers located in two or more tax jurisdictions. The course involves two major categories, international taxation and state and local taxation. Prereq: ACC 507 and admission to MSACC program, or consent of the Director of Graduate Studies.

ACC 691 ADVANCED TOPICS IN ACCOUNTING (SUBTITLE REQUIRED). (3)
Readings, projects, lecture, and/or discussion to illuminate current topics of special interest or concern in accounting. May not be repeated under the same title. A particular topic may be offered at most three times under the ACC 691 number. Prereq: Admission to MSACC program or consent of DGS.

ACC 700 TOPICAL SEMINAR IN ACCOUNTING RESEARCH (SUBTITLE REQUIRED). (1-3)
An advanced seminar on selected topics such as cross-disciplinary research on behavioral decision-making, research using archival data, and analytical models in accounting. May be repeated to a maximum of eighteen credits. Prereq: Doctoral student status in business administration.

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 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. Students who have completed ECO 201 are not eligible to take AEC 101 without the consent of the instructor.

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 AEC 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: AEC 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: 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: ECO 201 and MA 113 or 123.

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: AEC 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: 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: AEC 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 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 316 COOPERATIVE MANAGEMENT AND MARKETING. (1)
This course provides knowledge about the unique features of cooperatives and their role in a market economy and examines the structure organization, finance, management, and operations of cooperative organizations. Prereq: AEC 305.

AEC 317 MARKETING HORTICULTURAL PRODUCTS. (1)
This course examines the market structure and institutions associated with horticultural and nursery product markets within the context of formulating and evaluating alternative, firm-specific marketing strategies. Prereq: AEC 305.

AEC 320 AGRICULTURE PRODUCT MARKETING AND SALES. (3)
This course examines marketing activities within the U.S. food system. Sector performance is considered as well as the competitive behavior of firms within various agricultural market channels. Firm level marketing principles, methods, and strategies are considered, with a special focus on developing effective sales programs for agricultural products. 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: AEC 101.

AEC 399 EXPERIENTIAL LEARNING IN AGRICULTURAL ECONOMICS. (1-6)
A field or community-based experience in the application of economics to agricultural or rural problems. May be repeated; a maximum of six credits allowed. Pass-fail only. Credit not available for the Agricultural Economics Major Requirements. Prereq: AEC 101, nine hours in agricultural economics or economics, and permission of instructor, department chairperson, and completion of learning agreement prior to registration.

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, FIN 300, MGT 301, MKT 300, and senior standing in Agricultural Economics.

AEC 424 PRINCIPLES OF ENVIRONMENTAL LAW. (2)
Provides a basic knowledge of the principles of United States environmental law. Addresses the framework of the American Legal system as it applies to environmental regulation. Covers the sources of environmental law and reviews major federal environmental statutes and judicial decisions addressing specific issues. Prereq: AEC 101.

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: 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 TRADE. (3)**
This is advanced economic course in international trade. The first part of the course covers the basics of why countries trade, what explains the pattern of trade that we observe and what are the effects of trade on welfare and the distribution of income. The second part of the course covers issues concerning trade policy and looks at the positive and normative effects of trade policy and trade agreements as well as investigating topics of current interest. While the focus of the course is on theory, students will also be exposed to many applications of the theory as a means of both explaining the economic intuition and encouraging students to analyze the world around them from an economic perspective. Prereq: ECO 401 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 401 or equivalent. Agricultural Economics majors may substitute AEC 303 for this prerequisite. (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 490 QUANTITATIVE METHODS AND PRICE ANALYSIS. (3)
An integration of current issues in Agricultural Economics with oral and written communications, problem solving, and research. Major emphasis is on a senior paper and oral presentation. Prereq: AEC 302, 303, 305, ECO 391 and senior standing in Agricultural Economics.

AEC 510 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 and ECO 401.

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 545 RESOURCE AND ENVIRONMENTAL ECONOMICS. (3)
This course builds on the principles of economics to analyze the problems in achieving an efficient allocation of resources. It provides the theoretical concepts for evaluating environmental policies and the tools necessary in the application of benefit/cost analysis. Prereq: ECO 201. (Same as NRC 545.)

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, director of undergraduate or graduate studies and completion of a proposed plan of learning objectives and outcomes prior to registration.

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 401 and 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 macroeconomic linkages to marketing. Prereq or concur: AEC 590 and ECO 601.

AEC 610 INTERNATIONAL TRADE IN AGRICULTURAL PRODUCTS. (3)
This course analytically examines current empirical research in the area of agricultural trade. Prereq: ECO 601, 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 601.

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 391 and STA 291.

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 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 601.

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 601.

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 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 601.

AEC 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 FOR 662.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 790 RESEARCH WORK IN AGRICULTURE ECONOMICS. (3-9)
Independent research under the direction of a faculty members and the Director of Graduate Studies. Prereq: Successful completion of written portion of AEC qualifying exam and permission of Director of Graduate Studies.

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 110 INTRODUCTION TO CAREER AND TECHNICAL EDUCATION. (3)**
The history, status, philosophy, and objectives of career and technical education in relation to general education. (Same as FCS 110.)

***AED 362 FIELD EXPERIENCES IN CAREER AND TECHNICAL EDUCATION. (3)**
Supervised experiences in schools and other agencies. Required of all Career and Technical Education majors. Includes observation, participation, experience, field trips, inspection of programs, and professional organizations. Prereq: Majors only. (Same as FCS 362.)

#AED 371 ADVISING A CAREER AND TECHNICAL STUDENT ORGANIZATION. (3)
This course is designed to assist students in developing skills and competencies needed to plan, implement, advise, and evaluate a Career and Technical Student Organization as part of the total CTE program. (Same as FCS 371.)

***AED 435 DESIGNING CURRICULUM AND ASSESSMENT IN CAREER AND TECHNICAL EDUCATION. (3)**
Instructional methodology course focused on analyzing the principles of learning and teaching and designing curriculum and instruction for teaching subjects in formal and informal settings. (Same as FCS 435.)

AED 535 PRINCIPLES AND PHILOSOPHY OF CAREER AND TECHNICAL EDUCATION. (3)
Study is made of philosophy, accepted principles, and legislation affecting programs in vocational education. (Same as FCS 535.)

***AED 580 FOUNDATIONS OF TEACHING CAREER AND TECHNICAL EDUCATION. (3)**
Course focuses on the foundation of teacher development including: effective teacher characteristics, principles of teaching and learning, and preparation of lesson plans. Prereq: Admission into the Teacher Education Program. (Same as FCS 580.)

***AED 586 METHODS OF TEACHING CAREER AND TECHNICAL EDUCATION. (3)**
Development of teaching competencies with emphasis on: discussion, demonstration, problem-solving, cooperative learning, service learning methods. Prereq: Admission into the Teacher Education Program and AED/FCS 580. (Same as FCS 586.)

***AED 590 TEACHING EXPERIENCE IN CAREER AND TECHNICAL EDUCATION. (12)**
Supervised experience in teaching Career and Technical Education. Requires observation, lesson plan development, and incorporation of effective teaching methods and strategies. Regularly scheduled seminars included as an integral part of course. Prereq: Admission into the Teacher Education Program and successful completion of AED/FCS 580 and AED/FCS 586. (Same as FCS 590.)

AED 670 ADVANCED METHODS IN TEACHING CAREER AND TECHNICAL EDUCATION. (3)
The principles of method applied to teaching in the field of career and technical education. Prereq: Experience in teaching vocational education. (Same as FCS 670.)

AED 671 YOUTH ORGANIZATIONS IN CAREER AND TECHNICAL EDUCATION. (3)
A study of the underlying philosophy and principles for organizing and advising youth organizations in career and technical education. Emphasis on activities that will enrich and motivate the instructional programs, and develop leadership, cooperation and citizenship. (Same as FCS 671.)

AED 679 ADULT EDUCATION IN CAREER AND TECHNICAL EDUCATION. (3)
Preparation for teaching adult classes in career and technical education including organization of classes, development of curriculum, and methods of teaching. (Same as FCS 679.)

#AED 682 RESEARCH METHODS. (4)
Research methods and skills for communicators, educators, and leadership development programs. Topics include design and analysis, data gathering techniques, assessment tools, and issues such as the politics of information. (Same as CLD/FCS 682.)

AED 684 CURRENT TRENDS IN CAREER AND TECHNICAL EDUCATION. (3)
Class work in current trends and significant developments in career and technical education. May be repeated to a maximum of nine credits. (Same as FCS 684.)

AED 686 EVALUATION AND ASSESSMENT IN CAREER AND TECHNICAL EDUCATION. (3)
A course to acquaint teachers of career and technical education with techniques used in measuring attainment in career and technical education in middle and high school, college, and adult education. (Same as FCS 686.)

AED 693 SUPERVISION IN CAREER AND TECHNICAL EDUCATION. (3)
This course includes practice in teaching for observation by others, student teaching, and school visiting. (Same as FCS 693.)

AED 694 THE ADMINISTRATION OF CAREER AND TECHNICAL EDUCATION. (3)
A course designed for superintendents, high school principals, and other administrators. Its purpose is to prepare administrators and supervisors for leadership in career and technical education. (Same as FCS 694/EDA 694.)

AED 695 SPECIAL PROBLEMS IN CAREER AND TECHNICAL EDUCATION. (3)
An independent work course for students interested in career and technical education. Students make individual investigations and report on special problems. (Same as FCS 695.)

AED 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. (Same as FCS 748.)

AED 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)
May be repeated to a maximum of 12 hours. (Same as FCS 768.)

AED 779 SEMINAR IN CAREER AND TECHNICAL EDUCATION. (1-3)
A critical study of selected problems in career and technical education. May be repeated to a maximum of nine credits. (Same as FCS 779.)

AED 789 INDEPENDENT WORK IN CAREER AND TECHNICAL 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 career and technical education. May be repeated to a maximum of nine credits. (Same as FCS 789.)

AED 799 RESEARCH IN CAREER AND TECHNICAL EDUCATION. (1-3)
Individual research of importance to career and technical education. May be repeated to a maximum of nine credits. (Same as FCS 799.)

AEN Agricultural Engineering

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 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 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 physics and mathematics requirement in Food Science curriculum.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

AFS Air Force Studies

AFS 111 AEROSPACE STUDIES I. (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.

AFS 112 LEADERSHIP LABORATORY I. (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. Coreq: AFS 111.

AFS 113 AEROSPACE STUDIES I. (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. Prereq: AFS 111.

AFS 114 LEADERSHIP LABORATORY I. (1)
A continuation of AFS 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. Coreq: AFS 113.

AFS 211 AEROSPACE STUDIES II. (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: AFS 111, 113 or PAS approval.

AFS 212 LEADERSHIP LABORATORY II. (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. Coreq: AFS 211.

AFS 213 AEROSPACE STUDIES II. (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: AFS 111, 113 or PAS approval.

AFS 214 LEADERSHIP LABORATORY II. (1)
A continuation of AFS 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. Coreq: AFS 213.

AFS 311 AEROSPACE STUDIES III. (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.

AFS 312 LEADERSHIP LABORATORY IIIA. (1)
A course designed and focused on developing advanced leadership skills. Students fill the mid-level management function within the cadet corps. The course involves the planning and controlling of military activities of the cadet corps, and the preparation and presentation of briefings and other written and oral communications. Pass/Fail only. Coreq: AFS 311.

AFS 313 AEROSPACE STUDIES III. (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: AFS 311.

AFS 314 LEADERSHIP LABORATORY III. (1)
Laboratory to accompany AFS 313. Pass/fail only. Coreq: AFS 313.

AFS 395 INDEPENDENT AEROSPACE STUDIES. (2-6)
A study of an advanced problem on a subject area in aeronautical science under the guidance of a departmental staff member. One discussion per week; term paper is required. May not be repeated. Prereq: Senior standing in the AFROTC Program, and 3.0 standing in Aerospace Studies.

AFS 411 AEROSPACE STUDIES IVA. (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: AFS 313, or approval of PAS.

AFS 412 LEADERSHIP LABORATORY IVA. (1)
A course designed and focused on developing advanced leadership skills. Students fill the top level management function within the cadet corps. The course involves the planning and controlling of military activities of the cadet corps, and the preparation and presentation of briefings and other written and oral communications. The lab also includes practice of leadership techniques aimed at motivating and instructing cadets in the lower three levels. Pass/Fail only. Laboratory, two hours per week. Coreq: AFS 411.

AFS 413 AEROSPACE STUDIES IVB. (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: AFS 411 or approval of PAS.

AFS 414 LEADERSHIP LABORATORY IVB. (1)
A continuation of AFS 412. A course designed and focused on developing advanced leadership skills. Students fill the top level management function within the cadet corps. The course involves the planning and controlling of military activities of the cadet corps, and the preparation and presentation of briefings and other written and oral communications. The lab also includes practice of leadership techniques aimed at motivating and instructing cadets in the lower three levels. Pass/Fail only. Laboratory, two hours per week. Coreq: AFS 413.

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. (Same as CLM 840.)

AIS Arabic and Islamic Studies

AIS 101 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.

AIS 102 ELEMENTARY MODERN STANDARD ARABIC. (4)
Continuation of AIS 101. Prereq: AIS 101.

AIS 201 INTERMEDIATE MODERN STANDARD ARABIC. (3)
A continuation of AIS 102, stressing comprehension of written and oral material, the ability to read Arabic aloud and to compose written material, and the ability to speak. Prereq: AIS 102.

AIS 202 INTERMEDIATE MODERN STANDARD ARABIC. (3)
A continuation of AIS 201, stressing comprehension of written and oral material, the ability to read Arabic aloud and to compose written material, and the ability to speak. Prereq: AIS 201.

#AIS 301 COLLOQUIAL ARABIC I. (3)
Provides advanced skills in developing linguistic and communicative skills in colloquial Arabic based on Egyptian Arabic that is widely understood throughout the Arab world. Introduces aspects of Egyptian cultural life. Designed for those who have some experience with Standard Arabic. Prereq: AIS 202 or consent of instructor.

#AIS 302 COLLOQUIAL ARABIC II. (3)
A continuation of AIS 301. Prereq: AIS 301 or consent of instructor.

AIS 328 ISLAMIC CIVILIZATION I. (3)
The rise of Islam and its classical development.

AIS 330 ISLAMIC CIVILIZATION II. (3)
The Islamic world's response to westernization and the resultant reassertion of its cultural role in the modern world.

AIS 331 CLASSICAL ARABIC LITERATURE (IN ENGLISH). (3)
Reading from some of the major works of Arabic literature (poetry and prose) of the 6th-14th centuries which are an integral part of the Arab cultural heritage, e.g., the Mu'allaqat, Koran, Ibn Ishaq's Sirah; al-Tabari's Ta'rikh; Abu'l Faraj's Kitab al-Aghani; al-Ghazzali's Ihya; al-Hariri's Maqamat; and Ibn Khaldun's Muqaddimah.

AIS 338 WOMEN AND ISLAM. (3)
A survey of women's issues related to Islam and contemporary Muslim culture including the perception of women in Islam, the role and rights of women in Islam, female circumcision, honor killing women's dress. The course will discuss the viewpoints of the Muslim traditionalists, modernists, western feminists and the emerging Islamic feminists.

AIS 340 FUNDAMENTALISM AND REFORM IN ISLAM. (3)
This course focuses on the revival of Islam in the 20th century and the various responses of Islam to modernism and western political and intellectual domination. Particular attention will be given to the rise of militant Islam and the terrorist attacks of 9/11. The original writings of major thinkers will be read and discussed.

AIS 395 INDEPENDENT WORK IN ARABIC/ISLAMIC STUDIES. (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.)

AIS 435 TOPICS IN ISLAMIC STUDIES (SUBTITLE REQUIRED). (3)
Variable in content, this course focuses on important texts and issues in Islamic history, religion, literature, and philosophy. May be repeated to a maximum of six credits under different subtitles.

AIS 440 INTRODUCTION TO THE QURAN. (3)
An introduction to the disciplines of knowledge related to the Quran, its major themes, style of presentation, and relevance to contemporary societies and issues.

AIS 442 ARABIC READING I. (3)
Advanced skills in speaking, reading, and analyzing selected texts from traditional and modern Arabic literature using formal spoken and written Arabic. Introduction to the use of Arabic computer software. Prereq: AIS 202 or equivalent.

AIS 443 ARABIC READING II. (3)
Continuation of AIS 442 with emphasis on Modern Arabic Short Stories. Prereq: AIS 442 or equivalent.

AIS 495G ADVANCED INDEPENDENT WORK IN ARABIC/ISLAMIC 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 AIS 395 and 495G.

AMS American Military Studies

BASIC COURSES

AMS 101 INTRODUCTION TO THE ARMY. (2)
This introductory level course is designed to give students an appreciation for the role the Army currently plays in our society. The course covers the history of the Army and the roles and relationships of the Army within our society. The course also covers some of the basic skills necessary for today's leaders to include oral presentation, time management, map reading, basic rifle marksmanship and squad tactics.

AMS 102 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.

AMS 201 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.

AMS 202 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.

AMS 211 ADVANCED LEADERSHIP I. (2)
This course focuses on both theoretical and practical aspects of leadership. Students will examine topics such as written and oral communication, effective listening, assertiveness, personality, adult development, motivation, and organizational culture and change. Prereq: AMS 101 and 102, or consent of instructor.

AMS 212 ADVANCED LEADERSHIP II. (2)
This course focuses principally on officership, providing an extensive examination of the unique purpose, roles, and obligations of commissioned officers. It includes a detailed investigation of the origin or our institutional values and their practical application in decision making and leadership. Prereq: AMS 101, 102 and 211, or consent of the instructor.

AMS 250 BASIC MILITARY SCIENCE LAB. (1)
A hands-on practicum which exposes the student to the military skills required for basic technical and tactical competence to enter the Advanced Course. Laboratory, two hours per week and two week-end exercises. May be repeated to a maximum of four credits.

ADVANCED COURSES

AMS 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: AMS 101, 102 graduate or undergraduate student (male or female), successful completion of basic course or basic camp, physically fit to pursue program; consent of PMS.

AMS 302 ADVANCED TACTICS. (3)
Small unit tactics and communications, organization and mission of combat arms units; leadership and the exercise of command. Prereq: AMS 101, 102, graduate or undergraduate student (male or female), successful completion of basic course or basic camp, physically fit to pursue program; consent of PMS.

AMS 320 ADVANCED STUDIES IN AMERICAN MILITARY HISTORY. (3)
This course will furnish upper level UK ROTC Cadets, and qualified History majors or minors with the methodological tools and materials needed to gain a more detailed understanding of American Military History and to put together a major research paper. AMS/HIS 320 will emphasize basic research skills: understanding historiographical debates within a military framework, developing effective note taking, outlining techniques, picking a feasible research topic, finding useful primary sources and drawing inferences from them, examining American military campaigns and leaders in order to complete a battle analysis, and short research assignments. Prereq: Consent of instructor (Same as HIS 320.)

AMS 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: AMS 301, 302.

AMS 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: AMS 301, 302.

AMS 350 ADVANCED MILITARY SCIENCE LAB. (1)
A hands-on practicum which exposes the student to the military skills required for advanced technical and tactical competence as an Army officer. The course affords junior and senior cadets opportunities to develop and refine their leadership style and abilities under differing constraints and environments. Laboratory, two hours per week and two weekend exercises. May be repeated to a maximum of four credits. Prereq: AMS 250, AMS 101, AMS 201 and AMS 202. Concurrent: AMS 301, 302, 341 or 342.

AMS 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 AMS 302 and approval of PMS.

ANA Anatomy and Neurobiology

ANA 109 ANATOMY AND PHYSIOLOGY FOR NURSING I. (3)
Basic anatomy and physiology integrated to prepare freshman students for nursing.

ANA 110 ANATOMY AND PHYSIOLOGY FOR NURSING II. (3)
Basic anatomy and physiology integrated to prepare freshman students for nursing. Prereq: Successful completion of ANA 109.

ANA 209 PRINCIPLES OF HUMAN ANATOMY. (3)
The structure of the human body will be examined at various levels: cellular, tissues and organ systems. The gross anatomical arrangement of the body will be studied in a system-by-system format relating structure to function and the fundamentals of human embryology/malformation with adult anatomy. The central nervous system will be emphasized. Prereq: Introductory 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 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 516 SELECTED TOPICS IN ADVANCED NEUROSCIENCE. (3)
ANA 516 will cover advanced topics in neuroscience. Topics include: neural pathways, development, neuroanatomy, neurobiochemistry, neuropharmacology, neural imaging and molecular neuroscience. Laboratory experiences will be used to complement lectures. Prereq: ANA 511, 512, 513; PGY 511; and enrollment in the College of Medicine or a graduate program in the bio-medical sciences. In addition, students from graduate programs outside of anatomy must obtain the consent of the course director before registration.

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 GROSS ANATOMY AND NEUROANATOMY. (6)
Study of human gross anatomy and neuroanatomy, with a particular emphasis on functional anatomy and neuroanatomy of the head and neck. Lecture/laboratory course, with dissection being an essential component of the laboratory portion. 140 hours. Prereq: Admission to the College of Dentistry or some background in biology and consent of instructor. (Same as OBI 815.)

ANA 536 HUMAN EMBRYOLOGY, AN ABBREVIATED COURSE. (2)
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 611 REGIONAL HUMAN ANATOMY. (5)
Functional human anatomy covering all regions of the body utilizing dissection techniques with an emphasis on cross-sectional anatomy and normal morphology. Lecture, four hours; laboratory, four hours per week. Prereq: Enrollment in the PAS Program of the College of Allied Health or a graduate program in the biomedical sciences (by consent of course director only).

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/PGY 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 625 INTRODUCTION TO FUNCTIONAL MRI. (1)
Hands-on course for practitioners interested in acquiring functional MRI technique(s) as a research tool. Prereq: (1) Introductory statistics (e.g. PSY 610, STA 503, STA 570). (2) Permission of instructor.

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 660 BIOLOGY OF REPRODUCTION. (3)
Advanced study of current topics in reproductive biology. The course is comprised equally of student-led discussions and lectures given by faculty with research expertise in selected topics. Readings will be taken from current and classic literature. Topics covered include (but are not limited to) molecular and cellular endocrinology, hormone receptors and mechanism of action, reproductive neuroendocrinology, reproductive behavior, gametogenesis, fertilization, sexual differentiation, puberty, menopause and environmental effects on reproduction. Emphasis will be placed on the analysis and understanding of the experimental basis for current concepts in reproductive biology. Prereq: ASC/PGY 601 and ASC 364 or BIO/PGY 502 or consent of instructor. (Same as ASC 660 and PGY 660).

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 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. (Same as GRN/PGY/PHA 710.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 the PT program of the College of Allied Health Professions.

ANA 812 HUMAN STRUCTURE/ CELL AND TISSUE BIOLOGY. (4)
The organization of cells, tissues and organs is presented in lectures and in the laboratory through the study of in vivo materials, histological sections and electron microscopic illustrations with focus on the correlation of structure and function. Small group discussions on select topics supplement full classroom work. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year). (Same as MD 812.)

ANA 814 HUMAN STRUCTURE/GROSS ANATOMY. (6)
The course consists of lecture, small group, laboratory, and palpation exercises that provide a basic understanding of anatomical principles, organization and development. Anatomical structures are introduced as a basis for future functional correlates and principles are taught via laboratory discussions, prosections, disections, films and skeletal materials. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year). (Same as MD 814.)

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 ELECTIVE:

ANA 850 APPLIED HUMAN ANATOMY

ANS Anesthesiology

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 ANESTHESIOLOGY

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 101 INTRODUCTION TO ANTHROPOLOGY. (3)
This course introduces the student to the study of human cultures, past and present. It offers a comprehensive introduction to anthropology, emphasizing the concepts and methods of the major sub-fields, i.e., cultural, biological, archaeology, and linguistics.

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 CULTURAL DIVERSITY IN THE MODERN WORLD. (3)
Directed at non-majors, this course is intended to introduce the student to the diversity of human cultural experience in the contemporary world. Goals of the course include gaining an appreciation for the common humanity and uniqueness of all cultures; to gain a sensitivity toward stereotypes and ethnocentrism, and to understand the distinctions between "race," ethnicity and racism. The course features extended descriptions of the cultural dynamics of the culture(s) with which the instructor has worked.

ANT 220 INTRODUCTION TO CULTURAL ANTHROPOLOGY. (3)
The study of the lifeways and beliefs of different peoples. The objectives of the course are to foster an appreciation for the variety of cultural traditions found throughout the world, and to introduce students to anthropological concepts and methods of inquiry.

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 230 INTRODUCTION TO PHYSICAL ANTHROPOLOGY. (3)
This course explores the ways in which biology, the environment and culture come together to form the human condition. Topics include human genetics, human evolution, primate behavior, contemporary human variation and applied biological anthropology, including forensics, child growth and human nutrition. This course includes a laboratory component.

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 origins and growth of ancient peoples of the Americas as revealed by archaeological data.

ANT 245 FOOD CULTURE AND SOCIETY. (3)
This course is designed for students in anthropology, food and nutrition, agriculture and environmental studies. It explores food in terms of human food systems. Human food systems include the knowledge, values, and practices used to produce, distribute, process, exchange and consume food. These are embedded in culture and operate within societies. Thus, why we eat, what we eat, when, where and with whom we eat, how and where we obtain our food, how we prepare it, and distribute it in specific ways may vary as a function of the culture in which we live, our place of residence and our location within society. We will explore these issues through the lectures, readings, videos and discussions to gain a better understanding of the complexity of food-related behaviors among people around the world.

ANT 301 HISTORY OF ANTHROPOLOGICAL THEORY. (3)
The purpose of this course is to acquaint the undergraduate student with the history of the development of anthropological ideas from their precursors in thought about human nature and behavior beginning with ethnographic and philosophical literature from Greek and Roman civilization, and ending with discussion of current emphases in anthropological theory. The course will provide anthropology majors with the foundations they need to master this area of disciplinary knowledge. Prereq: ANT 220.

ANT 319 HISTORICAL LINGUISTICS. (3)
Students in this course will study a variety of topics related to the topic of language change: the reconstruction of linguistic systems; language classification; comparative linguistics; the temporal, spatial, and social context of language change. Prereq: ENG/LIN 211, or ENG 414G, or equivalent. (Same as LIN 319.)

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 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. (Same as JPN 321.)

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 101 or 220.

ANT 324 CONTEMPORARY LATIN AMERICAN CULTURES. (3)
This course is a detailed survey of societies and cultures of contemporary Latin America, utilizing contributions from anthropological research. Prereq: Introductory social science course.

ANT 327 CULTURE AND SOCIETIES 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 humans. The evidence for the evolution of humans and their primate relatives will be studied, with attention paid to alternate interpretations of the data. Prereq: ANT 230 or BIO 150.

ANT 333 CONTEMPORARY HUMAN VARIATION. (3)
This course focuses on human variation resulting from adaptation to a wide range of environments and the stresses inherent in each. It explores how humans respond/have responded to natural stresses, e.g., cold, heat, aridity and altitude, and human-made stresses, e.g., poverty, malnutrition and chemical pollution. Prereq: ANT 230.

ANT 340 DEVELOPMENT AND CHANGE IN THE THIRD WORLD. (3)
This course introduces the student to how anthropologists approach the study and practice of economic development. It explores cross-culturally how local populations have responded to development; the different topics of development anthropology, such as agriculture and rural development; and the ways anthropological knowledge is applied in addressing development problems.

ANT 342 NORTH AMERICAN ARCHAEOLOGY. (3)
This course focuses on the origin and growth of prehistoric American Indian cultures north of Mexico as revealed by archaeological data. Prereq: ANT 240 or permission of instructor.

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 220 and ANT 230, or consent of instructor.

ANT 375 ECOLOGY AND SOCIAL PRACTICE. (3)
This course provides a broad survey of theoretical and historical issues in the link between humans and their environment. Throughout the semester, students will read about and discuss the many ways humans interact with their physical surroundings. Students will examine human cultural adaptation to different ecological settings, with an overall concern of finding general principles that apply to the many human lifestyles on the planet.

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 220, WS minor, or consent of instructor.

ANT 429 SURVEY OF MEDICAL ANTHROPOLOGY. (3)
This course provides a survey of health, disease, and healing in non-Western and Western societies. An examination of major theoretical perspectives in medical anthropology. Prereq: ANT 220 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 220, or consent of instructor. (Same as AAS 431G.)

ANT 432 ANTHROPOLOGY OF EASTERN EUROPE AND RUSSIA. (3)
An anthropological approach to the cultural, political, and economic experiences of people living under state socialism and through its demise. We ask how everyday life and social relations in this region are being affected by emerging market relations and democracy. Reading include ethnographic studies and the works of essayists, fiction writers, and scholars from the region. Prereq: ANT 160 or ANT 220.

ANT 433 SOCIAL ORGANIZATION. (3)
This course provides an overview of how anthropologists approach the study of social organization. The class will provide historical and conceptual background to the study of social organization, and explore a range of organizational forms from rural households to complex communities. Prereq: ANT 220 or consent of instructor.

ANT 435 CULTURES AND POLITICS OF REPRODUCTION. (3)
This course takes a cross-cultural approach to understanding the ways reproduction and associated phenomena (such as family formations and the social use of technologies) comprise arenas where social relations become created and challenged. Ethnographic case studies will explore cross-cultural constructions of the body (sexuality, anatomy and physiology), parenthood, and kinship relations; and students will examine the ways the state, social movements, legal/medical experts, and lay persons struggle to appropriate reproductive potentials for their own needs. Prereq: ANT 220 or WS 201 or permission of instructor.

ANT 440 ANTHROPOLOGICAL PERSPECTIVES ON CHILD GROWTH. (3)
This course examines basic concepts of child growth and development, the evolutionary pattern of human growth and comparative patterns of human growth across populations. Taking a biocultural approach, it explores the many influences that facilitate or constrain child growth, including poverty, gender ideology, nutrition, and illness, focusing especially on social inequality. Taking a child-centered approach, the course also focuses on the lives of children, how children cope with the circumstances of their lives, and the effect of those circumstances on their well-being. Prereq: ANT 230 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 220, or consent of instructor.

ANT 490 ANTHROPOLOGICAL RESEARCH METHODS. (3)
Introduction to anthropological research methodology and techniques in ethnology, biological anthropology and archaeology. Prereq: Anthropology major, 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 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 532 PRIVATE INTERESTS IN THE PUBLIC DOMAIN: THE COMPARATIVE STUDY OF POLITICS. (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 534 SOCIOLOGY OF APPALACHIA. (3)**
A sociological study of selected social issues facing Appalachian communities, with an emphasis on placing regional political economy, society and culture in a global context. Prereq: Sociology or Anthropology senior major or minor; graduate student status; or consent of instructor. (Same as SOC 534.)

ANT 538 BEYOND ECONOMICS, BEYOND GROWTH: ANTHROPOLOGY'S CRITIQUE OF AN ANTI-SOCIAL "SCIENCE". (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 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 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. Prereq: Nine hours cultural anthropology or archaeology, or consent of instructor.

ANT 545 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. Prereq: ANT 240.

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 220, or consent of instructor.

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 240 and six hours of archaeology or cultural anthropology, or consent of instructor.

ANT 580 ADVANCED 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. Prereq: Consent of instructor.

ANT 581 INDEPENDENT WORK IN ANTHROPOLOGY. (1-4)
May be repeated three times to a maximum of 12 credits. Prereq: Major in anthropology, standing of 3.0 in the department and consent of instructor.

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 THEORIES AND CONCEPTS IN ANTHROPOLOGY. (3)
This course is an intensive examination of the theoretical perspective in anthropology. While attention will be given to the historical foundations of anthropological theory, emphasis will be placed on contemporary concerns in anthropology as illustrated through the contributions of selected theorists. Prereq: Admission to Graduate Program or approval of instructor.

ANT 602 SEMINAR IN CULTURE CHANGE. (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 603 HUMAN BIOLOGY IN CONTEXT OF SOCIOCULTURAL CHANGE. (3)
This course explores the relationship between society, culture, and human biology. Its thematic focus will be how cultural ideologies and social organization play out with respect to the biology of human groups, both archaeological and contemporary populations. We will pay special attention to issues of class, gender and ethnicity and focus on demographic and health-related issues. Current issues in biological anthropology, including critical analysis of evolutionary/adaptation theory and the concept of "race" in contemporary human populations will also be addressed. Prereq: First-year graduate standing in Anthropology, or permission of instructor.

ANT 604 SOCIAL ORGANIZATION. (3)
This course begins with discussion of the major theoretical approaches to the study of social organization, and examines key concepts such as "time," kinship, and gender. A theme emphasized throughout the course is the inherent tension between individual behavior (agency) and social structure. Prereq: Graduate standing in Anthropology.

ANT 607 FOOD RELATED BEHAVIORS. (3)
This team-taught course will provide background in topics and methods in food related behaviors to students in Nutritional Sciences and other interested students. The course will follow a problem-based learning approach, and will consist of 3 out of 4 modules in any given year. The four modules will be Social and Cultural Perspectives on Food, Psychological Perspectives on Food and Food Behaviors, Challenges to Community Food Security, and International Issues in Nutrition. (Same as NFS 607, NS 607, BSC 607.)

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 639 AGING IN CROSS-CULTURAL PERSPECTIVE. (3)
The course has three themes. These are critical discourse, modeling and personal explorations. The course will involve extensive reading and discussion of a selection of contemporary literature on socio-cultural aspects of aging. As part of this there will be a thorough examination of such foundational concepts as culture, ethnicity and "race," facilitating critical use of these concepts by students. There will be a number of presentations by researchers experienced in doing aging research in cross-cultural settings. Each student is asked to select a topical area for individual study and exploration that is consistent with the cross-cultural focus of the course. The course is intended as a course for the gerontology and health Ph.D. program. The content emphasizes gerontologically relevant work done by research anthropologists. Prereq: Consent of instructor.

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 645 ANTHROPOLOGY AND EPIDEMIOLOGY. (3)
This course will introduce students to the fundamentals of epidemiology, as the methodological approach, which underlies biomedical research, and will examine the ways that the methodologies of anthropology and epidemiology complement each other in the study of health and disease. The course will examine the points of similarity between anthropology and epidemiology particularly as regards the importance of examining sociocultural phenomena in order to better understand the origins of disease. The course will explore the tensions between anthropology and epidemiology in matters of methodology, exemplified by the debate over quantitative vs. qualitative approaches, as well as theoretical perspective. Prereq: Permission of instructor. (Same as BSC 645.)

ANT 646 GLOBAL HEALTH: PEOPLE, INSTITUTIONS AND CHANGE. (3)
This course presents anthropological studies of health in an international context, attending to ways in which anthropological study can contribute to identification of issues relevant to health and development. It will have a dual focus. First, it will deprivilege western concepts and explore both indigenous and biomedical accounts of health. Topics may include culturally-defined syndromes, international medicines and health, and illness and body from an international, ethnographic perspective. Second, the course will explore the culture of international health agencies, e.g., WHO, UNICEF, etc. Prereq: Permission of instructor.

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: Graduate standing in Anthropology.

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: Graduate standing in Anthropology and ANT 660.

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 Anthropology and consent of instructor.

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 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 601 or consent of instructor.

ANT 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. (Same as HP 726.)

ANT 731 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 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 SEMINAR IN SYMBOLS AND MEANING. (3)
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 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 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 736 CULTURE, ENVIRONMENT AND DEVELOPMENT. (3)
This seminar explores the interrelationships between social processes, development and the environment. It provides the graduate student with the necessary theoretical and analytical tools to examine the social and cultural processes of environmental degradation and change. Topics include political ecology, health impacts of development, deforestation, resource tenure systems, environmental grassroots movements and large-scale development organizations. Prereq: Consent of instructor. (Same as SOC 737.)

ANT 737 SOCIOCULTURAL THEORIES IN THE ANTHROPOLOGY OF GENDER. (3)
Anthropological approaches to the study of gender have proliferated since the 1970s. The primary objective of this seminar is to provide participants with an overview of some of the salient "schools" that have emerged, and through comparison, critically to assess their limitations and utility for both theoretical and applied objectives. Prereq: Graduate standing in anthropology, or permission 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 760 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 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: Consent of instructor. (Same as BSC 765.)

ANT 766 GENDER, ETHNICITY AND HEALTH. (3)
This course will bring the anthropology of gender to the study of medical anthropology. We will examine the interconnections between gender, ethnicity, and class in relation to the greater and lesser likelihood of disease. We will explore differences in health in relation to the resources available and the treatment modalities called upon by people in different social locations within the United States, and internationally. We will also look at the symbolic importance given to different phenomena related to the body, disease, and healing. This course will draw heavily upon the ethnographic literature to develop conceptual accounts of gender, ethnicity, class, and health. Prereq: Permission of instructor.

#ANT 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 in Anthropology, or consent of instructor.

ANT 774 FOOD AND FOOD SECURITY IN A CHANGING WORLD. (3)
This cross-cultural seminar explores the biocultural interactions among food, human biology, and the social, cultural, political and economic factors that shape food-related behaviors and nutritional status of populations. Topics include the social role of food, food beliefs and ideology, the political economy of malnutrition, development strategies and food security, and methods in nutritional anthropology research. Readings and discussions are research focused and approach issues from a variety of theoretical perspectives. Prereq: ANT 601 or consent of instructor. (Same as BSC 774.)

ANT 775 CULTURES AND POLITICS OF REPRODUCTION. (3)
This course takes a cross-cultural approach to understanding how reproduction and associated phenomena (family formations and the social use of technologies) comprise arenas where broader political debates become played out, and social relations become created and contested. Ethnographic case studies include cross-cultural constructions of the body, parenthood, and kinship relations; and we examine how the state, social movements, legal/medical experts, and lay persons struggle to appropriate reproductive potentials for their own needs. Prereq: Graduate standing in Anthropology or consent of instructor.

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.

APP 300 TOPICS IN APPALACHIAN STUDIES (SUBTITLE REQUIRED). (3)
Study of topics relevant to Appalachian Studies, such as gender, folklore, literature, religion, community development, public policy, social movements and social change. May be repeated to a maximum of twelve credits under different subtitles. Prereq: APP 200 or consent of instructor.

#APP 395 INDEPENDENT STUDY. (1-6)
Independent study of special topic under the supervision of Appalachian Studies-affiliated faculty. Students must identify both a topic for this project as well as a faculty mentor who has agreed to supervise this project. May be repeated to a maximum of six credits. Prereq: APP 200.

#APP 399 PRACTICUM. (1-6)
A field-, community-based, practical or applied educational experience supervised by an Appalachian Studies Program faculty affiliate. May be repeated to a maximum of 6 hours. Pass-fail only. A learning contract must be filed in order to receive credit for this course. Prereq: APP 200.

ARC Architecture

***ARC 101 DRAWING I: OBSERVATIONAL FREEHAND DRAWING. (2)**
Focuses on the rigors of observational drawing. Structure, space, contour, line, and color are explored through study of the human body, still life, landscape, and architectural spaces with attention to their application to the architectural experience. Studio: 4 hours per week. Prereq: Admission to the School of Architecture.

ARC 102 DRAWING II: OBSERVATIONAL FREEHAND DRAWING. (2)
A continued focus on the content of Drawing I with particular attention to basic notions of descriptive geometry. Students are introduced to three-dimensional perspective drawing, rendering in color, and shade and shadow. Studio: 4 hours per week. Prereq: ARC 101.

ARC 111 INTRODUCTION TO HISTORY AND THEORY. (3)
Introduces enduring themes and generative forces in the history and theory of architecture by examining the cultural periods of various societies in different historical periods.

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 151 DESIGN STUDIO I. (6)**
Students investigate two-dimensional media, analyze buildings and text, and construct models as a means to explore basic environmental design principles. The studio continues with an emphasis on three-dimensional exploration and construction. Students investigate architectural design programs and materials of constructions. Studio: 12 hours per week. Prereq: Admission to the School of Architecture.

ARC 199 TOPICS IN ARCHITECTURE. (3)
This course number is to allow for new and experimental classes to be introduced into the architectural curriculum on an ad hoc basis. The course, if adopted on a permanent basis, will be formally proposed for addition to the College curriculum and assigned a new, permanent number. May be repeated to a maximum of six credits under different subtitles. Prereq: TBA.

***ARC 203 DIGITAL MEDIA WITHIN ARCHITECTURE. (3)**
A workshop that introduces students to the creative, analytical and generative potential of computers in the design of architecture. Lecture: one hour; laboratory: four hours per week. Prereq: Admission to the School of Architecture.

ARC 212 HISTORY AND THEORY I: 15TH-17TH CENTURIES. (3)
An overview of the key themes and historical developments in architecture from the fifteenth through seventeenth centuries. Emphasis on Western examples and relationships with earlier and later conditions, including contemporary problematics.

ARC 213 HISTORY AND THEORY II: 18TH-19TH CENTURIES. (3)
Continues the investigation of key themes and historical developments of architecture in the eighteenth and nineteenth centuries. Prereq: ARC 212 or consent of instructor.

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 231 STRUCTURAL AND MATERIAL CONCEPTS. (3)**
Introduces technological concepts of building and investigates the spatial and formal language of architecture with visual and physical analyses of various building structures and materials through the use of computers, field observations, etc. Prereq: Admission to the School of Architecture; MA 109 or MA 123. Paired with: ARC 252.

ARC 252 DESIGN STUDIO II. (6)
Students gain understanding of architectural language based on modern archetypes. Projects explore aesthetic and poetic possibilities while also emphasizing cohesion among space, structure, site, program, and material assembly. A variety of assembly types are introduced for the examining of structural and materials concepts. Studio: 12 hours per week. Prereq: ARC 151 with a grade of C or better. Paired with course: ARC 231.

ARC 253 DESIGN STUDIO III. (6)
Extends the consideration of the issues related to the isolated object to the multiplication of that object with reference to issues of site and context, focusing attention on formal strategies for obtaining thematic unity. Studio: 12 hours per week. Prereq: ARC 252 with a grade of C or better.

ARC 299 TOPICS IN ARCHITECTURE. (3)
This course number is to allow for new and experimental classes to be introduced into the architectural curriculum on an ad hoc basis. The course, if adopted on a permanent basis, will be formally proposed for addition to the College curriculum and assigned a new, permanent number. May be repeated to a maximum of six credits under different subtitles. Prereq: TBA.

ARC 314 HISTORY AND THEORY III: 20TH CENTURY AND CONTEMPORARY ARCHITECTURE. (3)
Investigates modern and late twentieth century architecture as well as current themes and issues in contemporary architecture in relation to their historical context. Prereq: ARC 213, or consent of instructor.

ARC 315 HISTORY AND THEORY IV: URBAN FORMS. (3)
An investigation of the factors and a consideration of the theories which have affected urban form. Prereq: ARC 314, or consent of the instructor.

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 332 ENVIRONMENTAL CONTROLS I. (3)
Design, analysis and coordination of building systems to meet basic human needs and social expectations of the built environment. Considers ecology when addressing the thermal environment, water, sanitation, concentrated energy, circulation, life-safety, and communication. Prereq: ARC 231. Paired with: ARC 354.

ARC 333 ENVIRONMENTAL CONTROLS II. (3)
A continuing investigation into ideas and issues raised in ARC 332, Environmental Controls I. Prereq: ARC 332. Paired with: ARC 355.

ARC 354 DESIGN STUDIO IV. (6)
Studies the formal characteristics of site and context together with laws and principles of building and nature, ecology, and the ways these forces influence architecture. The studio investigates applications of current technology and building systems. Studio: 12 hours per week. Prereq: ARC 253 with a grade of C or better. Paired with course: ARC 332.

ARC 355 DESIGN STUDIO V. (6)
Explores the architectural problem of a large-scale interior space conditioned by social and cultural programs. Special problems in lighting and acoustics will be addressed along with long-span structure. Attention will be paid to issues of scale, life safety social interaction and public circulation. Studio: 12 hours per week. Prereq: ARC 354 with a grade of C or better. Paired with course: ARC 333.

ARC 399 TOPICS IN ARCHITECTURE. (3)
This course number is to allow for new and experimental classes to be introduced into the architectural curriculum on an ad hoc basis. The course, if adopted on a permanent basis, will be formally proposed for addition to the College curriculum and assigned a new, permanent number. May be repeated to a maximum of six credits under different subtitles. Prereq: TBA.

ARC 404 DRAWING III (OFF CAMPUS). (3)
An elective course offered in conjunction with a sponsored travel program requiring student observation of and interaction with the visited environment to be expressed formally through visual representation. The sponsors of each travel program tailor the course to suit the needs of the program as it relates to a particular locale. Studio: 6 hours per week. Prereq: ARC 102.

ARC 405 DIGITAL VISUALIZATION I. (3)
Students are introduced to concepts of computer visualization as applied to the study of architecture. Students will utilize modeling, rendering, and animation software to create three-dimensional representations of selected projects. Lecture: two hours; laboratory: two hours per week. Prereq: ARC 203.

ARC 406 DIGITAL VISUALIZATION II. (3)
A continued exploration of computer visualization with particular emphasis on a specific software. Subtitle required. Lecture: 1 hours; laboratory: four hours per week. Prereq: ARC 405.

ARC 410 INDEPENDENT STUDY. (3)
An independent study of architecture history and/or theory, wherein a student will research a specific topic agreed upon with a designated faculty member of the college. Laboratory, six hours per week. May be repeated to a maximum of six hours.

ARC 434 STRUCTURAL DESIGN AND ANALYSIS I. (3)
An exploration of structural concepts with an emphasis on statics, strength of materials, and the use of mathematical and computer-aided methods of analysis. Prereq: ARC 231.

ARC 435 MATERIALS AND METHODS OF CONSTRUCTION. (3)
An intensive exploration of materials and building techniques with special consideration given to the properties of materials and their uses in various methods of construction. Prereq: ARC 231.

ARC 456 DESIGN STUDIO VI. (6)
This studio explores various design topics including building technology, furniture design, digital visualization, historic preservation, and human settlement. Studio: 12 hours per week. Prereq: ARC 355 with a grade of C or better.

ARC 457 DESIGN STUDIO VII. (6)
This studio explores various design topics including building technology, furniture design, digital visualization, historic preservation, and human settlement. Studio: 12 hours per week. Prereq: ARC 455 or ARC 456 with a grade of C or better.

ARC 461 TRAVEL SEMINAR: URBAN CONTEXT (OFF CAMPUS). (3)
An elective seminar offered in conjunction with a sponsored travel program, which investigates factors and considers theories of urban form in the context of the locale in question. Lecture: two hours; laboratory: two hours per week. Prereq: ARC 315.

ARC 499 TOPICS IN ARCHITECTURE. (3)
This course number is to allow for new and experimental classes to be introduced into the architectural curriculum on an ad hoc basis. The course, if adopted on a permanent basis, will be formally proposed for addition to the College curriculum and assigned a new, permanent number. May be repeated to a maximum of six credits under different subtitles. Prereq: TBA.

ARC 511 HISTORY AND THEORY SEMINAR: PRE-20TH CENTURY (SUBTITLE REQUIRED). (3)
One of a series of graduate seminars devoted to investigations and analyses of pre-twentieth century architecture. Subtitle required. May be repeated to a total of 6 credit hours under different subtitles. Prereq: Junior or Senior standing with six credit hours of architecture history or art history at the 200 level or above, graduate standing, or consent of instructor.

***ARC 512 HISTORY AND THEORY SEMINAR: MODERN (SUBTITLE REQUIRED). (3)**
One of a series of graduate seminars devoted to investigations and analyses of modern architecture. Subtitle required. May be repeated to a total of 6 credit hours under different subtitles. Prereq: Junior or Senior standing with six credit hours of architecture history or art history at the 200 level or above, graduate standing, or consent of instructor.

***ARC 513 HISTORY AND THEORY SEMINAR: CONTEMPORARY (SUBTITLE REQUIRED). (3)**
One of a series of graduate seminars devoted to investigations and analyses of contemporary architecture. Subtitle required. May be repeated to a total of 6 credit hours under different subtitles. Prereq: Junior or Senior standing with six credit hours of architecture history or art history at the 200 level or above, graduate standing, or consent of instructor.

***ARC 514 HISTORY AND THEORY SEMINAR: THEORY AND CRITICISM (SUBTITLE REQUIRED). (3)**
One of a series of graduate seminars devoted to investigations and analyses of architectural theory and criticism. Subtitle required. May be repeated to a total of 6 credit hours under different subtitles. Prereq: Junior or Senior standing with six credit hours of architecture history or art history at the 200 level or above, graduate standing, or consent of instructor.

***ARC 515 HISTORY AND THEORY SEMINAR: URBAN FORMS (SUBTITLE REQUIRED). (3)**
One of a series of graduate seminars devoted to investigations and analyses of urban forms. Subtitle required. May be repeated to a total of 6 credit hours under different subtitles. Prereq: Junior or Senior standing with six credit hours of architecture history or art history at the 200 level or above, graduate standing, or consent of instructor.

ARC 533 STRUCTURAL DESIGN AND ANALYSIS II. (3)
An exploration of structural concepts for the materials of steel and wood, including considerations of load and resistance as factors in architectural design. Prereq: ARC 434.

ARC 534 ADVANCED STUDIES IN STRUCTURAL SYSTEMS. (3)
An exploration of structural concepts relating to construction with the materials concrete and masonry, including discussion of stress and load as considerations in architectural design. Prereq: ARC 533.

ARC 584 DESIGN OF TIMBER AND MASONRY STRUCTURES. (3)
Current and historic design methods of buildings and their components using wood, wood products, bricks, and concrete blocks. Prereq: Courses in steel and reinforced concrete design at the senior level, or consent of instructor. (Same as CE 584.)

ARC 599 TOPICS IN ARCHITECTURE. (3)
This course number is to allow for new and experimental classes to be introduced into the architectural curriculum on an ad hoc basis. The course, if adopted on a permanent basis, will be formally proposed for addition to the College curriculum and assigned a new, permanent number. May be repeated to a maximum of six credits under different subtitles. Prereq: TBA.

ARC 631 BUILDING SYSTEMS INTEGRATION. (3)
Graduate level study of the art and science of building design with emphasis given to integrative strategies for developing a comprehensive, multi-systemic, architectural project. Paired with: ARC 750.

ARC 632 SPECIAL TOPICS IN ENVIRONMENTAL CONTROLS. (3)
Advanced studies in human environmental design. Topics for research and development will include sustainability, energy, infrastructure, sanitation and water, lighting, and acoustics. Subtitle required. Prereq: ARC 332 and ARC 333.

ARC 634 ARCHITECTURAL DETAILING. (3)
A study of the art and technique of complete building design through detail development. Prereq: Completion of all technical requirements for BA in Architecture or equivalent and admission to the Master of Architecture program.

ARC 641 PROFESSIONAL PRACTICE. (3)
An exploration of professional and ethical responsibilities of the architect as they pertain to the procedural matters of practice and management. Prereq: Admission to the M.Arch. program.

ARC 642 PROFESSIONAL INTERNSHIP. (3)
A graduate-level summer internship with a professional architectural firm in which the student, along with a faculty advisor, will determine specific experiential and educational goals to be met. Laboratory: hours to be agreed upon with selected firm (apx. 10-15 hrs/wk for duration of internship). Prereq: Admission to the M.Arch. program.

ARC 658 DESIGN STUDIO VIII. (6)
This graduate level studio explores various design topics including building technology, furniture design, digital visualization, historic preservation, and human settlement. Studio: 12 hours per week. Prereq: ARC 457 with a grade of C or better.

ARC 659 DESIGN STUDIO IX. (6)
This graduate level studio explores various design topics including building technology, furniture design, digital visualization, historic preservation, and human settlement. Studio: 12 hours per week. Prereq: ARC 658 with a grade of C or better.

ARC 699 TOPICS IN ARCHITECTURE. (3)
This course number is to allow for new and experimental classes to be introduced into the architectural curriculum on an ad hoc basis. The course, if adopted on a permanent basis, will be formally proposed for addition to the College curriculum and assigned a new, permanent number. May be repeated to a maximum of six credits under different subtitles. Prereq: TBA.

ARC 707 DIGITAL MEDIA: HISTORY AND THEORY. (3)
A graduate level seminar exploring the impact of digital media on visualization and the theoretical implications arising from its use as a means of visual expression. Laboratory: 6 hours per week. Prereq: ARC 406.

ARC 709 MASTER'S PROJECT IN DIGITAL VISUALIZATION. (9)
A final, comprehensive project in the digital visualization concentration, which synthesizes conceptual and experiential knowledge into a cohesive presentation. Studio: 18 hours per week. Prereq: ARC 750 and all requisite courses for the Digital Visualization concentration.

ARC 719 MASTER'S PROJECT IN HISTORY/THEORY/CRITICISM. (9)
A final, comprehensive project in the history, theory, and criticism concentration, which synthesizes conceptual and experiential knowledge into a cohesive presentation. Studio: 18 hours per week. Prereq: ARC 750 and all requisite courses for the History, Theory and Criticism concentration.

ARC 729 MASTER'S PROJECT IN HISTORIC PRESERVATION. (9)
A final, comprehensive project in the historic preservation concentration, which synthesizes conceptual and experiential knowledge into a cohesive presentation. Studio: 18 hours per week. Prereq: ARC 750 and all requisite courses for the Historic Preservation concentration.

ARC 735 PROJECT DELIVERY. (3)
A study in the execution of an architectural design including contract documents, cost estimation, and construction management. Prereq: Completion of all technical requirements for BA in Architecture or equivalent and admission to the Master of Architecture program.

ARC 736 BUILDING CODES AND DESIGN. (3)
An analysis of content and format of current model building codes combined with discussion of the necessity for building codes, problems in interpretation and applications as well as legal aspects involved. Prereq: Completion of all technical requirements for BA in Architecture or equivalent and admission to the Master of Architecture program.

ARC 738 CONSTRUCTION SPECIFICATIONS. (3)
A study in defining the quality of materials used in architectural design. Prereq: Admission to the Master of Architecture program.

ARC 743 ADVANCED PROFESSIONAL PRACTICE. (3)
A continuation of concepts introduced in ARC 641, Professional Practice, with an emphasis in issues relating to the legal, business, and organizational considerations of architectural practice as well as investigations into advocacy and the public and private leadership roles of the architect. Prereq: ARC 641.

#ARC 748 MASTER'S PROJECT RESEARCH. (0)
Half-time to full-time work on Master's Project. May be repeated a maximum of six times. Prereq: All course work toward the degree must be completed.

ARC 750 DESIGN STUDIO X. (6)
Utilizing given site and program requirements, graduate students explore design issues comprehensively by producing a developed and detailed building design. Students will engage in structural design, environmental systems, life-safety and post-design assessments as required to meet the most current NAAB standards for a comprehensive studio. Studio: 12 hours per week. Prereq: ARC 659.

ARC 759 MASTER'S PROJECT IN BUILDING DESIGN. (9)
A final, comprehensive project in the building technology and tectonics concentration, which synthesizes conceptual and experiential knowledge into a cohesive presentation. Studio: 18 hours per week. Prereq: ARC 750 and all requisite courses for the Building Design concentration.

ARC 761 SPECIAL PROBLEMS IN TOWN DESIGN. (3)
Students explore various topics related to the theory and practice of existing, emerging and new strategies for city and town development, revitalization, and long-term sustainability. Subtitle required. Prereq: Admission to the Master of Architecture program.

ARC 779 MASTER'S PROJECT IN TOWN DESIGN. (9)
A final, comprehensive project in the town design concentration, which synthesizes conceptual and experiential knowledge into a cohesive presentation. Studio: 18 hours per week. Prereq: ARC 750 and all requisite courses for the Town Design concentration.

ARC 799 TOPICS IN ARCHITECTURE. (3)
This course number is to allow for new and experimental classes to be introduced into the architectural curriculum on an ad hoc basis. The course, if adopted on a permanent basis, will be formally proposed for addition to the College curriculum and assigned a new, permanent number. May be repeated to a maximum of six credits under different subtitles. Prereq: TBA.

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.

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 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. Prereq: Restricted to Architecture and/or Landscape Architecture students only.

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 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.

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.

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.

ARC 850 PROFESSIONAL PRACTICE. (3)
Professional and ethical responsibility to profession and community; procedural matters pertaining to practice and management.

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 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 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.

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.

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.

ASC Animal Sciences

#ASC 101 DOMESTIC ANIMAL BIOLOGY. (3)
The first in a sequence of two courses providing an introduction to the subject of animal science. Emphasis is placed on a fundamental understanding of anatomy, physiology, nutrition, reproduction, genetic and behavior of domestic animals.

#ASC 102 APPLICATIONS OF ANIMAL SCIENCE. (3)
The second in a sequence of two courses providing an introduction to the subject of animal science. Emphasis is placed on the application of scientific disciplines of anatomy, physiology, nutrition, reproduction, genetics and behavior in the management of domestic animals. Prereq: ASC 101.

***ASC 106 ANIMAL AGRICULTURE IN THE MODERN WORLD. (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.

#ASC 205 LIVESTOCK, PEOPLE AND THEIR INTERACTIONS. (1)
Local experts in a wide variety of animal production enterprises and associated support services will give presentations on their area of expertise. Following the presentation, students will have the opportunity to discuss the topic of the day and potential employment opportunities in that field with the speaker. Prereq: ASC 101, ASC 102 (or concurrent enrollment).

ASC 300 MEAT SCIENCE. (4)
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), harvest the market animals, 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 postmortem changes that affect meat quality. Additional information will cover meat marketing trends, nutrition, meat cookery, meat selection, health issues and consumer information. Lecture: two hours; laboratory two hours per week. Prereq: ASC 106.

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: ASC 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: FSC 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. Lecture, two hours; laboratory, three hours per week. 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 325 ANIMAL PHYSIOLOGY. (3)
An introduction to the functional anatomy and physiology of major body systems in domestic animals. Emphasis will be on how these systems interact to regulate circulation, gas exchange, acid-base balance, digestion and metabolism, locomotion and adapting to environmental changes. Prereq: BIO 152, CHE 115 or equivalent.

***ASC 340 POULTRY PRODUCTION. (2)**
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 101 or ASC 102 or equivalent or permission of the instructor.

†ASC 360 GENETICS.

***ASC 362 ANIMAL GENETICS. (4)**
Study of genetics as applied to specific companion animals and livestock species. Roles of selection and mating systems and their expected consequences are examined when applied to qualitative and quantitative traits expressed by specific companion animals and various livestock species. Prereq: ASC 101.

***ASC 364 REPRODUCTIVE PHYSIOLOGY OF FARM ANIMALS. (4)**
Introduction to anatomy and physiological processes related to reproduction with a focus on farm animals. Evaluations of management procedures as they relate to reproductive physiology. Prereq: ASC 101 or BIO 152, CHE 230 or CHE 236. (Chemistry may be taken concomitantly.)

***ASC 378 ANIMAL NUTRITION AND FEEDING. (4)**
A fundamental study of the nutrients, their utilization and their role in the animal in conjunction with an applied understanding of the manner in which feedstuffs are evaluated and blended to meet the various species needs for those nutrients. 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 ANIMAL PRODUCTION PRINCIPLES. (3)**
A broad survey of animal agricultural management covering cattle, horses, poultry, swine, sheep and goats. Emphasis is placed on the practical application of scientific disciplines including anatomy, physiology, nutrition, reproduction and genetics. 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. Lecture, three hours; laboratory, three hours. Prereq: ASC 300, ASC 362, ASC 364 and ASC 380 or consent of instructor.

***ASC 408G SWINE PRODUCTION. (2)**
A study of scope and importance of the swine industry. Application of principles of breeding, reproduction, nutrition, housing, health, and management of swine in modern production systems. Prereq: ASC 101, 102, 378.

ASC 410G EQUINE SCIENCE. (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 and ASC 380 or consent of instructor.

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 or consent of instructor.

†ASC 462G ARTIFICIAL INSEMINATION AND FERTILITY OF FARM ANIMALS.

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 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 602 MICRONUTRIENT METABOLISM. (4)
Detailed study of the properties, metabolism, biochemical and physiological functions and interactions of vitamins and minerals, and their relationships to deficiency symptoms and toxicity. Prereq: BCH 401G or consent of instructor. (Same as NS 602.)

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: FSC 304, FSC 306 or equivalent; one course in histology or biochemistry or consent of instructor. (Same as FSC 630.)

ASC 660 BIOLOGY OF REPRODUCTION. (3)
Advanced study of current topics in reproductive biology. The course is comprised equally of student-led discussions and lectures given by faculty with research expertise in selected topics. Readings will be taken from current and classic literature. Topics covered include (but are not limited to) molecular and cellular endocrinology, hormone receptors and mechanism of action, reproductive neuroendocrinology, reproductive behavior, gametogenesis, fertilization, sexual differentiation, puberty, menopause and environmental effects on reproduction. Emphasis will be placed on the analysis and understanding of the experimental basis for current concepts in reproductive biology. Prereq: ASC/PGY 601 and ASC 364 or BIO/PGY 502 or consent of instructor. (Same as PGY 660 and ANA 660).

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 689 PHYSIOLOGY OF NUTRIENT DIGESTION AND ABSORPTION. (3)
An analysis and comparison of the structure and function of mammalian and avian gastrointestinal tracts, of feedstuff digestive processes, and of specific mechanisms responsible for nutrient absorption in various cell types. Emphasis is placed on livestock and avian species. Prereq: Graduate level Biochemistry.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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)
A course emphasizing the nature, origin and evolution of planets, satellites and other objects in the Solar System. Topics also include historical astronomy, the naked eye phenomena of the sky and modern solar system discoveries made by spacecraft. This course may be taken independently of AST 192.

AST 192 STARS, GALAXIES AND THE UNIVERSE. (3)
A course covering the universe outside the Solar System. A principle theme is the origin and evolution of stars, galaxies and the universe at large. Topics also include black holes, quasars and the big bang model of the universe. This course may be taken independently of AST 191.

AST 310 TOPICS IN ASTRONOMY AND ASTROPHYSICS (SUBTITLE REQUIRED). (3)
Readings, research, discussions and lectures to illuminate problems of contemporary significance in astronomy and astrophysics. May be repeated to a maximum of six credits under a different subtitle. Prereq: To be announced with subtitle.

AST 395 INDEPENDENT WORK IN ASTRONOMY. (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.

AST 591 ASTROPHYSICS I – STARS. (3)
The physics of stars from star formation to stellar death. Topics include stellar structure and evolution, energy generation and transport, the later stages of stellar evolution and stellar remnants. Prereq: PHY 361, PHY 416G, PHY 417G or consent of instructor. (Same as PHY 591.)

AST 592 ASTROPHYSICS II – GALAXIES AND INTERSTELLAR MATERIAL. (3)
The physics of galaxies and of the interstellar medium. Topics include galaxy formation, evolution and interaction, phases of the interstellar medium, and physical processes in the interstellar medium. Prereq: PHY 361, PHY 416G, PHY 417G or consent of instructor. (Same as PHY 592.)

AT Athletic Training

#AT 500 INTEGRATIVE CARE FOR HEALTH SCIENCES. (1-3)
Integrative care involves using the best possible treatments from both complementary/alternative and allopathic medicine, based on the patient's individual needs and condition. The selection of health care providers should be based on good science and this course will introduce students to complementary and alternative health care providers and the practices and beliefs of these practices as well as the scientific evidence in support of these practices. The course integrates successes from both worlds and describe the safest, least invasive, most cost-effective approach while incorporating a holistic understanding of the individual. May be repeated to a maximum of 3 credits (1 credit didactic and up to two credits experiential/research). (Same as HS 500, CLS 500, CNU 500, CD 500, PA 500, PT 686.)

AT 660 DIRECTED STUDY IN ATHLETIC TRAINING. (1-3)
A specific topic in Athletic Training related to the student's interests 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: Graduate standing and consent of instructor.

AT 670 SCIENTIFIC INQUIRY IN ATHLETIC TRAINING I. (2)
An introduction to the research process in athletic training. The importance of pursuing quality research in athletic training will be stressed and the procedures necessary to complete this process will be presented. May be repeated to a maximum of 8 credits. Prereq: Graduate standing and consent of the instructor.

AT 671 SCIENTIFIC INQUIRY IN ATHLETIC TRAINING II. (2)
The second course of a four part series that will develop skills and a knowledge base that will aid the student while conducting and critically reviewing research in athletic training. Course work will address the methodological procedures of designing and pursuing research in athletic training. The importance of pursuing quality research will be stressed and the procedures necessary to complete this process will be presented. Prereq: Graduate standing and consent of instructor.

AT 672 SCIENTIFIC INQUIRY IN ATHLETIC TRAINING III. (2)
The third course of a four part series that will develop skills and a knowledge base that will aid the student while conducting and critically reviewing research in athletic training. Course work will address the design of research and synthesis of data in athletic training. The importance of pursuing quality research will be stressed and the procedures necessary to complete this process will be presented. Prereq: Graduate standing and consent of instructor.

AT 673 SCIENTIFIC INQUIRY IN ATHLETIC TRAINING IV. (2)
The final course of a four part series that will develop skills and a knowledge base that will aid the student while conducting and critically reviewing research in athletic training. Course work will focus on developing the skills needed to critically synthesize material with accepted practice, and prepare professional presentations using acquired data and an appropriate statistical analysis. The importance of pursuing quality research will be stressed and the procedures necessary to complete this process will be presented. Prereq: Graduate standing, and consent of instructor.

AT 680 SPECIAL TOPICS IN ATHLETIC TRAINING: (SUBTITLE REQUIRED). (1-3)
Study of emerging topics of current high interest in athletic training. May be repeated to a maximum of 9 credits. Prereq: Graduate standing and consent of instructor.

#AT 685 PRINCIPLES AND APPLICATION OF KINESIOLOGICAL EMG. (3)
To introduce the student to the principles and application of kinesiologic electromyography (EMG). Kinesiological EMG research incorporates the study of human movement with direct assessment of the muscles involved with human motion. The primary aim for this course is to provide the student with background and practical knowledge of kinesiological EMG in order to be able to perform and critically analyze kinesiological EMG studies. Students will enhance their understanding of neuromuscular properties of skeletal musculature. Students will be exposed to the common procedures used to collect, analyze, and interpret both surface and indwelling kinesiological EMG research. Prereq: KHP 615 or comparable graduate level biomechanics course, the course can be taken concurrently. Approval of instructor.

***AT 690 ORTHOPAEDIC EVALUATION AND REHABILITATION OF THE UPPER EXTREMITY. (4)**
Current evaluation and rehabilitation of upper extremity and upper spine injuries that commonly occur in athletic, recreational or occupational activities. A combination of lecture, laboratory techniques will be used to review current practice and interventions. Prereq: Graduate standing and consent of instructor.

***AT 695 ORTHOPAEDIC EVALUATION AND REHABILITATION OF THE LOWER EXTREMITY. (4)**
Current evaluation and rehabilitation of lower extremity and lumbar spine injuries that commonly occur in athletic, recreational or occupational activities. A combination of lecture, laboratory and student presentation and written reviews of current practice and interventions will be employed. Prereq: Graduate standing and consent of instructor.

B&E Business and Economics

#B&E 120 LEADERSHIP IN THE GLOBAL MARKETPLACE. (1)
An introductory examination of the skills, competencies, and styles of effective global leaders. Activities include individual assessments and a personal leadership development plan. Prereq: Acceptance in Global Business Leadership certificate program.

#B&E 122 THE CHALLENGE OF LEADERSHIP. (1)
Current leadership challenges as discussed by the people who confront them. Students have the opportunity to discuss leadership challenges with guest speakers from the corporate, government and non-profit sectors. Prereq: Acceptance into Global Business Leadership certificate program.

#B&E 227 LARGER WORLD ISSUES IN BUSINESS. (2)
A case-based course that explores the nexus between business and the social issues of the day (e.g., poverty, the environment). Student activities include a case competition exercise where they examine a social issue in business and hone their analytical and oral presentation skills. Prereq: Acceptance into Global Business Leadership certificate program.

#B&E 240 INTER-CULTURAL BUSINESS COMMUNICATION. (3)
This course is designed to improve students' ability to communicate effectively with people from diverse cultural backgrounds. Prereq: Acceptance into Global Business Leadership certificate program.

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.

BA Business Administration

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

BAE Biosystems and Agricultural Engineering

BAE 102 INTRODUCTION TO BIOSYSTEMS ENGINEERING. (1)
An introduction to the engineering of food and fiber production and processing systems. Professionalism and the engineering approach will be emphasized.

BAE 103 ENERGY IN BIOLOGICAL SYSTEMS. (2)
This course introduces the concepts of energy transport in biological systems including the study of thermodynamics, heat transfer, psychometrics, and fluid flow. Prereq or concur: MA 113.

BAE 201 ECONOMIC ANALYSIS OF BIOSYSTEMS. (2)
The financial and managerial aspects of biosystems in evaluating design alternatives. 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: MA 113.

BAE 202 PROBABILITY AND STATISTICS FOR BIOSYSTEMS. (3)
Introduction to biosystems engineering: engineering problem solving; computer applications and structured programming; probability; and statistics. Emphasis on application of these skills to biosystems applications. Lecture, two hours; laboratory, two hours per week. Prereq: MA 113 and sophomore standing.

BAE 305 DC CIRCUITS AND MICROELECTRONICS. (3)
An introduction to the use of digital electronics and integrated circuits in solving biosystems engineering problems. Digital circuits, microprocessor concepts, computer interfacing, transducers, signal conditioning and control applications are discussed. Lecture, two hours; laboratory, two hours per week. Prereq: EE 305 or EE 306.

BAE 400 SENIOR SEMINAR. (1)
A course for senior students in biosystems and agricultural engineering with emphasis on oral communications skills. Students will do literature searches on topics related to the biosystems and agricultural engineering profession and present oral and written reports. Prereq: Senior standing in BAE and COM 199.

BAE 402 BIOSYSTEMS AND AGRICULTURAL ENGINEERING DESIGN I. (2)
A design course for seniors in BAE requiring students to solve open-ended problems. Students will use previously learned engineering principles to produce actual designs which will be built and analyzed in BAE 403. Prereq: Engineering standing in BAE or consent of instructor.

BAE 403 BIOSYSTEMS AND AGRICULTURAL ENGINEERING DESIGN II. (2)
Student design teams evaluate and enhance design solutions, fabricate prototypes, execute performance tests, analyze results, and develop final design specifications. Oral and written reports are required. Prereq: BAE 402.

BAE 417 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.

BAE 427 STRUCTURES AND ENVIRONMENT ENGINEERING. (3)
This course teaches load estimate for light timber and concrete structures and introduces the design of heating, cooling, and ventilation systems in these structures. Prereq: EM 302; prereq or concur: ME 325.

BAE 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.

BAE 437 LAND AND WATER RESOURCES ENGINEERING. (3)
The hydrologic cycle is studied and design procedures are developed for flood control structures, water table management, wetlands, irrigation, and erosion control systems. Prereq: CE 341 or ME 330.

BAE 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, layered systems flow and pollutant movement. Prereq: ME 330 or CE 341 or consent of instructor, and engineering standing. (Same as CE 460.)

BAE 447 BIOPROCESS ENGINEERING FUNDAMENTALS. (3)
Design principles and equipment selection for the most common processing operations are studied for the manufacturing and preservation of biological materials. Topics will include the design of fluid flow systems, transient heat transfer, heat exchangers, psychometrics, and refrigeration. Prereq: ME 325 and engineering standing.

BAE 450 SPECIAL PROBLEMS. (1-3)
An intensive study of some phases of biosystems and agricultural engineering in which the student is particularly interested. Approval of instructor is required. May be repeated to a maximum of six credits.

BAE 502 MODELING OF BIOLOGICAL SYSTEMS. (3)
The course will focus on the mathematical description and computer simulation of the complex interactions involved in biological systems. Computer simulation will be used as a tool to analyze and suggest design changes to optimize performance. Prereq: Bio science elective, ME 340, and two "core" courses.

***BAE 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, BAE 417.

BAE 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.

#BAE 517 OFF-ROAD VEHICLE DESIGN. (3)
Morphology, operational characteristics, and design considerations of off-road vehicles used in agriculture, forestry and construction. This course provides an introduction to conceptualization, analysis and design of these vehicles. Topics to be addressed include: engine performance and design, vehicle testing, turbo chargers and intercoolers, drivetrains, chassis mechanics, electronic systems, hydraulic systems, and human factors.

BAE 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 341 or ME 330 and engineering standing. (Same as CE 546.)

BAE 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.

***BAE 545 ENGINEERING HYDRAULICS. (3)**
Analysis of flow in closed conduits and natural and artificial open channels. Design of hydraulic structures. Prereq: CE 541 and engineering standing, or consent of instructor. (Same as CE 549.)

BAE 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.

BAE 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.)

BAE 580 HEATING, VENTILATING AND AIR CONDITIONING. (3)
A course emphasizing the use of thermodynamics, fluid mechanics, and heat transfer principles in thermal environmental design. Building energy requirements will be computed and thermal comfort criteria will be studied. Prereq: BAE 427 or ME 321 or consent of instructor. (Same as ME 580.)

BAE 581 PHYSICS OF PLANT AND ANIMAL ENVIRONMENTS. (3)
A study of the thermal, moisture, light, and gaseous components of plant and animal environments with emphasis on interactions between these biological systems and their environments. Prereq: BAE 427 or consent of instructor.

BAE 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 BAE 599 number. Prereq: Variable; given when topic identified.

***BAE 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: BAE 417.

BAE 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, BAE/ME 580, or consent of instructor.

BAE 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.)

***BAE 642 OPEN CHANNEL FLOW. (3)**
The study of open channel flow fundamentals and concepts. Topics include uniform flow, varied flow, steady and unsteady flow, energy dissipators, flow transitions, controls, analytical and numerical solutions in 1D and 2D applications. Prereq: CE 541 or consent of instructor. (Same as CE 642.)

BAE 647 SYSTEM OPTIMIZATION I. (3)
Introduction to linear and nonlinear optimization and their use in engineering design. Emphasis on numerical approaches and use of optimization methods for engineering systems (e.g. biological, mechanical, structural). Prereq: CS 221; one mathematics course beyond MA 214 or equivalent. (Same as ME 647.)

BAE 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: BAE 548 or consent of instructor.

BAE 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.)

BAE 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.

BAE 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.

BAE 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. (Same as CE 662.)

BAE 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.)

BAE 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.)

#BAE 672 LANDFILL DESIGN. (3)
This course deals with the geotechnical aspects of the design of landfills for the disposal of municipal solid waste. Since landfill design is driven by state and federal regulations, time is taken to review these regulations. Landfills are evaluated as engineered systems consisting of multiple components. Each component is investigated individually, and methods are developed to predict and quantify the performance of these components so that appropriate materials, design criteria, and construction methods can be selected to assure that the landfill will function with minimal environmental impact. Prereq: CE 471G. (Same as CE 672.)

BAE 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. (Same as CME 680.)

BAE 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.

BAE 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.

BAE 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.

#BAE 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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

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

BAE 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.

BAE 795 THESIS. (0)
May be repeated twice.

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. Discussion of structure and function; metabolism and bioenergetics; and biological information flow. At the undergraduate level, understanding is demonstrated through hour examinations; at the graduate level, understanding is demonstrated through hour examinations and a brief paper. Lecture, three hours; one optional conference. Prereq: CHE 107, CHE 236 and BIO 152 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 BIO/MI/PLS/PPA 601.)

BCH 604 STRUCTURAL BIOLOGY. (3)
An advanced course on the structure and function of proteins and nucleic acids. Topics include: the physical determinants of protein structure, classification of protein architecture, protein-nucleic acid and protein-protein interactions, sequence dependence of nucleic acid structure, ribozymes, dynamics and evolutionary relationships. Prereq: IBS 601-602/BCH 607-608 or equivalent.

BCH 607 BIOMOLECULES AND METABOLISM. (3)
An introductory graduate-level biochemistry course designed to provide a basic knowledge of molecular and biochemical principles necessary for advanced graduate study. Protein structure and function, enzyme catalysis, the generation and storage of metabolic energy, amino acid, nucleotide, and lipid metabolism and biological membranes and transport will be covered. Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents. (Same as IBS 601.)

BCH 608 BIOMOLECULES AND MOLECULAR BIOLOGY. (3)
An introductory graduate-level biochemistry course focused on the cellular mechanisms that underlie the regulated expression of genes, including transcription and translation, as well as basic mechanisms of DNA replication/repair and recombination. Genetic engineering and other experimental approaches critical to molecular biology research will be reviewed. Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents. (Same as IBS 602.)

BCH 609 PLANT BIOCHEMISTRY. (3)
The course will consider the chemical constituents of plants (with emphasis on biologically or nutritionally significant compounds unique to plants), their biosynthesis, contribution to key metabolic and defense processes and the regulation of their synthesis. Included will be discussions of photosynthesis, carbohydrates, lipids, isoprenoids and phenylpropanoids, nitrogen fixation, nitrogen and sulfur reduction and assimilation, alkaloids and additional secondary compounds, frontiers in plant biochemistry. Prereq: BCH 607 or equivalent or consent of instructor. (Same as PLS/PPA 609.)

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 procaryotic and eucaryotic cells. Lectures and discussions with readings in original literature. Prereq: A course in genetics (e.g. BIO 304) 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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. Prereq: Admission into the College of Dentistry. (Same as OBI 812.)

BCH 819 CELLULAR STRUCTURE AND FUNCTION/BIOCHEMISTRY. (7)
The course combines lecture, small group activities, clinical correlations, problem-based learning, and problem-solving sessions in providing an understanding of the relationship of biochemical principles to human health and disease. Close integration with genetics topics provides a better picture of how biochemistry, molecular biology and genetics contribute to normal human development and medicine. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year). (Same as MD 819.)

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 Biology

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 106 PRINCIPLES OF PLANT BIOLOGY. (3)
The principles underlying the structure, physiology and reproduction of flowering plants. Prereq: High school chemistry recommended.

BIO 110 INTRODUCTION TO HUMAN BIOLOGY AND HEALTH. (3)
This course provides the student with a general overview of the basic dimensions of health (such as physical, social and emotional) and the applications of these dimensions to personal wellness.

BIO 111 GENERAL BIOLOGY LABORATORY. (1)
Laboratory studies in the structure and function of cells, plants, and animals; ecology; heredity; and evolution. Prereq or coreq: BIO 103 or consent of instructor.

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 190 SUPPLEMENTAL BIOLOGY WORKSHOP I. (1)
Cooperative workshop offered only as an optional supplement to certain biology lecture courses. Offered only on a pass/fail basis. Coreq: BIO 150.

BIO 192 SUPPLEMENTAL BIOLOGY WORKSHOP II. (1)
Cooperative workshop offered only as an optional supplement to certain biology lecture courses. Offered only on a pass/fail basis. Coreq: BIO 152.

#BIO 199 RESEARCH EXPERIENCE IN BIOLOGY. (0-1)
Participation in biological research under the direction of a faculty mentor in Biology or a related field. A research contract signed by the student and faculty mentor must be approved by the Director of Undergraduate Studies in Biology. Offered pass/fail only.

BIO 208 PRINCIPLES OF MICROBIOLOGY. (3)
The course introduces fundamental microbiological principles and techniques. Emphasis is placed on structural, functional, ecological and evolutionary relationships among microorganisms, principally viruses, rickettsiae bacteria, fungi and algae. 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 or BIO 308 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 oganismic 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 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, BIO 152, and BIO 315.

BIO 308 GENERAL MICROBIOLOGY. (3)
Fundamental concepts of microbiology. The nutrition, physiology, genetics, molecular biology of microorganisms, and their roles in nature and in infection and immunity will be studied. Prereq: BIO 150-153; organic chemistry recommended.

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; BIO 315; 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 355 BIOLOGY STUDY ABROAD (SUBTITLE REQUIRED). (3)
This course offers students an opportunity to study unique biological communities and to experience living in a foreign culture. Specific content and location varies. May be repeated a maximum of two times under different subtitles. Prereq: Will be set by instructor.

BIO 361 ECOLOGY OF THE KENTUCKY FLORA AND VEGETATION. (3)
An overview of the physiography, geology, soils, hydrology, climate (paleo and recent), vegetation (paleo and recent), floras (including floralistic relationships), archaeobotany, and agriculture of Kentucky. Lecture, two hours; laboratory, two hours per week. Prereq: One year of introductory Biology or consent of instructor.

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. 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 the satisfy the requirements of a BS or BA in Biology. Prereq: BIO 150, 151, 152, and 153. Completion of at least one of the Biology core courses (Cell Biology, Genetics, Physiology, Ecology) is strongly recommended.

#BIO 401G SPECIAL TOPICS IN BIOLOGY FOR ELEMENTARY, MIDDLE AND HIGH SCHOOL TEACHERS (SUBTITLE REQUIRED). (1-4)
Selected topics in biology of special interest to teachers such as biological research experiences related to pharmacological assays, collecting behavioral data, compilation and statistically analysis of data. When the course is offered, a specific title with specific credits, the number of hours in lecture-discussion and laboratory, will be given. Lecture/discussion, two-four hours; laboratory, zero-four hours. May be repeated to a maximum of 12 credits. Prereq: By consent of instructor only.

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 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. (Same as NRC 420G.)

BIO 425 BIOLOGY SEMINAR: (SUBTITLE REQUIRED). (1)
This seminar develops effective analysis, presentation, and discussion skills required of Biology majors by exploring various life science topics of interest to faculty and students. Satisfies seminar requirements for Biology majors and can be repeated for a maximum of 2 credits under a different subtitle. Prereq: Senior standing in Biology recommended. BIO 150-153 or equivalent. Additional prereq(s) may be identified by instructor when topic is selected.

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 315 (or equivalent) or consent of instructor.

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 325 or equivalent and consent of instructor.

BIO 461 INTRODUCTION TO POPULATION GENETICS. (3)
This survey course examines the population dynamics and equlibria 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: ABT 360 (or equivalent) and one course in probability/statistics. (Same as ABT/ENT/FOR 461.)

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 208 or BIO 308 or consent of instructor. (Same as MI 494G.)

BIO 499 BIOLOGY RESEARCH SEMINAR. (1)
A seminar for students engaged in independent research. Students with BIO 395 experience will interact with student colleagues and an experienced research mentor. Prereq: Past or current enrollment in BIO 395.

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 507 BIOLOGY OF SLEEP AND CIRCADIAN RHYTHMS. (3)
This course provides an introduction to the fields of sleep and circadian rhythms including the underlying neuroanatomy, neurophysiology, and the molecular and genetic underpinnings of sleep and circadian behaviors. The medical and societal relevance of these areas will also be emphasized. Considerable time will be spent reading and analyzing the primary literature in these fields, including student presentations of selected articles. Prereq: BIO 304; BIO 315; BIO 350 (or equivalent).

BIO 508 EVOLUTION. (3)
Mechanisms of evolutionary change, with a brief summary of historical evolution, especially of the Metazoa. Prereq: BIO 304 or ASC/ABT 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. Lecture, one hour; laboratory; six hours per week. Prereq: BIO 304 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. Prereq: BIO 315 or BIO 304 or BCH 401 or BCH 501 or BCH 502 or BIO 510 or consent of instructor. (Same as INF 520.)

BIO 529 DEVELOPMENTAL BIOLOGY. (3)
An introduction to the principles of developmental biology, particularly of animals, including genetic and environmental control of development at the molecular, cellular, and physiological levels. Prereq: BIO 304 and BIO 315, or graduate standing in life sciences, or consent of instructor.

BIO 530 BIOGEOGRAPHY AND CONSERVATION. (3)
An introduction to the geographic patterning of biological diversity, exploring its origins, dynamics, and present trends. Examines the interplay among physical conditions, ecological interactions, evolutionary processes, and the historical movements of organisms and land masses as they have combined to affect the distribution of species, with particular attention to the application of biogeographic knowledge to current problems of species loss and conservation. Prereq: Two semesters of introductory biology or physical geography, or consent of the instructor. (Same as GEO 530.)

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 542 HISTOLOGY. (5)
An in-depth study of vertebrate cell and tissue structure and function. Human tissue is emphasized. Some knowledge of biochemistry, physiology, and anatomy is desirable. The laboratory involves study of prepared microscope slides. Lecture, three hours; laboratory, four hours per week. Prereq: BIO 315 or consent of instructor.

BIO 550 COMPARATIVE PHYSIOLOGY. (3)
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 LIFE CYCLE ECOLOGY OF FLOWERING PLANTS. (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 325 or consent of instructor.

BIO 553 FISH BIOLOGY. (4)
This course explores the biology of fishes from an evolutionary perspective. Lectures cover physiology, functional morphology, ecology, population biology, behavior, evolutionary relationships, and fisheries biology. Laboratory exercises include development of a fish collection; experiments in fish physiology, behavior and ecology; computer modeling of problems in fisheries biology; and field trips. Lecture, three hours; laboratory, two hours per week. Prereq: BIO 150, 151, 152 and 153 or consent of instructor.

BIO 555 VERTEBRATE ZOOLOGY. (5)
An intensive survey of the vertebrate classes with emphasis on trends and processes in evolution, classification, phylogeny, ecology, and adaptations in morphology and behavior. Lecture, three hours; laboratory, four hours per week. Prereq: BIO 150, 151, 152, 153 or consent of instructor.

BIO 556 COMMUNICATION BIOLOGY. (3)
Animals sense and respond to numerous signals from their environment by using sensory modalities attuned to visual, auditory, chemical, and electromagnetic cues. This course is an in-depth examination of the physiological bases of sensory input and the interactive, motor system-mediated, behavioral repertoires exhibited by different species in response to such inputs. Prereq: BIO 325 or BIO 350.

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 560 ENVIRONMENTAL PHYSIOLOGY AND TOXICOLOGY. (4)
Emphasis will be placed on the physiological and toxicological effects of chemicals on natural biota, including considerations at cellular, organismal, population, and community levels. This will include assimilation and metabolism of pollutants by animal species, with emphasis upon biochemical and physiological mechanisms involved in stress-induced responses and stress reduction. Additional areas of concern will include the transport, fate, and effects of chemical stressors on structure and function of biotic communities and will include introductions to ecotoxicology and environmental regulatory strategies. Lecture, three hours; recitation, two hours per week. Prereq: BIO 350 or PGY 502 or equivalent or consent of instructor. (Same as TOX 560.)

***BIO 561 INSECTS AFFECTING HUMAN AND ANIMAL HEALTH. (3)**
Discussion of arthropod parasites and disease vectors. Topics include an overview of disease transmission and public health, epidemiology, vector biology, important arthropod groups and their control. 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 563.)

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 567 APPLICATIONS OF GENETICS. (4)
Course covers genetic concepts with an emphasis on interpretation and analysis of molecular and population genetic data using examples from the entomological literature. Prereq: ABT 360 or BIO 304 or equivalent and an introductory statistics course.

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 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 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: BIO 304 and biochemistry or equivalent strongly recommended, or consent of instructor.

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 BCH/MI/PLS/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 325 or FOR 340 or ENT 665, or consent of instructor. (Same as ENT/FOR 605.)

BIO 606 CONCEPTUAL METHODS IN ECOLOGY AND EVOLUTION. (3)
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. The latter part of the course will consist of collaborative modeling projects, in which small groups of students will work with the instructor to address an important contemporary research problem and will report their results in a public talk and a project writeup. Prereq: One year of calculus and BIO 325 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 304 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 325 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 325 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/PGY 612.)

BIO 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 304) 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: ABT/ASC/ENT 360 or BIO 304. (Same as PLS 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 PLS 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 607. (Same as FOR/PLS 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 or consent of coordinator. Prereq or concur: BCH 607. (Same as FOR/PLS 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 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 304 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 304 or equivalent, BCH 501 or equivalent or consent of instructor.

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 650 ANIMAL PHYSIOLOGY LABORATORY. (2)
Hands-on laboratory exercises in animal physiology. Prereq: Previous or concurrent enrollment in BIO 550. (Same as PGY 650.)

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 684 PHYLOGENETIC SYSTEMATICS. (3)
Theory and methods of phylogenetic analysis and cladistics will be explained. Applications of phylogenetic analysis, such as historical biogeography, biological classification, and testing of ecological hypotheses will be explored. (Same as ENT 684.)

BIO 685 ADVANCED IMMUNOBIOLOGY. (3)
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 720 MICROBIAL STRUCTURE AND FUNCTION. (3)
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: (to reflect appropriate IBS course). (Same as MI 720 and OBI 720.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 PLS 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. (Same as VS 782.)

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, one hour, 15 minutes; laboratory, two hours, 55 minutes. Prereq: EE 305 or equivalent.

BME 579 NEURAL ENGINEERING: MERGING ENGINEERING WITH NEUROSCIENCE. (3)
A multidisciplinary approach combining engineering principles for systems analysis and control, knowledge of biological control mechanisms, and computational properties of biological neural networks in the development of engineering neural networks for control applications. Topics include: equivalent circuit models for biological neurons and networks, non-linear differential equation representations, biological control strategies for rhythmic movements, design and development of controller for robot function, proposal development and presentation. Prereq: EE 422G and Engineering Standing or consent of instructor. (Same as EE 579.)

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 642 NAVIGATIONAL GUIDES FOR BIOMEDICAL PRODUCT DEVELOPMENT. (3)
This course teaches engineers how biomedical product designs are influenced by government regulations, economic issues, and ethical concerns.

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 BIOSOLID MECHANICS. (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 MUSCULOSKELETAL BIOMECHANICS. (3)
Application of laws of mechanics to study behavior of human musculoskeletal system. Materials science of bone, muscle, tendon are integrated into static and dynamic analyses of isolated (e.g., foot, arm, and hand) and whole body segment. Prereq: PGY 502, ME 330 or consent of instructor.

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 766 MANAGEMENT OF TECHNOLOGY. (3)**
Successfulness in developing new technologies relies upon knowing which technology advance, the ultimate scientific limits of that technology, and the forecasted rate of technological change. This course presents curricula that explore the direction of technological change and how this affects the rate and extent of innovation.

#BME 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 774 GRADUATE BME SEMINAR. (0-1)
Scientists and engineers present current research in biomedical engineering. Students are required to prepare for and deliver a seminar on their own research. May be repeated to a maximum of 4 credits. Prereq: Graduate standing in Biomedical Engineering or consent of instructor.

BME 777 ADVANCED STUDY PROJECT. (3)
This is an independent study project, topic to be selected in consultation with the instructor. Purpose is to integrate all materials learned in the program and apply these principles to the solution of an actual problem in biomedical engineering technology. Prereq: Permission of instructor and completion of year 1 PBME studies.

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 607 FOOD RELATED BEHAVIORS. (3)
This team-taught course will provide background in topics and methods in food related behaviors to students in Nutritional Sciences and other interested students. The course will follow a problem-based learning approach, and will consist of 3 out of 4 modules in any given year. The four modules will be Social and Cultural Perspectives on Food, Psychological Perspectives on Food and Food Behaviors, Challenges to Community Food Security, and International Issues in Nutrition. (Same as ANT 607, NFS 607, NS 607.)

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 645 ANTHROPOLOGY AND EPIDEMIOLOGY. (3)
This course will introduce students to the fundamentals of epidemiology, as the methodological approach, which underlies biomedical research, and will examine the ways that the methodologies of anthropology and epidemiology complement each other in the study of health and disease. The course will examine the points of similarity between anthropology and epidemiology particularly as regards the importance of examining sociocultural phenomena in order to better understand the origins of disease. The course will explore the tensions between anthropology and epidemiology in matters of methodology, exemplified by the debate over quantitative vs. qualitative approaches, as well as theoretical perspective. Prereq: Permission of instructor. (Same as ANT 645.)

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: 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 FOOD AND FOOD SECURITY IN A CHANGING WORLD. (3)
This cross-cultural seminar explores the biocultural interactions among food, human biology, and the social, cultural, political and economic factors that shape food-related behaviors and nutritional status of populations. Topics include the social role of food, food beliefs and ideology, the political economy of malnutrition, development strategies and food security, and methods in nutritional anthropology research. Readings and discussions are research focused and approach issues from a variety of theoretical perspectives. Prereq: ANT 601 or consent of instructor. (Same as ANT 774.)

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 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 782 WOMEN'S HEALTH AND AGING. (3)
This class explores the issues related to health and well-being among older women. Using a multidisciplinary approach that blends humanities, social and medical science and public policy, the course examines social, economic and cultural contexts of chronic physical and mental health. Prereq: Upper level/graduate class in social science. (Same as GRN 782.)

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 810 PHYSICIANS, PATIENTS, AND SOCIETY I. (4)
In small groups, students and their assigned preceptors will study written clinical scenarios. Students will investigate, contemplate, comprehend, and discuss biological, clinical, psychological, economic, social, legal, and ethical issues concerning the problem-based histories. Prereq: Admission to Medical School (first year). (Same as MD 810.)

BSC 814 PATIENTS, DENTISTS AND SOCIETY I. (1)
This course aims to orient the student to the place health and health professions play in modern cultures. Recognition of their own social assumptions and values and those of persons of different backgrounds is encouraged. Understanding, predicting, and changing dental patient behavior from a social standpoint is emphasized. (Same as CDE 814.)

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.

APPROVED ELECTIVE:

BSC 850 ELECTIVE IN BEHAVIORAL SCIENCE

CD Communication Disorders

CD 277 INTRODUCTION TO COMMUNICATION DISORDERS. (3)
An introduction to disorders of speech, language, and hearing. The course includes definitions, symptomatology, etiologies, and basic intervention principles for these disorders.

CD 285 APPLIED PHONETICS. (3)
Study of the phonetic structure of the English language with requirement of mastery of the International Phonetic Alphabet. Emphasis will be placed on phonetic transcription, and application will be made for students interested in communication disorders, communications, telecommunications, and theater.

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 401 BASES 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 402 BASES OF SPEECH. (3)
Provide basic information concerning the physics of sound and the scientific bases of human speech production and perception. The relationship between speech production and speech perception will also be addressed. Students will have exposure to instrumentation designed to increase understanding of human communication. Prereq: CODI major or permission of instructor.

CD 410 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: CODI major or consent of instructor.

CD 420 AUDIOLOGY. (3)
Introduction to symptomatologies and etiologies of hearing impairment and principles of hearing assessment. Topics include: peripheral hearing impairment; central and nonorganic hearing impairment; screening for hearing impairment; hearing conservation; pure tone air and bone conduction threshold testing; basic speech audiometry; masking; audiometric calibration; and acoustic immitance screening. Prereq: CD 401 or consent of instructor; CODI majors only.

CD 481 CLINICAL EXPERIENCE IN COMMUNICATION DISORDERS. (3)
Supervised observation and shadowing of assessment and intervention to familiarize students with diagnostic and clinical services in communication disorders at various settings such as schools, clinics, long term care, home health, and/or hospitals. Lecture: 1 hour; laboratory: 4 hours per week. Prereq: CD 401, 402, and 410 or consent of instructor; CODI majors only.

CD 482 CLINICAL MANAGEMENT OF COMMUNICATION DISORDERS I. (3)
Introduction to remediation of speech disorders in individuals from birth through adulthood and from culturally and linguistically diverse backgrounds. Emphasis on strategies to deal with disorders in voice, fluency, and articulation. Prereq: CD 401, CD 402, and CD 410 or consent of instructor; CODI majors only.

CD 483 CLINICAL MANAGEMENT OF COMMUNICATION DISORDERS II. (3)
Introduction to remediation of language disorders in individuals from birth through adulthood and from culturally and linguistically diverse backgrounds. Emphasis on strategies to deal with disorders in child language, aphasia, and other language-based disorders, including Alzheimer's Disease and dementia. Prereq: CD 401, CD 402, and CD 410 or consent of instructor; CODI majors only.

CD 484 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 401, CD 402, and CD 410 or consent of instructor; CODI majors only.

#CD 500 INTEGRATIVE CARE FOR HEALTH SCIENCES. (1-3)
Integrative care involves using the best possible treatments from both complementary/alternative and allopathic medicine, based on the patient's individual needs and condition. The selection of health care providers should be based on good science and this course will introduce students to complementary and alternative health care providers and the practices and beliefs of these practices as well as the scientific evidence in support of these practices. The course integrates successes from both worlds and describe the safest, least invasive, most cost-effective approach while incorporating a holistic understanding of the individual. May be repeated to a maximum of 3 credits (1 credit didactic and up to two credits experiential/research). (Same as AT 500, HS 500, CLS 500, CNU 500, PA 500, PT 686.)

CD 520 INTRODUCTION TO MANUAL COMMUNICATION. (2)
An introduction to manual communication systems, including American Sign Language and other commonly-used manual sign systems. Includes study of the characteristics and use of existing manual communication systems. Students will learn to code and decode sentences using a combination of signs and fingerspelling. Lecture: one hour; laboratory: two hours per week.

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 571 NEURAL BASES OF SPEECH, LANGUAGE, AND HEARING. (3)
Detailed investigation of the neuroanatomy and neurophysiology of speech, language, and hearing from a communication sciences perspective. Emphasis on anatomy and physiology of the central nervous system, neurodevelopment, and normal neural substrates involved in speech, language, and hearing. Prereq: CD 378 or permission of the instructor.

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 621 ALTERNATIVE AND AUGMENTATIVE COMMUNICATION. (3)
A detailed investigation of the use of augmentative and alternative communication systems with individuals with moderate to severe communication disorders. Participants will examine the full range of augmentative/alternative communication systems and the related assessment and intervention considerations. Prereq: EDS 375 or equivalent or graduate status in CODI or RHB, or consent of instructor.

CD 647 LANGUAGE DISORDERS IN DEVELOPMENTALLY YOUNG INDIVIDUALS. (3)
A detailed investigation of language disorders and language intervention in developmentally young populations. Includes an in-depth discussion of prevention strategies, service delivery models, assessment tools and paradigms, and intervention strategies. Provides practice in self-directed inquiry. Prereq: Graduate status in CODI or RHB or consent of instructor.

CD 648 LANGUAGE DISORDERS IN SCHOOL-AGE POPULATIONS. (3)
A detailed investigation of language disorders and language intervention in school-age populations. Includes an in-depth discussion of prevention strategies, service delivery models, related cultural diversity issues, and assessment and intervention principles and strategies. Prereq: Graduate status in CODI or RHB or consent of instructor.

CD 654 CLINICAL ORIENTATION IN COMMUNICATION DISORDERS. (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: Graduate status in CODI or consent 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 657 CLINICAL PRACTICUM IN SPEECH-LANGUAGE PATHOLOGY. (1-3)
Experience with children and adults in the assessment and management of communication and swallowing disorders. Lecture, one hour; practicum, four hours per week. May be repeated to a maximum of 12 credits. Prereq: Graduate status in CODI, CD 481 or equivalent, and CD 654.

CD 659 CLINICAL ROTATION IN SPEECH-LANGUAGE PATHOLOGY. (1-12)
Supervised clinical experience in the evaluation and management of children and adults. Up to 40 laboratory hours per week (at site all day). May be repeated up to 36 hours. Prereq: Graduate status in CODI, successful completion of 6 hours of graduate clinical practicum and consent of instructor.

CD 661 PHONOLOGICAL DEVELOPMENT AND DISORDERS. (3)
A comprehensive course in phonological theory, assessment, and treatment. Advanced principles of diagnosis and remediation for patients across the age span and from culturally and linguistically diverse backgrounds. Prereq: Graduate status in CODI or RHB or consent of instructor.

CD 670 VOICE DISORDERS. (3)
Assessment and management of adults and children with disorders of voice and resonance. Includes laryngectomy. Prereq: Graduate status in CODI or RHB or consent of instructor.

CD 674 DISORDERS OF FLUENCY. (3)
Analysis, identification and management of fluency disorders. Prereq: Permission of instructor.

CD 677 NEUROGENIC COMMUNICATION DISORDERS I. (3)
Analysis, identification and management of acquired neurogenic disorders of language and cognition. Primary emphasis is given to aphasia, dementia, and right hemisphere dysfunction. Prereq: Graduate status in RHB or CODI or consent of instructor.

CD 678 NEUROGENIC COMMUNICATION DISORDERS II. (3)
Analysis, identification and management of neurogenic disorders of speech. Emphasis will be placed on clinical management of dysarthria, apraxia, and communication disorders following traumatic brain injury. Prereq: CODI major, RHB doctoral major or consent of instructor.

CD 691 AURAL REHABILITATION. (3)
Management strategies for people with hearing loss. Topics include: variables affecting hearing handicap; characteristics, selection, counseling, and orientation in regard to amplification systems; acoustic, perceptual and visual aspects of speech; assessment and management of problems resulting from hearing loss across the lifespan. Prereq: CD 420 or consent of instructor.

CD 701 RESEARCH METHODS 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 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.

CD 761 APPLIED PHONOLOGY: DEVELOPMENT AND DISORDERS. (3)
Critical review and discussion of clinical and developmental phonology research and phonological theories. Study of the bases for normal and disordered phonological development from birth through age twelve. Study of procedures for assessment and treatment of children with phonological disorders including the development of individualized remediation plans for expediting intelligibility gains. Course will include information regarding second language acquisition and oral and written language as these relate to phonological systems. Prereq: Admission to the Communication Disorders graduate program or the Rehabilitation Sciences Ph.D. program or consent of the instructor.

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

CD 771 DYSPHAGIA. (3)
This course includes a review of the anatomy and physiology of normal deglutition; the nature and characteristics of swallowing disorders; methods of evaluation and management of dysphagia in adults and children; and consideration of medical conditions such as aspiration pneumonia, tracheostomy, and other complicating factors associated with dysphagia. Also included is a brief review of professional issues relating to efficacy of treatment; third party reimbursement; and roles and responsibilities of other health care professionals in feeding and swallowing. Prereq: Admission to the Communication Disorders graduate program or the Rehabilitation Sciences Ph.D. program or consent of the instructor.

CD 772 ADVANCED SEMINAR IN APHASIA. (3)
Critical review of the literature in disturbances in symbolic behavior in adults resulting from a variety of etiologies. The course includes aphasia, as well as adult communication disorders associated with dementia, agnosia, right hemisphere injury, traumatic brain injury, and schizophrenia. Prereq: Admission to the Communication Disorders graduate program or the Rehabilitation Sciences Ph.D. program or consent of the instructor.

CD 775 SEMINAR IN LITERATE LANGUAGE. (3)
A review and discussion of the literature concerning literate language. Topics include: 1) characteristics of literate language; 2) differences between literate and oral language; 3) emergent literacy; 4) theories of the reading and writing processes; 5) components, development, strategies, and factors involved in typical reading and writing; 6) literate language and speaking; and 7) issues pertaining to atypical readers and writers. Prereq: Admission to the Communication Disorders graduate program or the Rehabilitation Sciences Ph.D. program or consent of the instructor.

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 814 PATIENTS, DENTISTS AND SOCIETY I. (1)
This course aims to orient the student to the place health and health professions play in modern cultures. Recognition of their own social assumptions and values and those of persons of different backgrounds is encouraged. Understanding, predicting, and changing dental patient behavior from a social standpoint is emphasized. (Same as BSC 814.)

CDE 815 FUNDAMENTALS OF DENTAL PUBLIC HEALTH. (2)
Fundamentals of Dental Public Health is a first-year course designed to increase student knowledge of concepts of dental public health and dental epidemiology that are used in population based (community) health care. Oral health problems in Kentucky and the U.S. will be studied. Students will participate in external public service activities during laboratory sessions. Lecture, 23 hours; laboratory, 28 hours.

CDE 824 COMMUNICATION IN THE DENTAL HEALTH CARE SETTING. (1)
This course aims to improve the student's ability to communicate with patients and the public in an empathetic and professional manner. Methods of obtaining necessary health information from all types of patients are taught. Prereq: Second year standing in the College of Dentistry. (Same as BSC 824.)

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. (4)
This course is primarily designed to give the student dentists, prior to graduation, practical, useful knowledge on establishing and maintaining a private dental practice. The course will be presented in an active learning format. Course sessions and activities will also include special sessions designed to introduce students to the current environment of dental practice, to organized dentistry in Kentucky, to the College's Alumni Association and to new developments and continuing education in the dental profession. Lecture 69 hours. Prereq: CDE 830 or consent of course director.

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 613 CONTEMPORARY LEADERSHIP IN DENTISTRY. (1)
The course will explore the current leadership dilemma in the health professions (specifically). The purpose is to prompt the extension of the role of oral health professionals to serve as leaders who engage a richer "public good" agenda as part of their role as doctor/teacher. The course will concentrate on important issues such as leadership development and theories of leadership; team building; personality preferences and leadership; peer assessment; transformational and transactional leadership; stress management; leading change; negotiation; and giving and receiving feedback. Prereq: Enrollment in one of the College of Dentistry's post-doctoral programs.

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 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 CLINICAL DENTISTRY. (3)
This survey course presents an introduction to the dental field of operation (operatory), basic assisting procedures, preventive dentistry, infection control, application of sealants and oral isolation techniques. It is designed to prepare students to function in dental environments, safely and efficiently and to prepare them for the school-based sealant experience offered in CDE 815, Fundamentals of Dental Public Health. Lecture, 34 hours; lab, 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 819 SPECIAL TOPICS IN DENTISTRY. (1)
This course will have first-year dental students consider important social, educational, and professional issues they will encounter during dental school and in their careers. The topics range from cultural diversity, professional and academic responsibility, sexual harassment awareness, minority health and related issues, to time management, personality type, and learning/teaching styles. Prereq: First year standing.

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 822 GERONTOLOGY/GERIATRIC DENTISTRY. (1)
This course is designed to help students gain an appreciation for the significant opportunities as well as challenges the aging population will bring to their oral health practice. This course will provide students basic knowledge and information in gerontology/geriatric dentistry. Lecture, 17 hours. May be repeated to a maximum of two credits. Prereq: Admission to the College of Dentistry or discretion of course director. (Same as GRN 720.)

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 821 or consent of course director.

CDS 824 INTRODUCTION TO ORAL DIAGNOSIS AND TREATMENT PLANNING. (2)
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 815 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 CLINICAL PATIENT MANAGEMENT. (1)
This course introduces the dental student to various special needs conditions and teaches the proper methods of physical management of special needs 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 835 DENTAL IMPLANTOLOGY. (2)
Dental implantology has become an integral part of dental services. This course contains information on patient centered criteria for implant services, surgical considerations, and prosthetically driven treatment results. The student will have the opportunity to familiarize him/herself with the components used in providing such treatment through a hands-on laboratory session. Lecture; 24 hours; laboratory, 12 hours. Prereq: Admission to College of Dentistry or discretion of course director.

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.

CDS 844 DRUG MISUSE, ABUSE AND DEPENDENCY: WHAT DENTISTS NEED TO KNOW. (1)
This course is designed to provide new insights and understanding into prevention, recognition and treatment of patients with, and at risk for, drug misuse and abuse. The course enables dental students to understand addiction as primary, chronic and progressive disease and to demonstrate an understanding of the pharmacology, abuse potential, as well as the behavioral and physiological effects of the commonly abused drugs. Emphasis will be on increasing dental students skills and abilities to recognize the signs and symptoms of drug abuse; identify and manage patients at risk for drug problems; and become effective in providing successful care for drug dependent patients while minimizing their potential for relapse.

CDS 846 DIAGNOSIS AND MANAGEMENT OF OROFACIAL PAIN. (3)
This course will present information regarding the diagnosis and management of orofacial pain and temporomandibular disorders. The course will consist of lectures and one laboratory session. The information provided in this course will allow the student to understand the dentist's role in managing complex orofacial pain problems. The area of temporomandibular disorders will be emphasized since the dentist plays a major role in managing these pain disorders. Lecture, 29 hours; laboratory, 2 hours; clinic, 6 hours. Prereq: ANA 534, OBI 829, OSG 820, and RSD 822.

CE Civil Engineering

***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 or coreq: MA 113 or consent of instructor.

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 211 SURVEYING. (4)
A comprehensive course in the art and science of surveying as applied to civil 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 and MA 114. (Same as MNG 211.)

CE 221 APPLIED UNCERTAINTY AND RISK ANALYSIS IN CIVIL ENGINEERING. (3)
An introduction to the applications of uncertainty, reliability, decision, and risk analysis in civil engineering. Data collection, systems analysis, and civil engineering design under uncertainty. Probabilistic analysis applied to the various areas of civil engineering: geotechnical, transportation, environmental, materials, structural, hydraulic, and water resources engineering. Civil engineering systems governed by random processes. Applications of mathematics software, Monte Carlo simulation, and time series in civil engineering. Prereq: MA 114.

CE 303 INTRODUCTION TO CONSTRUCTION ENGINEERING. (4)
The study of the planning, administration, management, and cost of construction projects and an introduction to the methodology utilized in executing specific designs. Emphasis is placed on the organization of construction firms, development of construction documents, interpretation and analysis of engineering plans and specifications, theory of engineering economics, estimating and quantity take-off, contractural and management systems, scheduling, project administration, and inspection of construction operations. Lecture, three hours; laboratory, two hours per week. Prereq: CE 106 and registration in the College of Engineering.

CE 321 CIVIL ENGINEERING SYSTEMS. (2)
An introduction to basic principles of engineering problem solving with applications to civil engineering systems. Formulation and solution of inductive and deductive mathematical models using principles of numerical analysis and mathematical programming. Prereq or concur: CS 221.

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 and registration in the College of Engineering.

***CE 341 INTRODUCTION TO FLUID MECHANICS. (4)**
Fundamental principles of thermodynamics and fluid flow. Includes fluids at rest, fluids in motion. Continuity, momentum and energy relations, ideal and viscous fluids. Emphasis on incompressible fluids. Description of pumps and open channels. Prereq: PHY 231 and MA 214 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 I. (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. Coreq: EM 302 and registration in College of Engineering.

***CE 382 STRUCTURAL ANALYSIS. (3)**
Statically determinate analysis of two-dimensional structures: trusses, beams and frames. Influence lines for truss and beam structures. Displacement calculations using virtual work principles. Statically indeterminate structural analysis includes approximate, force method and plastic analyses. Prereq: EM 302 and engineering standing.

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 399 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 399 number. Prereq: Variable; given when topic identified and registration in the College of Engineering.

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 429 CIVIL ENGINEERING SYSTEMS DESIGN. (4)
The course is designed to provide the graduating civil engineer with an integration of professional practice issues with planning, design, and construction. Topics to be covered will include: development of teaming, problem solving, and decision-making skills; development of written and oral technical communication skills; procurement of professional services; integration of planning, design, and construction activities; integration of environmental, legal, political, and social issues and concerns into the project process. All activities will be conducted in teams. Lecture, three hours; laboratory three hours per week. Prereq: To be taken during the student's last semester.

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, layered systems flow and pollutant movement. Prereq: ME 330 or CE 341 or consent of instructor, and engineering standing. (Same as BAE 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. (4)
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. Design of footing foundations and retaining walls. Written and oral presentations of student projects will be required. Lecture, three hours; laboratory, three hours per week. Prereq: EM 302; prereq or concur: GLY 220; 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 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 plant 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 525 CIVIL ENGINEERING APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS. (3)
CE 525 focuses on GIS as a tool in Civil Engineering. The terms and concepts related to Geographic Information Systems are introduced. The management of spatial databases, particularly those related to Civil Engineering, is covered. Students will collect data using a Global Positioning System (GPS). Students will be required to use the GIS ArcInfo to solve a specific individual spatial problem that they propose based on several Civil Engineering databases available to them. Lecture, two hours; laboratory, three hours per week. Prereq: Engineering standing and one of the following: CE 331, CE 341, or CE 471G.

***CE 531 GEOMETRIC DESIGN AND OPERATIONS OF ROADWAYS. (3)**
Analysis of transportation facilities through a diagnostic study of transportation systems with emphasis on design, capacity and safety. Engineering practice oriented toward open-ended design solutions, mostly focused on roadway design. Prereq: CE 211, CE 331, and 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. (3)
This course focuses on the design of urban intersections and the procedures used to evaluate the operational level of urban roadway systems. First, a review of urban intersection design principles and aspects is presented. Second, traffic signal timing techniques are reviewed and students are required to use two software packages for evaluation of traffic operation of urban roadway systems. The focal point of the course is a group design project where solutions to accommodate all transportation modes and their issues along a corridor in Lexington are sought. Fieldwork and data collection are part of this course. Lecture, two hours; laboratory, one hour. Prereq: CE 211 and CE 331; CE 531 prereq or concur.

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 341 or ME 330 and engineering standing. (Same as BAE 536.)

***CE 549 ENGINEERING HYDRAULICS. (3)**
Analysis of flow in closed conduits and natural and artificial open channels. Design of hydraulic structures. Prereq: CE 541 and engineering standing, or consent of instructor. (Same as BAE 545.)

CE 555 MICROBIAL ASPECTS OF ENVIRONMENTAL ENGINEERING. (3)
Environmental microbiology for engineering students with emphasis on microbially mediated chemical cycles, microbial ecology, and industrial microbiology. Prereq: CHE 105 and 107, engineering standing or consent of instructor.

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 BAE 556.)

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 581 CIVIL ENGINEERING MATERIALS II. (3)
Design, evaluation, and construction of portland cement concrete and hot mix asphalt (HMA). Advanced topics related to high performance concrete and asphalt materials are covered in this course. Prereq: CE 381 and engineering standing.

***CE 582 INTERMEDIATE STRUCTURAL ANALYSIS. (3)**
Analysis of indeterminate, truss, frame and arch structures using energy principles associated with the flexibility and stiffness methods; influence line functions for indeterminate structures; and use of available computer programs for structural analysis and matrix operations. Prereq: CE 382 and engineering standing; or consent of instructor.

CE 584 DESIGN OF TIMBER AND MASONRY STRUCTURES. (3)
Current and historic design methods of buildings and their components using wood, wood products, bricks, and concrete blocks. Prereq: Courses in steel and reinforced concrete design at the senior level, or consent of instructor. (Same as ARC 584.)

CE 585 CIVIL ENGINEERING FAILURES. (3)
Fundamentals of failure investigation and forensic engineering; Failure types and mechanisms; Case studies and discussions on various constructed facilities. Prereq: CE 382 or consent of instructor, 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. (3)
Design loads. Structural systems and bracing. Analysis and design of buildings and bridges. Use of computer systems for design projects. Written and oral presentations required. Prereq: CE 486G and CE 487G; prereq or concur: CE 579; or consent of instructor.

#CE 595 INDEPENDENT WORK IN CE. (1-4)
Individual work on some selected problem in the field of civil engineering. May be repeated for a maximum of six credits. Prereq: Consent of department chairperson and the instructor; with engineering standing.

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 PROJECT MANAGEMENT. (3)
Management of construction projects: planning, estimating, scheduling and control; organization; site management; material management; safety management; quality management; construction labor relations; productivity management; claims. Prereq: CE 503, CE 505, or consent of instructor.

CE 605 NEW ENGINEERING ENTERPRISES. (3)
The course covers the theory and actual practices of organization, management and operation of engineering companies. Primary emphasis on construction companies; however, the principles apply to most service oriented engineering companies. Students will be required to do several independent exercises related to establishing an engineering company. Prereq: CE 505, graduate standing in engineering, or consent of instructor.

CE 631 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 and use models; modal split; developing and testing proposed systems; simulation. Prereq: CE 531 or equivalent and STA 381, or 681 or equivalent statistics course. (Same as GEO 643.)

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 635 HIGHWAY SAFETY. (3)
A detailed review of the impacts of safety considerations on highway design and planning, focusing on the highway environment, its users (both vehicles and drivers) and their interactions. The role of special interest groups (tracking industry, insurance agencies) is also examined. Prereq: CE 539 or consent of instructor.

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 study of open channel flow fundamentals and concepts. Topics include uniform flow, varied flow, steady and unsteady flow, energy dissipators, flow transitions, controls, analytical and numerical solutions in 1D and 2D applications. Prereq: CE 541 or consent of instructor. (Same as BAE 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 BAE 653.)

CE 655 WATER SANITATION AND HEALTH. (3)
Prevention of water-related diseases by appropriate supply and sanitation practices with designs applicable to small systems and rural areas of developing nations. Prereq: Previous college-level courses in chemistry and/or biology, 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 BAE 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. (Same as BAE 662.)

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 BAE 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 BAE 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 672 LANDFILL DESIGN. (3)
This course deals with the geotechnical aspects of the design of landfills for the disposal of municipal solid waste. Since landfill design is driven by state and federal regulations, time is taken to review these regulations. Landfills are evaluated as engineered systems consisting of multiple components. Each component is investigated individually, and methods are developed to predict and quantify the performance of these components so that appropriate materials, design criteria, and construction methods can be selected to assure that the landfill will function with minimal environmental impact. Prereq: CE 471G. (Same as BAE 672.)

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 GEOTECHNICAL EARTHQUAKE ENGINEERING. (3)
Introduction to seismology. Dynamic and earthquake response of soils using standard analysis. Liquefaction of soils under cyclic loading. Measurements of dynamic properties of soils. Earthquake resistant design of retaining walls, foundations, slopes, and earth dams. Soil improvement methods for seismic resistant design. Current state-of-the-art techniques in geotechnical earthquake engineering. Prereq: CE 579.

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 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 783 STRUCTURAL FINITE ELEMENT ANALYSIS. (3)
Theoretical, conceptual and computational aspects of the finite element method are presented. Development of the element relationships, element calculations, assembly and efficient solution of the finite element method are emphasized. Finite element formulations developed for 2D, 3D axisymmetric and plate bending problems in structural mechanics for both static and dynamic applications. Prereq: MA 432G and EGR 537, or CE 682 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.

CGS Cognitive Science

CGS 500 COGNITIVE SCIENCE IN THEORY AND PRACTICE. (3)
This course will introduce upper-level undergraduate students (and lower-level graduate students) to Cognitive Science, an interdisciplinary field that seeks to study the mind from the perspective of various disciplines: Biology, Computer Science, Linguistics, the Neurosciences, Philosophy, and Psychology. The course will consist of modules in at least four of these six disciplines. Prereq: Upper-class standing.

CHE Chemistry

CHE 101 MOLECULAR SCIENCE FOR CITIZENS. (3)
A conceptual introduction to the molecular nature of all natural and man-made materials as well as the key molecules of biological organisms. The important classes of molecules (structural and high-technology materials, cosmetics, fibers, fuels, polymers, metals, water, carbon dioxide, food, vitamins, detergents, pharmaceuticals, proteins, bio-molecules, environmental pollutants) will be discussed in terms of their properties, synthesis, transformations, and utility.

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: Two years of high school algebra and Math ACTE of 19 or above (or Math placement test), or completion of MA 108R.

***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 or CHE 104 and CHE 108, but open to students who have completed just CHE 104. Prereq: Math ACTE of 23 or above (or Math placement test), or MA 109, 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 108 INTRODUCTION TO INORGANIC, ORGANIC AND BIOCHEMISTRY WITHOUT LABORATORY. (3)
A continuation of CHE 104. A study of selected aspects of inorganic, organic, and biochemistry including the chemistry of metals and nonmetals, basic organic functional groups, proteins, nucleic acids, and lipids. Lecture material is identical to that of CHE 106, but there is no laboratory component. Not open to students who have already completed CHE 105 and 107 or CHE 106. 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.

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 195 GENERAL CHEMISTRY WORKSHOP I. (1)
Peer-led team problem solving. Two-hour workshop offered on a pass-fail basis only. Enrollment in CHE 105 need not be accompanied by enrollment in CHE 195. Prereq: Concurrent registration in CHE 105 required.

CHE 197 GENERAL CHEMISTRY WORKSHOP II. (1)
Peer-led team problem solving. Two-hour workshop offered on a pass-fail basis only. Enrollment in CHE 107 need not be accompanied by enrollment in CHE 197. Prereq: Concurrent registration in CHE 107 required.

CHE 199 RESEARCH EXPERIENCE IN CHEMISTRY. (0)
Participation in laboratory research in chemistry. Offered pass/fail only. Prereq: Permission of instructor.

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 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 295 ORGANIC CHEMISTRY WORKSHOP I. (1)
Peer-led team problem solving. Two-hour workshop offered on a pass-fail basis only. Enrollment in CHE 230 need not be accompanied by enrollment in CHE 295. Prereq: Concurrent registration in CHE 230 required.

CHE 297 ORGANIC CHEMISTRY WORKSHOP II. (1)
Peer-led team problem solving. Two-hour workshop offered on a pass-fail basis only. Enrollment in CHE 232 need not be accompanied by enrollment in CHE 297. Prereq: Concurrent enrollment in CHE 232 required.

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 INTRODUCTORY 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, including quantum chemistry, spectroscopy, thermodynamics and chemical kinetics. Laboratory, six hours. Prereq: A previous course in physical chemistry.

CHE 442G THERMODYNAMICS AND KINETICS. (3)
Principles of physical chemistry including thermodynamics, chemical kinetics, and statistical thermodynamics. Prereq: CHE 226; MA 213; PHY 213 or 232.

***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; CME 200 or the equivalent.

CHE 450G PRACTICAL INORGANIC CHEMISTRY. (4)
A combined lecture and laboratory course that will acquaint the student with the synthesis, characterization and properties of inorganic and organometallic compounds of both main-group and transition elements. Lecture, two hours; laboratory, six hours per week. Prereq: CHE 231 and CHE 232; prereq or concur: CHE 440G or CHE 446G.

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 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 modern applications of quantum theory to the calculation of molecular properties. Practical experience with quantum chemistry software on various computer platforms is included. Prereq: MA 213; PHY 213 or 232; or consent 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 550 BIOLOGICAL CHEMISTRY I. (3)
An introduction to biological chemistry. Topics include amino acids and proteins; nucleic acids and nucleotides; enzyme structure, function and energetics; metabolism including glycolysis; the tricarboxylic acid cycle; electron transport and oxidative phosphorylation; glycogen metabolism; hormone action; and other aspects of modern biological chemistry. Prereq: CHE 232 and a physical chemistry course at or above the 400 level, or consent of instructor.

CHE 552 BIOLOGICAL CHEMISTRY II. (3)
A further introduction to biological chemistry. Topics include lipid metabolism, biosynthesis and metabolism of nitrogen-containing compounds, storage and utilization of genetic information, immunochemistry, and other contemporary topics in biological chemistry Prereq: CHE 232 and a physical chemistry course at or above the 400 level, or consent of instructor.

CHE 553 CHEMISTRY AND MOLECULAR BIOTECHNOLOGY. (3)
This course focuses on the chemical aspects of biotechnology development. Current topics in biotechnology are emphasized through extensive reading and classroom discussion of the most recent scientific literature. Biotechnology development in fields as diverse as agriculture, the environment, and medicine will be covered. Prereq: An introductory course in biology, biological chemistry, or biochemistry; and CHE 232; or consent of instructor.

CHE 555 HOMONUCLEAR NMR. (3)
This course will give students hands-on experience with modern NMR experiments that are the mainstays of chemical structural analysis and biophysical studies of macromolecules and pharmaceuticals. Lecture, two hours; laboratory, three hours per week. Prereq: CHE 232 or CHE 236; and CHE 440G.

***CHE 558 HORMONE RECEPTORS AND CELL SIGNALS. (3)**
This course starts with the general concepts on hormones and their receptors and describes how hormones interact with their receptors and generate hormone signals and responses. Prereq: BIO 315 or equivalent, BCH 401G or equivalent, CHE 550 or 552 or equivalent, or consent of instructor.

CHE 559 MOLECULAR BIOPHYSICS. (3)
Overview of intermolecular forces responsible for formulation tertiary structure and macromolecular assemblies, as well as linked equilibria, allostery and propagation of signals. Extension of these principles to explain macromolecular machines, complex molecular behavior and, ultimately, processes of life. Prereq: CHE 442G or equivalent or permission of instructor.

CHE 565 ENVIRONMENTAL CHEMISTRY. (3)
A study of the sources, reactions, transport, effects, and fates of chemical species in the atmosphere, hydrosphere, lithosphere and biosphere. Prereq: Two semesters of general college chemistry are required. Courses in analytical and physical chemistry are recommended, but are not required.

CHE 572 COMMUNICATION IN CHEMISTRY. (1)
Reports and discussions on recent research and current chemical literature in seminar format; literature searching methods; resume 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 612 INORGANIC CHEMISTRY OF THE NON-METALS. (3)
A detailed treatment of the inorganic chemistry of the nonmetals. Topics include theories of bonding, spectral characteristics, reaction mechanisms, preparations, physical methods of characterization and structural determination, and applications. 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 include potentiometric, voltammetric, amperometric, and coulometric methods. Prereq: CHE 442G, 522 or 548.

CHE 623 CHEMICAL EQUILIBRIUM AND DATA ANALYSIS. (3)
An advanced treatment of chemical equilibrium, sampling, and the evaluation of data obtained from chemically related measurements. Prereq: CHE 226 or 440G or 522 or equivalent.

CHE 625 SPECTROCHEMICAL ANALYSIS. (3)
An intensive study of the theory, instrumentation, and analytical applications of modern atomic and molecular spectrometric methods. Prereq: CHE 522.

CHE 626 ADVANCED ANALYTICAL CHEMISTRY. (3)
An advanced study of the theory and practice of quantitative analysis.

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 664 MULTIDISCIPLINARY SENSORS LABORATORY. (3)
A multidisciplinary laboratory course with laboratory experiences in areas related to sensors and sensing architectures, typically including chemistry, chemical and materials engineering, and electrical engineering. Lecture, 1 hour; laboratory, 2 hours. Prereq: One year of college chemistry, calculus and physics. GS 660 or by consent of instructor. (Same as CME/EE/MSE 664.)

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 736 TOPICS IN ORGANIC CHEMISTRY. (2-4)
Selected topics which may include heterocyclic organic compounds, natural and synthetic dyes, carbohydrates, nitrogen compounds, and recent advances in the field of organic chemistry. May be repeated to a maximum of 12 credits.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

CHI Chinese Culture and Language

CHI 101 BEGINNING CHINESE I. (4)
A course in first semester Chinese language.

CHI 102 BEGINNING CHINESE II. (4)
A course in second semester Chinese language. Prereq: CHI 101 or equivalent.

CHI 201 INTERMEDIATE CHINESE I. (4)
A course in third semester Chinese language. Prereq: CHI 102 or equivalent.

CHI 202 INTERMEDIATE CHINESE II. (4)
A fourth semester course in Chinese language. Prereq: CHI 201 or equivalent.

CHI 320 GENDER POLITICS IN CHINESE LITERATURE. (3)
An interdisciplinary, multimedia approach to the representation of gender relations in Chinese literature over time. Critical engagement of such topics as the complex relationships between women's issues and national discourse, between identity and performance, between the construction of female subjectivity and male fantasy, between gender and genre. Students will be encouraged to conduct cross-genre and cross-cultural comparisons. All readings in English. Prereq: Junior status or consent of instructor.

CHI 321 INTRODUCTION TO CONTEMPORARY CHINESE FILM. (3)
The course offers an overview of major films, directors and actors in the contemporary PRC, Taiwan and Hong Kong. It examines the genres of Chinese film better known in the U.S., including the Hong Kong action film, fifth-generation mainland cinema and Taiwanese urban dramas. The course will provide an understanding of contemporary Chinese cinema through analyses of the content and style, poetics and politics of films/filmmakers/film movements, that reflect the Chinese cultural value system and differing Chinese aesthetics vis-a-vis Western and Hollywood views. All films are screened with English subtitles. Prereq: Junior status or consent of instructor.

CHI 395 INDEPENDENT WORK IN CHINESE. (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.)

CHI 495G ADVANCED INDEPENDENT WORK IN CHINESE. (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 CHI 395 and 495G.

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 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 610 PARTICIPATORY COMMUNICATION. (3)
This seminar will provide students with a state of the art account of the underlying philosophical, theoretical, and methodological premises of participatory communication. This will help students gain a deep understanding of participatory communication theory and research, and their implications for such contexts as management and organizational communication, health communication, international development, journalism, democracy and civic engagement, public policy, and communication with marginalized groups. Prereq: At least one year of graduate study in communication or consent of instructor.

CJT 615 PROSEMINAR IN COMMUNICATION AND INFORMATION SYSTEMS. (3)
This course is an introductory graduate-level survey of theory and research on human communication mediated by communication and information technologies. This course is designed to cover the areas not typically addressed in traditional courses of mass or interpersonal communication, including theory and research on the use of computers and electronic communication over a variety of communication and information systems. Prereq: Graduate standing or consent of instructor. (Same as LIS 615.)

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)
The course reviews existing and emerging theoretical, perspectives relevant to the context of interpersonal communication. Emphasis is on theories of message production and reception, identity management, relationship development, and related processes. Methods of investigation unique to the study of interpersonal interaction are also addressed. Students are expected to be familiar with general communication theory and basic research methods prior to enrolling in the course.

CJT 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. Prereq: Consent of instructor. (Same as LIS 637.)

CJT 638 INTERNET TECHNOLOGIES AND INFORMATION SERVICES. (3)
A course examining the structure, development and evolution of the Internet; network protocols and client/server architecture issues; Web page design, authoring, and evaluation; the use of the Internet as an information storage and retrieval system; recent advances in HTML and scripting languages; and Internet related social issues such as censorship and copyright. Prereq: LIS 636 or consent of instructor. (Same as LIS 638.)

#CJT 639 INTRODUCTION TO MEDICAL INFORMATICS. (3)
This course is designed to introduce the interdisciplinary field of medical informatics to health information professionals. Medical Informatics is a developing field that essentially seeks to apply information and computing technologies to improve all aspects of healthcare, including patient care, research, and education. During the semester we will explore a number of topics central to understanding the field, including: the nature of biomedical information, the electronic medical record, the role of information and computing technologies to support clinical decision making, healthcare and informatics standards, information retrieval, system analysis and technology assessment, and essential issues of information technology in medical education and medical ethics. By the end of this Web-based course, students are expected to be able to understand broad aspects of the field and can use this as a foundation for further education, training, and work in health information professions. (Same as LIS 639.)

CJT 640 HEALTH SCIENCES LIBRARIES. (3)
A survey of health sciences libraries and information agencies, including coverage of topics related to: the healthcare community and their information needs, information resources in the health sciences, controlled medical terminologies and classification systems, search and retrieval of various information resources, issues in the management of collections and access in health libraries, and current trends and issues. Prereq: LIS 601 and LIS 602 or consent of instructor. (Same as LIS 640.)

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 651 COMMUNICATION THEORY. (3)
Examination and critical analysis of the major theories of communication processes, including systems theory, structural theories and semiotics, behaviorism, symbolic interactionism, theories of the social construction of reality, and other theoretical approaches to the study of communication. Prereq: Graduate standing or consent of instructor.

***CJT 664 QUALITATIVE METHODS IN COMMUNICATION RESEARCH. (3)**
Goals, epistemology and methods of qualitative inquiry in communication. Strengths and limitations of different qualitative research methodologies. Distinctive contributions of qualitative research to theory and practice of communication.

CJT 665 QUANTITATIVE METHODS IN COMMUNICATION RESEARCH. (3)
The scientific method. Communication research as part of social science research. Study and practice of quantitative behavioral research techniques which apply to communication. Prereq: Graduate standing in communication or consent of instructor.

CJT 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 or consent of instructor. (Same as LIS 668.)

CJT 671 PROSEMINAR IN HEALTH COMMUNICATION. (3)
This course is designed to provide a broad introduction to communication in a health care context. Topics addressed are patient-provider communication, small group communication, communication in health care organizations, intercultural communication in health care, and health images in the mass media. Prereq: Graduate standing in communication 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 684 PROSEMINAR IN INSTRUCTIONAL COMMUNICATION. (3)
This course is an introductory graduate-level survey of current theory, research, and current developments in the area of instructional communication. Students will be exposed to a variety of current theoretical perspectives and methodological orientations. Hands-on opportunities are provided to construct and refine strategies and resources for instruction. Prereq: Prior teaching experience, or COM 584, or consent of instructor.

CJT 685 SEMINAR: PREPARING FUTURE FACULTY FOR THE MULTICULTURAL CLASSROOM. (1)
This course is to prepare future communication faculty for facilitating and dealing with diverse student learning in an increasingly multicultural classroom context. Prereq: Recommend CJT 684 or GS 650.

CJT 686 PRACTICUM IN PREPARING FUTURE FACULTY. (1)
Practicum at a participating institution to provide students with variety of experiences as faculty member working with a mentor there and supervised through CJT. Prereq: CJT 684 or CJT 685.

CJT 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. (Same as LIS 690.)

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 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 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 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 751 ADVANCED TOPICS IN COMMUNICATION THEORY CONSTRUCTION. (3)
Intensive examination of selected topics important to the construction, development, and testing of communication theories and problems. Prereq: Completion of required first-year curriculum for the Ph.D.

***CJT 764 ADVANCED TOPICS IN QUALITATIVE RESEARCH METHODS. (3)**
A focused treatment of one or more issues, topics, or problems in qualitative research methodology in communication, such as ethnography, discourse analysis, semiotics, or historical methods. Prereq: CJT 664 or consent of instructor.

#CJT 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 775 SEMINAR IN HEALTH COMMUNICATION CAMPAIGNS. (3)
The role of communication in public health campaigns. Includes theories relevant to such campaigns, campaign effects studies, methods of evaluation, and message design and targeting principles. Prereq: CJT 645 and graduate standing in communication or consent of instructor.

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 790 RESEARCH PROBLEMS IN COMMUNICATION. (1-6)
Significant participation in important aspects of a research project under the direction of a graduate faculty member. May be repeated to a maximum of six credits. Prereq: Completion of all required first-year courses in the doctoral curriculum and consent of Associate Dean for Graduate Studies.

CLA Classics

COURSES IN ENGLISH

(No knowledge of Greek or Latin expected.)

CLA 100 ANCIENT STORIES IN MODERN FILMS. (3)
This course will view a number of modern films and set them alongside ancient literary texts which have either directly inspired them or with which they share common themes. In the first part of the course, we will consider the relationship between ancient Greek epic, tragic, and comic literature and the modern cinema. In the second part, we will look at a number of ways in which the city of Rome has been treated as both a physical place and as an idea or ideal in the works of both ancient Romans and modern film-makers.

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 135 GREEK AND ROMAN 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 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 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 STUDIES IN GREEK ART (SUBTITLE REQUIRED). (3)
Study of the arts of Greece. According to subtitles, attention may focus on particular periods or media from Bronze Age through Hellenistic Greece in the context of political, social and intellectual developments. May be repeated under a different subtitle to a maximum of six credits. Prereq: A-H 105 recommended. (Same as A-H 312).

CLA 313 STUDIES IN ROMAN ART (SUBTITLE REQUIRED). (3)
Study of the art and architecture of Rome. According to subtitles, attention will focus on various aspects of public or private painting, sculpture and architecture as reflections of political, social and cultural developments in the Roman world from the early Republic through the age of Constantine. May be repeated under a different subtitle to a maximum of six credits. Prereq: A-H 105 recommended. (Same as A-H 313.)

CLA 331 GENDER AND SEXUALITY IN ANTIQUITY. (3)
A survey of the construction of gender, sexuality, and their relation to and expression in the societies of ancient Greece and Rome. Gender roles, marriage, social problems concerning sex and virginity, and different ways of understanding sexuality and gender in historical contexts are examined through the study of ancient literature, art and the insights of contemporary scholarship.

CLA 382 GREEK AND ROMAN RELIGION. (3)
A broad examination of the varieties of religious practice and experience in the ancient Mediterranean world, particularly in Greece and Rome, with emphasis placed on how dramatically ancient religious concepts and systems differ from those of the modern world.

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 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 211 ACCELERATED LATIN. (3)
An intensive course that covers, in one semester, all the morphology, syntax, and grammar of Latin that is required to bring students with no background in the language to the level at which they can begin to read unaltered Latin texts.

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.

CLA 611 LATIN OF THE LATER ROMAN EMPIRE AND EARLY MIDDLE AGES. (3)
A survey of seminal texts in late antique and medieval Latin with extensive reading and composition in Latin. Prereq: CLA 511 or equivalent.

CLA 612 LATIN FROM THE LATER MIDDLE AGES TO THE MODERN WORLD. (3)
A survey of seminal texts in late medieval and post-medieval Latin with extensive reading and composition in Latin. Prereq: CLA 511 or equivalent.

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 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 (SUBTITLE REQUIRED). (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 561 STUDIES IN GREEK PHILOLOGY. (3)
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 695 INDEPENDENT WORK. (3)
Independent investigation of a problem under supervision of a graduate faculty member; or directed readings, writing, and discussion in small groups on topics outside the usual seminar offerings, guided by a graduate faculty member. May be repeated to a maximum of nine credits. Prereq: Admission to graduate program, permission of instructor and of departmental Director of Graduate Studies.

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.

CLD Community and Leadership Development

***CLD 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.

#CLD 204 WRITING FOR THE MASS MEDIA. (3)
An introduction to the concepts and techniques of media writing. This course offers hands-on instruction in information gathering, organization, and writing for print, broadcast and on-line media. Lecture, one hour; laboratory, four hours per week. Prereq: JOU pre-major status; JOU 101 or consent of instructor. (Same as JOU 204.)

#CLD 250 READING CRITICALLY AND WRITING WELL: COMMUNITY COMMUNICATIONS AND LEADERSHIP DEVELOPMENT. (3)
This course will provide students with a foundation in critical thinking through an emphasis on reading, writing and analytical discussions addressing basic agricultural topics, controversial agricultural topics and specific topics in community communications and leadership development. Prereq: ENG 104 and sophomore status. Primary registration access limited to majors and remaining seats open during secondary registration.

#CLD 301 NEWS REPORTING. (3)
A course designed to develop skills in information gathering, news judgment, organization and writing. Students will learn to cover breaking news and write features. Lecture, two hours; laboratory, two hours per week. Prereq: JOU/CLD 204 or equivalent. (Same as JOU 301.)

***CLD 302 LEADERSHIP STUDIES. (3)**
From an overview of theories of leadership, leadership styles, and leader-follower relationships, the course moves to a consideration of other factors influencing contemporary leadership and management (e.g., conflict resolution, ethical decision-making, group processes). Readings, case study analyses, interviews with community and business leaders, and self-diagnostic inventories help students develop both conceptual and reality-based understandings of contemporary leadership.

***CLD 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.

#CLD 340 COMMUNITY INTERACTION. (3)
Examines community effects on group and individual behavior from the perspective of sociological social psychology. By focusing on individuals, individuals in groups, and groups, special emphasis is given to how community context shapes the attitudes, beliefs, and actions of individuals as well as their interactions with others. Prereq: CLD 102 or SOC 101 or consent of instructor. Primary registration access limited to SOC and CLD majors and remaining seats open during secondary registration. (Same as SOC 340.)

***CLD 362 FIELD EXPERIENCE IN COMMUNITY COMMUNICATIONS AND LEADERSHIP DEVELOPMENT. (3)**
Supervised experiences in businesses, agencies or government. Required of all Community Communications and Leadership Development majors. Includes observation, participation, experience, field trips, inspection of programs, and professional organizations. Prereq: Junior standing, majors only.

***CLD 395 SPECIAL PROBLEMS IN COMMUNITY COMMUNICATIONS AND LEADERSHIP DEVELOPMENT. (1-3)**
Directed independent study of a selected problem in the field of community communications and leadership development. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

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

***CLD 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. Prereq: Primary registration access limited to majors and remaining seats open during secondary registration.

***CLD 401 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 and senior students.

#CLD 405 ANALYTIC METHODS FOR COMMUNITY COMMUNICATIONS AND LEADERSHIP DEVELOPMENT. (3)
This course will familiarize students with research concepts, methods and skills often used in community and organizational development and communication. The course focuses on applied research topics such as: design and analysis, data gathering, assessment, and related issues such as the politics of information and ethical concerns in social research. Prereq: CLD 102 and junior standing, or consent of instructor. Primary registration access limited to majors and remaining seats open during secondary registration.

#CLD 420 SOCIOLOGY OF COMMUNITIES. (3)
A sociological study of issues relevant to communities. Topics may include: conceptual approaches to community; organizational and institutional linkages within and beyond the community; social inequality and social processes within communities such as social networks, social capital, power and decision-making, and social change. Prereq: SOC 101 or RSO 102 or CLD 102; and one of the following: SOC 302 or 304 or CLD 405; or consent of instructor. (Same as SOC 420.)

#CLD 440 COMMUNITY PROCESSES AND COMMUNICATION. (3)
This course examines the relationship between community organization and change and the media. Special emphasis is given to the place of media organizations in community structure, the effects of media on community processes, and how community members use the media. Prereq: CLD 102 or SOC 101 and CLD/SOC 340 or consent of instructor. Primary registration access limited to majors and remaining seats open during secondary registration. (Same as SOC 440.)

#CLD 485 COMMUNITY JOURNALISM. (3)
A study of all aspects of small town and suburban newspapers, including editorial, advertising, circulation and management. Lecture, two hours; laboratory, two hours per week. Prereq: JOU/CLD 301. (Same as JOU 485.)

***CLD 490 SEMINAR IN COMMUNITY COMMUNICATIONS AND LEADERSHIP DEVELOPMENT. (3)**
A capstone course for seniors in community communications and leadership development. Presentations, research papers, outside speakers and career guidance will be significant course components. Prereq: Senior standing in the major, or consent of instructor.

***CLD 495 TOPICAL SEMINAR IN COMMUNITY COMMUNICATIONS AND LEADESRHIP DEVELOPMENT (SUBTITLE REQUIRED). (1-3)**
Topical seminar using readings, discussions and papers to focus on current issues of significance to community communications and leadership development. May be repeated to a maximum of six credits under different subtitles. Prereq: Consent of instructor. Primary registration access limited to majors and remaining seats open during secondary registration.

#CLD 650 APPLIED COMMUNITY COMMUNICATIONS. (3)
Designed to familiarize students with advanced writing and editing techniques, common forms of workplace writing, audience analysis, content analysis, and graphic design tips and tools. Discussion will include some of the larger issues surrounding community communications, such as discourse communities, bias, and ethics. Prereq: Graduate standing.

CLD 665 PROGRAM DEVELOPMENT AND EVALUATION. (3)
Course is designed to help students design, implement, and evaluate educational and social programs using a logic-based framework.

CLD 675 COMMUNITY DEVELOPMENT AND LEADERSHIP COMMUNICATIONS. (3)
This course is designed to explore the dynamics of community development and leadership communication within both geographic-bounded communities and communities of taste.

CLD 680 COMMUNITY DEVELOPMENT THEORY AND PRACTICE. (3)
This course examines the application of our conceptual understanding of community and organizational dynamics to community development that builds upon assets and encourages local involvement.

***CLD 682 RESEARCH METHODS. (4)**
Research methods and skills for communicators, educators, and leadership development programs. Topics include design and analysis, data gathering techniques, assessment tools, and issues such as the politics of information. (Same as AED/FCS 682.)

#CLD 748 MASTER'S THESIS RESEARCH IN COMMUNITY AND LEADERSHIP DEVELOPMENT. (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.

CLD 750 PRACTICUM IN COMMUNITY AND LEADERSHIP DEVELOPMENT. (3)
This three hour course will allow a student to complete a research project in collaboration with a professor aligned with the Career, Technical, and Leadership Education Program.

CLD 775 TOPICAL SEMINAR IN COMMUNITY AND LEADERSHIP DEVELOPMENT. (3)
Advanced study of topics of current importance in community and leadership development such as dispute resolution, volunteer management, or advanced program design and evaluation. May be repeated to a maximum of six credits.

#CLD 780 SPECIAL PROBLEMS IN COMMUNITY AND LEADERSHIP DEVELOPMENT. (1-6)
Supervised individual study on selected issues in community and leadership development. May be repeated to a maximum of six credits. Learning contract must be filed with Director of Graduate Studies.

#CLD 790 RESEARCH IN COMMUNITY AND LEADERSHIP DEVELOPMENT. (1-6)
Supervised individual graduate research projects on selected issues in community and leadership development. May be repeated to a maximum of six credits. Research Learning contract must be filed with the Director of Graduate Studies.

CLM Clinical Leadership and Management

#CLM 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: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as HSM 351.)

#CLM 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: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as HSM 353.)

#CLM 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. Prereq: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as HSM 354.)

#CLM 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: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as HSM 355.)

#CLM 405 EPIDEMIOLOGY AND BIOSTATISTICS. (3)
This course will provide a foundation in the principles and methods of the epidemiological investigation of disease with special emphasis on the distribution and dynamic behavior of disease in a population. Etiologic factors, modes of transmission and pathogenesis will be examined. Topics to be covered include epidemics and the spread of infectious disease, epidemiological aspects of non-infectious disease; rates of morbidity and mortality, sensitivity, specificity, and predictive values' strategies used in epidemiological studies to include measures of disease effect, validity, reliability; sampling methods and computer-based biostatistical analysis that emphasize the generalized linear mode and forms of SEM as appropriate for an upper division undergraduate course. Prereq: Admission to the CLM program or consent of instructor.

#CLM 444 LEADERSHIP AND HUMAN RESOURCE MANAGEMENT. (3)
This course focuses on clinical leadership and managerial roles and responsibilities, with particular emphasis on organizational design, theory, and behavior. Human resource management, team leadership, and strategies for promoting employee motivation, loyalty, and productivity will be discussed. Other topics to be discussed include writing a business plan, financial and budgetary considerations, public relations, and quality and productivity. Laboratory compliance, government regulations, and accreditation will also be covered. Prereq: Admission to the CLM Program or consent of instructor.

#CLM 445 QUALITY AND PRODUCTIVITY IMPROVEMENT AND EVALUATION. (3)
A core program course that focuses on leadership and management knowledge, skills, and practices that promote clinical quality, efficiency, and productivity. Methods to measure, monitor, and evaluate quality and productivity will be discussed. Prereq: Admission to the CLM Program or consent of instructor.

#CLM 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: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as HSM 452.)

#CLM 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. (Same as AHP 840.)

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 500 INTEGRATIVE CARE FOR HEALTH SCIENCES. (1-3)
Integrative care involves using the best possible treatments from both complementary/alternative and allopathic medicine, based on the patient's individual needs and condition. The selection of health care providers should be based on good science and this course will introduce students to complementary and alternative health care providers and the practices and beliefs of these practices as well as the scientific evidence in support of these practices. The course integrates successes from both worlds and describe the safest, least invasive, most cost-effective approach while incorporating a holistic understanding of the individual. May be repeated to a maximum of 3 credits (1 credit didactic and up to two credits experiential/research). (Same as AT 500, HS 500, CNU 500, CD 500, PA 500, PT 686.)

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 520 REPRODUCTIVE LABORATORY SCIENCE. (3)
This is a course designed to educate students in basic theories, procedures and quality assurance concepts of assisted reproduction. It will consist of two lectures per week and a limited number of three-hour laboratories. Computer-assisted instruction and video-tapes will also be used. Prereq: Admission to the professional CLS program; or a baccalaureate degree with CLS certification; or 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 816 HISTOTECHNOLOGY II. (3)
The study of principles and applications of microtomy, frozen sectioning and some special staining techniques.

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 832 BASIC CLINICAL CHEMISTRY. (1)
The study of the theory and practice of clinical chemistry laboratory testing, including quality control, instrumentation principles, problem-solving, and appreciation of accuracy of and confidentiality for patient laboratory findings. Prereq: Admission into the Clinical Laboratory Sciences Professional Program or consent of instructor.

CLS 833 BASIC HEMATOLOGY. (1)
The theory and practice of clinical hematology laboratory testing, including manual and automated procedures, instrumentation principles, quality assurance, and problem-solving. Hematopoiesis, hemostasis, and blood cell function are discussed as they relate to clinical laboratory practice. Special emphasis is placed on the relationship of clinical hematology testing to pathophysiology and on the acquisition of valid test results. Prereq: Admission into the Clinical Laboratory Sciences Program or consent of instructor.

CLS 835 CLINICAL IMMUNOLOGY. (3)
An overview of immunology with a molecular 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: Admission into the Clinical Laboratory Sciences Professional Program.

CLS 836 LABORATORY ORGANIZATION AND MANAGEMENT. (1-3)
An overview of clinical laboratory organization. Content will include regulatory, management, personnel issues; leadership; quality assurance and improvement strategies; principles of education related to laboratory management; and other topics relevant to clinical laboratory organization. Prereq: Admission into the Clinical Laboratory Sciences Professional Program.

CLS 838 BASIC IMMUNOHEMATOLOGY. (1)
Introduction to the principles and practice of blood banking including blood group systems, routine serologic testing, blood collection and processing and component therapy. Prereq: Admission to the Clinical Laboratory Sciences Program and CLS 835 or equivalent.

CLS 843 ADVANCED CLINICAL HEMATOLOGY AND BODY FLUID ANALYSIS. (3)
The theory and practice of clinical hematology laboratory testing as it relates to hematological disorders and disorders of body fluids. Anemias, hemostasis and thrombotic disorders, leukemias and non-malignant leukocyte disorders, and body fluid disorders, including the reproductive system are discussed as they relate to clinical laboratory practice. Special emphasis is placed on pathophysiology, the clinical correlation of laboratory test results with hematological and body fluids disorders, and the interpretation and resolution of discrepant results. Prereq: CLS 833 or consent of the instructor.

CLS 844 ADVANCED CLINICAL CHEMISTRY. (3)
A study of the theory and evaluation of specialized clinical chemistry testing, including toxicology, therapeutic drug monitoring, endocrine function, and quality assurance issues. Prereq: Admission into the Clinical Laboratory Sciences Professional Program; biochemistry, immunology (may be taken concurrently) and CLS 832 or equivalent.

CLS 848 ADVANCED IMMUNOHEMATOLOGY. (3)
This course emphasizes clinical interpretation and problem solving. Antibody identification, selection of blood components, transfusion complications, hemolytic disease of the newborn, autoimmune hemolytic anemia and quality assurance are included. Prereq: Admission to the Clinical Laboratory Sciences Program and CLS 838 or equivalent.

CLS 851 BASIC CLINICAL MICROBIOLOGY. (1)
The study of medically significant microbiology, including commensal flora, normal flora and pathogens. Lectures also cover microbial physiology, interactions between host and pathogenic microorganisms, and the clinical and epidemiological consequences of these interactions. Prereq: Admission to the Clinical Laboratory Sciences Program.

CLS 856 ADVANCED CLINICAL MICROBIOLOGY. (3)
The study of medically important bacteria, with an emphasis on anaerobes and mycobacteria, and clinically significant fungi, parasites and viruses. Clinical bacteriology knowledge will be applied through case studies. Prereq: Admission to the Clinical Laboratory Sciences program and CLS 851 or equivalent.

CLS 860 BLOOD COLLECTION. (1)
The theory and practice of blood collection related to routine and special specimen collection for clinical laboratory testing. Particular emphasis is placed on quality assurance and safe practice issues associated with venipuncture and skin puncture. Students perform venipunctures on artificial arms, actual patients and fellow students. The course includes a mandatory clinical component. 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; pediatric patients; and nursery patients. Offered on a Pass/Fail basis only. Prereq: Admission into the Clinical Laboratory Sciences Professional Program, or consent of the instructor and completion of required immunizations.

CLS 881 IMMUNOHEMATOLOGY PRACTICUM. (1-5)
A supervised practicum in which the student integrates theory and practice of immunohematology in a clinical setting. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience. Prereq: Admission into the Clinical Laboratory Sciences Program and CLS 848 (may be taken concurrently).

CLS 882 PRACTICUM IN CLINICAL CHEMISTRY. (1-5)
A supervised practicum in which the student integrates theory and practice of clinical chemistry in a health care setting. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience. Prereq: Admission into the Clinical Laboratory Sciences Program and CLS 844 (may be taken concurrently).

CLS 883 PRACTICUM IN CLINICAL HEMATOLOGY. (1-5)
A supervised practicum in which the student integrates theory and practice of clinical hematology in a health care setting. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience. Prereq: Admission into the Clinical Laboratory Sciences Program and CLS 843 (may be taken concurrently).

CLS 884 PRACTICUM IN CLINICAL MICROBIOLOGY. (1-5)
A supervised practicum in which the student integrates theory and practice of clinical microbiology in a health care setting. Offered on a Pass/Fail basis only. Laboratory, 35-40 hours per week. The number of credits will depend on the student's prior experience. Prereq: Admission into the Clinical Laboratory Sciences Program and CLS 856 (may be taken concurrently).

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 LABORATORY INVESTIGATION. (1-3)
Students will demonstrate knowledge and expertise in CLS through interpretation and integration of CLS issues. Student will analyze laboratory data through patient-focused scenarios and integrate information from multiple laboratory reports for the patient care management. Students will apply the principles of research technique to analyze problems arising from technical methods, disease correlation, or other pertinent problem areas in laboratory sciences and will use library sources, computer skills, and presentation skills in the pursuit of solutions to identified problems. Prereq: Completion of all requirements for the CLS program; may be concurrent.

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, CME 200, 320, CS 221 or EGR 199, and MA 214.

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 404G POLYMERIC MATERIALS. (3)
Synthesis, structure, and processing of polymers, useful geometric forms, mechanical and thermal properties, crystallinity, polymer blends, evaluation of polymers for specific applications (aerospace, automotive, biomedical), laboratory activities for each of the above. Prereq: Engineering standing. CHE 230 or CHE 236. MSE 301 or consent of instructor. (Same as MSE 404G.)

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 meterology. 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 554 CHEMICAL AND PHYSICAL PROCESSING OF POLYMER SYSTEMS. (3)
Theory and practice as related to the chemical and physical processing of polymer systems. Polymer rheology, heat transfer in polymer flows, polymer engineering properties. Polymer processing operations and materials selection; flow instabilities. Prereq: CME 330, CME 425 or ME 325; or consent of instructor. (Same as ME/MFS/MSE 554.)

***CME 556 INTRODUCTION TO COMPOSITE MATERIALS. (3)**
Applications, materials selection and design of 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. Prereq: MSE 201, 301, CHE 236, and Engineering Standing, or consent of instructor. (Same as ME/MSE 556.)

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 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 622 PHYSICS OF POLYMERS. (3)
An in-depth look at the physical and mathematical descriptions of polymer behavior. Comparison of diverse approaches to modeling the same behavior. Study of isolated polymer chain and how it relates to polymers in rigid, rubbery, melt, and solution states. Prereq: Graduate standing and undergraduate degree in the physical sciences or engineering that includes advanced calculus, differential equations, and matrix algebra. (Same as MSE 622.)

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 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 664 MULTIDISCIPLINARY SENSORS LABORATORY. (3)
A multidisciplinary laboratory course with laboratory experiences in areas related to sensors and sensing architectures, typically including chemistry, chemical and materials engineering, and electrical engineering. Lecture, 1 hour; laboratory, 2 hours. Prereq: One year of college chemistry, calculus and physics. GS 660 or by consent of instructor. (Same as CHE/EE/MSE 664.)

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. (Same as BAE 680.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

CME 790 RESEARCH IN CHEMICAL ENGINEERING. (1-9)
Graduate Research in Chemical Engineering on a topic approved by the Departmental Graduate Studies Committee. May be repeated to a maximum of two semesters. Prereq: Consent of the Director of Graduate Studies.

CNU Clinical Nutrition

#CNU 500 INTEGRATIVE CARE FOR HEALTH SCIENCES. (1-3)
Integrative care involves using the best possible treatments from both complementary/alternative and allopathic medicine, based on the patient's individual needs and condition. The selection of health care providers should be based on good science and this course will introduce students to complementary and alternative health care providers and the practices and beliefs of these practices as well as the scientific evidence in support of these practices. The course integrates successes from both worlds and describe the safest, least invasive, most cost-effective approach while incorporating a holistic understanding of the individual. May be repeated to a maximum of 3 credits (1 credit didactic and up to two credits experiential/research). (Same as AT 500, HS 500, CLS 500, CD 500, PA 500, PT 686.)

#CNU 501 NUTRACEUTICALS AND FUNCTIONAL FOODS IN HEALTH AND DISEASE PREVENTION. (2)
The course will cover the classification, brief history and the impact of nutraceuticals and functional foods on health and disease. An example of nutraceuticals to be covered in the course include isoprenoids, isoflavones, flavanoids, carotenoids, lycopene, garlic, omega 3 fatty acids, sphingolipids, vitamin E and antioxidants, S-adnosyl-L-methionine, CLA, creatine, herbal products in foods and lipoic acid. Prereq: Undergraduate organic chemistry and/or biochemistry.

#CNU 502 OBESITY C2C: CELL TO COMMUNITY (SUBTITLE REQUIRED). (2)
This course will provide an overview of the obesity epidemic from an applied clinical as well as public health perspective. Topics to be covered include etiology, pathophysiology, evaluation, treatment, management, and prevention of obesity throughout the lifecycle.

CNU 601 MACRONUTRIENT METABOLISM. (4)
Emphasis will be on macronutrient assimilation and utilization and will include lectures, discussions and student presentations related to energy balance and protein-lipid-carbohydrate metabolism and its relationship to health maintenance. This course integrates biochemistry, physiology and nutrition with regards to macronutrient metabolism. Prereq: NFS 311 and PGY 206 or equivalent or consent of instructor. (Same as NS 601.)

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: NS/CNU 601, BCH 401G and PGY 412G or consent of instructor. (Same as NS 604.)

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 NS/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. (Same as NS 606.)

CNU 608 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. (Same as NS 608.)

CNU 609 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.) (Same as NS 609.)

CNU 701 NUTRITION AND CHRONIC DISEASES, (4)
Selected topics in nutritional sciences as related to health and chronic diseases, e.g., gastrointestinal disease, cancer, AIDS, diabetes, cardiovascular disease, obesity, including drug-nutrient interactions. Prereq or concur: NS/CNU 601, NS/ASC 602. (Same as NS 701.)

CNU 702 CLINICAL/WELLNESS NUTRITION PROBLEM-BASED CASE STUDIES. (1-3)
A problem-based learning approach to case studies is integrated with a traditional didactic approach to offer options in therapeutic nutrition, and/or health promotion. 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 class presentations including case studies regarding rotations through various medical or health services e.g. surgery, pediatrics, nutrition support and health promotion. Prereq: NS/CNU 601, NS/ASC 602, NS/CNU 701, NS/NFS 610 and graduate status or consent of instructor. (Same as NS 702.)

CNU 704 CURRENT TOPICS IN NUTRITIONAL SCIENCES. (1)
This course is designed to develop the student's independent thinking and critical analysis related to various nutritional sciences issues. These skills will be developed through reading assignments and group discussion related to current topics in nutrition. Prereq: Consent of instructor. (Same as NFS/NS 704.)

CNU 782 SPECIAL PROBLEMS. (1-6)
Independent advanced work on a special problem in nutritional sciences. Prereq: Consent of graduate advisor. (Same as NFS/NS 782.)

CNU 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. (Same as NFS/NS 790.)

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.

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 communication media. Prereq: COM 101 or its equivalent.

COM 252 INTRODUCTION TO INTERPERSONAL COMMUNICATION. (3)
This course examines basic verbal and nonverbal concepts affecting the communication process between individuals in various interpersonal contexts. Course also requires participation in written and oral activities designed to develop and improve interpersonal skills. Topics may include: perspective-taking, relationship and conversation management, effective listening, conflict management, communication climate, communication anxiety, and cultural/gender differences in interpersonal communication.

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 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.

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 325 INTRODUCTION TO ORGANIZATIONAL COMMUNICATION. (3)
Designed to introduce students to basic concepts in the study of organizational communication. The course considers approaches to the practice and study of communication within organizational settings, including classical approach, human relations, human resources approaches, systems approaches, cultural approaches, and critical approaches. It also introduces specific issues within the study of organizational communication, including assimilation, decision-making, conflict, change, emotion, cultural diversity and communication technologies. Prereq: Communication major; others need departmental approval.

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 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: COM 351 and COM 365 and a Communication Major, departmental approval and completion of learning contract prior to registration.

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: COM 351 and COM 365, consent of Department Internship Director prior to registration, and completion of departmental learning contract.

COM 449 SOCIAL PROCESSES AND EFFECTS OF MASS COMMUNICATION. (3)
Examines theory and research on 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 on the mass media and on the way in which the mass media influence cultural processes and social change. Prereq: For Communication majors COM 249, COM 351 and COM 365; for other majors, COM 249 and departmental approval.

COM 452 STUDIES IN INTERPERSONAL COMMUNICATION. (3)
Examines current theory and research on the nature and development of interpersonal communication ability. Topics include: understanding strategic communicative relational communication elements, and cultural and institutional influences on the development of interpersonal communication. Prereq: For Communication majors: COM 351 and COM 365; for other majors: COM 252 and departmental approval.

***COM 453 MASS COMMUNICATION AND SOCIAL ISSUES. (3)**
A course designed to examine theory and research related to criticism of the mass media and to the relationship of mass communication to contemporary social issues. Prereq: COM 249, COM 351 and COM 365 for Communication majors; for others, COM 249 and departmental approval.

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: COM 351, COM 365, and 3.3 GPA in Communication Major.

COM 462 INTERCULTURAL COMMUNICATION. (3)
An overview of problems, issues, processes and assumptions involved with communicating with people of different cultural and subcultural backgrounds. Theories of cognition and communication will be used to explore and explain communication with people from other cultures. Differences in both verbal and nonverbal communication among different cultural groups will be discussed. Prereq: For Communication majors: COM 351 and COM 365; for other majors: COM 252 and departmental approval.

COM 482 STUDIES IN PERSUASION. (3)
Examines theory and research of persuasion. Topics include message characteristics, credibility, compliance-gaining, decision-making, and motivational appeals. Prereq: For Communication majors COM 351 and COM 365; for other majors, departmental approval.

COM 525 ORGANIZATIONAL COMMUNICATION. (3)
Examines theory and research relevant to understanding the organizational communication process. Topics include strategies of organizing, globalization, technology, power, and diversity. Prereq: For Communication majors COM 325, COM 351 and COM 365; for other majors, COM 325 and departmental approval.

COM 571 HEALTH COMMUNICATION. (3)
Examines theory and research relevant to health communication including interpersonal, organizational, and mass communication approaches. Topics include the role of communication in general models of health and illness, the relationship between patients and healthcare providers, social support, and health campaigns. Prereq: For Communication majors COM 351 and COM 365; for other majors, departmental approval.

COM 581 STUDIES IN SMALL GROUP COMMUNICATION. (3)
Examines theory and research on the nature and development of small group communication. Topics include leadership, interpersonal relations and roles, goals, and decision-making in multiple contexts. Prereq: For Communication majors COM 281, COM 351 and COM 365; for other majors, COM 281 and departmental approval.

COM 584 TEACHING OF COMMUNICATION. (3)
An analysis of the field of speech education as related to the teacher of speech. Prereq: COM 351 and COM 365; or consent of instructor.

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: COM 351 and COM 365; or consent of instructor.

CPH College of Public Health

#CPH 201 INTRODUCTION TO PUBLIC HEALTH. (3)
This course provides the student with basic knowledge about the discipline of public health. After receiving a philosophical and political orientation to public health, students will begin to acquire functional knowledge of the strategies most often applied in public health practice. Key content areas (such as HIV prevention, maternal and child health, reducing obesity rates, and reducing tobacco addiction) will become focal points for the investigation of these strategies.

CPH 535 DATABASES AND SAS PROGRAMMING. (3)
Students will learn how to construct and maintain databases with applications to public health. They will also learn how to program in SAS, the leading statistical analysis system. SAS skills include report writing, MACRO writing, and Programming using SAS Intranet. Lecture, two hours; laboratory, two hours per week. Prereq: STA 291 or equivalent.

***CPH 601 ENVIRONMENTAL HEALTH. (3)**
An introduction to the theory and practice of assessing, correcting, controlling, and preventing environmental health hazards that may adversely affect the health of current and future generations. Prereq: Undergraduate chemistry and biology, or permission of instructor. (Same as ES 620.)

CPH 602 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.

CPH 604 PUBLIC HEALTH AND DISEASE PREVENTION. (3)
This course will introduce students to issues of public health and populations health status. Principles of disease prevention and the focus on population health will be explored. The behavior of population is a major variable in health outcomes. Behavior models resulting in positive health will be introduced. Prereq: Admission to MPH program or permission of instructor.

CPH 605 EPIDEMIOLOGY. (3)
This is an initial graduate level course in the principles of epidemiology and applications in preventive medicine and environmental health. The course consists of lectures and informal discussions. Principles and methods of epidemiologic research with a focus on issues of study design and analysis will be presented. Prereq: Graduate student in good standing in the MPH program, MSPH program, or community health nursing, or consent of instructor. (Same as PM 620.)

CPH 609 PUBLIC HEALTH PRACTICUM. (3 OR 6)
The public health practicum is designed as an integrative experience in the workplace. The practicum is an opportunity to apply classroom theories and methods under the guidance of an experienced public health practitioner with faculty oversight. Prereq: Admission to MPH program or permission of instructor.

CPH 610 INJURY EPIDEMIOLOGY AND CONTROL. (3)
The epidemiological basis for understanding the distribution and determinants for traumatic injury and poisonings including both intentional and unintentional events. Topics include sources of data, methodological approaches to studying injuries, evaluation of injury interventions and the link between epidemiology and public health policy impacting injuries. Prereq: PM 620 and/or permission of instructor.

CPH 611 ADVANCED EPIDEMIOLOGY. (3)
This course provides specialized epidemiologic content and method designed to meet the research and practice needs of health professionals. Practice-based problem sets and hands-on computer assignments will complement this seminar-oriented course, focusing on the role of epidemiology in the prevention of disease and injury. Prereq: CPH 605 or consent of instructor. (Same as PM 621.)

CPH 612 INFECTIOUS/EMERGING DISEASES EPIDEMIOLOGY. (3)
The theory/concepts of infectious diseases epidemiology, such as epidemic modeling expostulated through a systematic study of the more recent emerging diseased. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 614 MANAGERIAL EPIDEMIOLOGY. (3)
This course applies and integrates the principles and tools of epidemiology to the decision-making process in health care management. Prereq: Enrollment in a Public Health degree program and CPH 605/PM 620, or consent of instructor.

CPH 616 CARDIOVASCULAR DISEASE EPIDEMIOLOGY. (3)
This course is designed to study and evaluate the broad array of epidemiologic studies on cardiovascular disease and the impact on prevention policy. Prereq: Enrollment in a Public Health degree program, CPH 605/PM 620 - Introduction to Epidemiology, or consent of instructor.

CPH 617 ENVIRONMENTAL/OCCUPATIONAL EPIDEMIOLOGY. (3)
A study of work-related and environmental exposures and hazards associated adverse health outcomes. Integrating the fields of occupational and environmental epidemiology. Prereq: Enrollment in a Public Health degree program and CPH 605/PM 620 or consent of instructor.

CPH 618 EPIDEMIOLOGY OF AGING. (3)
This course introduces the application of epidemiologic methods to the study of older persons. Prereq: Enrollment in a Public Health degree and CPH 605/PM 620 Intro to Epidemiology and GRN 650, or consent of instructor. (Same as GRN 618.)

CPH 630 BIOSTATISTICS II. (3)
Students will learn statistical methods used in public health studies. This includes receiver operator curves, multiple regression logistic regression, confounding and stratification, the Mantel-Haenzel procedure, and the Cox proportional hazardous model. Lecture, two hours; laboratory, two hours per week. Prereq: STA 580 or equivalent. (Same as STA 681.)

CPH 631 DESIGN AND ANALYSIS OF HEALTH SURVEYS. (3)
Students will learn design and analysis issues associated with well-known national health surveys, including reliability and validity of measurements, instrument validation, sampling designs, weighing of responses, and multiple imputations. Students will learn how to use statistical software to analyze data from complex survey designs. Lecture, two hours; laboratory, two hours per week. Prereq: STA 580 or equivalent.

CPH 632 MIXED MODELS IN PUBLIC HEALTH. (3)
Students will learn statistical techniques for analyzing those longitudinal studies in public health that involve repeated measures and random effects. This course will cover multilevel regression models, Poisson regression models, logistic Models with random effects, crossover experiments, and nonlinear pharmacokinetic models. Lecture, two hours; laboratory, two hours per week. Prereq: STA 580 or equivalent.

#CPH 636 DATA MINING IN PUBLIC HEALTH. (3)
This course concerns statistical techniques for and practical issues associated with the exploration of large public health data sets, the development of models from such data sets, and the effective communication of one's findings. Prereq: STA 570 or 580 and CPH 535, or consent of instructor.

CPH 646 SPECIAL TOPICS IN BEHAVIORAL HEALTH: (SUBTITLE REQUIRED). (1-3)
This course will engage students in readings, projects, lectures and/or discussions to address current topics of special interest or concerns. May be repeated to a maximum of 6 credit hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

#CPH 647 RESEARCH METHODS FOR PUBLIC HEALTH. (3)
This course provides the student with basic knowledge about the design and analysis of research in the field of health behavior. The theory, design, applications, and analytic strategies used for various types of research are presented in a sequential format. Goals of the course include: 1) gaining the ability to critically evaluate research in health behavior 2) achieving competence in research methodology, and 3) understanding the conceptual application of analytic techniques to data. Prereq: M.P.H., Dr.P.H., or Ph.D. in public health student or permission of instructor.

#CPH 648 HEALTH AND CULTURE. (3)
This course will help the learner understand differences in minority populations in order to help build and lobby for the infrastructure needed to prevent excess disease and death among underserved populations. A special emphasis in this class will be placed on understanding the role of culture in influencing the adaptation of health attitudes, practices, and behaviors. An additional focus will be placed on health status, current trends, and health indicators for special populations. Prereq: Graduate student in Public Health and others by instructor permission.

CPH 649 INDEPENDENT STUDIES IN HEALTH BEHAVIOR. (1-3)
Designed for advanced students with research or special study interest in Behavioral Health. Students are under guidance and confer individually with faculty. May be repeated to a maximum of 6 credit hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 650 MANAGEMENT OF PUBLIC HEALTH ORGANIZATIONS. (3)
This course teaches the theories and practice of administration as they are applied in public health settings. It addresses knowledge and applications of the functions of public health management and their relationship to organizational effectiveness. Prereq: HSM/HA 601/PA 671/CPH 602 or consent of instructor.

CPH 652 FINANCE MANAGEMENT FOR HEALTH CARE DELIVERY/PUBLIC HEALTH ORGANIZATION. (3)
This course is an overview of financial practices in public health care organizations, including government, non-profit, insurance and direct providers. Prereq: Enrollment in a Public Health degree program and CPH 602/HSM 601, or consent of instructor.

CPH 658 PUBLIC HEALTH ECONOMICS. (3)
This course describes the role and methods of economics as applied to public health care delivery in the United States. Prereq: Enrollment in a Public Health degree program, CPH 602/HSM 601, or consent of instructor.

CPH 661 BIOETHICS FOR PUBLIC HEALTH PROFESSIONALS. (3)
This course will engage students in readings, projects, and discussions to address controversial issues of bioethics for public health professionals. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 662 PUBLIC HEALTH RESPONSE TO TERRORISM, DISASTERS AND EMERGENCIES. (3)
This course will focus on the public health concepts, history, methods, planning, and response preparedness to weapons of mass destruction, terrorism, natural and human-made disasters, and other health emergencies. Prereq: Enrollment in a Public Health degree program and CPH 605, or consent of instructor.

***CPH 663 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.

CPH 664 DESIGN AND ANALYSIS OF CLINICAL TRIALS. (3)
This course will introduce the fundamental concepts used in the design of Phase IIV clinical trials and statistical methodology associated with trial data analysis. Prereq: STA 570 or permission of instructor.

CPH 665 ETHICAL ISSUES IN CLINICAL RESEARCH. (3)
Based on NIH guidelines for Responsible Conduct of Research, this course will present ethical and regulatory guidelines for conducting clinical research. Prereq: Participation in curriculum leading to Graduate Certificate in Clinical Research Skills, or permission of instructor.

CPH 666 PRACTICUM IN CLINICAL RESEARCH I. (1)
This course for participants in the curriculum leading to the Graduate Certificate in Clinical Research Skills includes participation in a mentored research experience with the final goal of a presentation at a local program-specific retreat; attendance at monthly journal club meetings, two annual retreats, and special seminars; and completion of research reports. Prereq: Participation in curriculum leading to the Graduate Certificate in Clinical Research Skills.

CPH 667 PRACTICUM IN CLINICAL RESEARCH II. (1)
Participants working toward Graduate Certificate in Clinical Research Skills earn credit for associated activities and an abstract for a national meeting. Prereq: Participation in curriculum leading to Graduate Certificate in Clinical Research Skills.

CPH 668 PRACTICUM IN CLINICAL RESEARCH III. (1)
Participants working toward Graduate Certificate in Clinical Research Skills earn credit for associated activities and a journal article or funding proposal. Prereq: Participation in curriculum leading to Graduate Certificate in Clinical Research Skills.

CPH 695 PUBLIC HEALTH PRACTICE THROUGH SERVICE LEARNING. (3)
This course will provide students the opportunity to gain first hand public health experience by participating in projects in a community setting, completing a project, and participating in a series of seminars. Lecture, two hours; laboratory, two hours per week. Prereq: Enrollment in a Public Health degree program and completion of the core curriculum, or consent of instructor.

CPH 711 CHRONIC DISEASE EPIDEMIOLOGY. (3)
A survey course on the leading chronic diseases in the U.S., including cardiovascular disease, cancer and diabetes with focus on surveillance and risk factors. Prereq: Enrollment in a Public Health degree program, CPH 605/PM 620 Introduction to Epidemiology or consent of instructor. (Same as PM 790.)

CPH 712 ADVANCED EPIDEMIOLOGY. (3)
Introduction to specialized epidemiologic content areas as well as methods designed to meet the research and practice of health professionals. Lecture, two hours; laboratory, two hours each week. Prereq: Enrollment in a Public Health degree program and CPH 605/PM 621 or consent of instructor.

CPH 718 SPECIAL TOPICS IN EPIDEMIOLOGY: (SUBTITLE REQUIRED). (1-3)
This course will engage in readings, projects, lectures and/or discussions to address current topics of special interest or concerns. May be repeated to a maximum of 6 semester hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 719 INDEPENDENT STUDIES IN EPIDEMIOLOGY. (1-3)
Designed for advanced students with research or special study interests in Epidemiology. Students are under guidance and confer individually with faculty. May be repeated to a maximum of 6 semester hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 728 SPECIAL TOPICS IN OCCUPATIONAL/ENVIRONMENTAL HEALTH: (SUBTITLE REQUIRED). (1-3)
This course will engage students in reading, projects, lectures and/or discussions to address current topics of special interest or concerns. May be repeated to a maximum of 6 semester hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 729 INDEPENDENT STUDIES IN OCCUPATIONAL/ENVIRONMENTAL HEALTH: (SUBTITLE REQUIRED). (1-3)
Designed for advanced students with research or special study interest in Occupational and Environmental Health. Students are under guidance and confer individually with faculty. May be repeated to a maximum of 6 semester hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 738 SPECIAL TOPICS IN BIOSTATISTICS: (SUBTITLE REQUIRED). (1-3)
This course will engage students in readings, projects, lectures and/or discussions to address current topics of special interest or concerns. May be repeated to a maximum of 6 credit hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 739 INDEPENDENT STUDIES IN BIOSTATISTICS. (1-3)
Designed for advanced students with research or special study interest in Biostatistics. Students are under guidance and confer individually with faculty. May be repeated to a maximum of 6 credit hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 750 LEGAL BASIS OF PUBLIC HEALTH. (3)
Introductory course for non-lawyers in selected aspects of the law relating to public health. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 758 SPECIAL TOPICS IN HEALTH SERVICES MANAGEMENT: (SUBTITLE REQUIRED). (1-3)
This course will engage students in readings, projects, lectures and/or discussions to address current topics of special interest or concerns. May be repeated to a maximum of 6 credit hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 759 INDEPENDENT STUDIES IN HEALTH SERVICES MANAGEMENT: (SUBTITLE REQUIRED). (1-3)
Designed for advanced students with research or special study interest in Health Services Management. Students are under guidance and confer individually with faculty. May be repeated to a maximum of 6 semester hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 768 RESIDENCY CREDIT FOR MASTER'S DEGREE. (1-6)
May be repeated to a maximum of 12 credits. Prereq: All course work toward the degree must be completed.

CPH 778 SPECIAL TOPICS IN PUBLIC HEALTH: (SUBTITLE REQUIRED). (1-3)
This course will engage in reading, projects, lectures and/or discussions to address current topics of special interest or concern in public health. May be repeated to a maximum of 6 semester hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 779 INDEPENDENT STUDIES IN PUBLIC HEALTH. (1-3)
Designed for advanced students with research or special study interests in Public Health. Students are under guidance and confer individually with faculty. May be repeated to a maximum of 6 semester hours. Prereq: Enrollment in a Public Health degree program or consent of instructor.

CPH 901 PUBLIC HEALTH DOCTORAL PROFESSIONAL COLLOQUIUM. (1)
Seminar course designed as the integrative introduction, consideration, capstone for the Doctor of Public Health (Dr.P.H.) degree. Offered each semester of enrollment. Prereq: Admission to the Dr.P.H. program.

CPH 910 TOPICS IN ADVANCED EPIDEMIOLOGY AND LABORATORY. (3)
Provides the student with an introduction to advanced epidemiologic content areas as well as methods designed to meet the research and practice needs of health professionals. Lecture, two hours; laboratory, two hours per week. Prereq: Admission to the Dr.P.H. program, completion of MPH/MSPH core or equivalent, or approval of instructor.

CPH 911 PROFESSIONAL SEMINAR IN EPIDEMIOLOGY. (3)
Professional Seminar in Epidemiology is an advanced course in one of the five content areas of public health designed as the link between academic work in epidemiology and application in Public Health practice. Prereq: Admission to the Dr.P.H. program, completion of CPH 910, or approval of instructor.

#CPH 920 ADVANCED ENVIRONMENTAL HEALTH. (3)
This professional seminar in Environmental Health is designed to provide comprehensive coverage of the principles upon which the Environmental Health field relies. Prereq: Admittance into the Dr.P.H. curriculum.

CPH 921 PROFESSIONAL SEMINAR IN ENVIRONMENTAL HEALTH. (3)
Designed as the link between academic work in environmental health and application health practice, and to prepare the student for a leadership role in public health. Prereq: Admission to the Dr.P.H. program, completion of MPH/MSPH core or equivalent, or approval of instructor.

CPH 930 ADVANCED BIOSTATISTICAL METHODS IN PUBLIC HEALTH. (3)
The study of advanced topics in biostatistics for the public health professional emphasizing concepts over methodology. Prereq: Admission to the Dr.P.H. program, completion of MPH/MSPH core or equivalent, or approval of instructor.

CPH 931 PROFESSIONAL SEMINAR IN BIOSTATISTICS. (3)
Designed as the link between academic work in biostatistics and application in public health practice; and to prepare the student for a leadership role in public health. Prereq: Admission to the Dr.P.H. program, CPH 930 , or approval of instructor.

CPH 940 HEALTH-RELATED BEHAVIORS: MODELS AND APPLICATIONS. (3)
This course evaluates the use of models of health on related behavior and their applications for intervention in public health problems. Prereq: Admission to the Dr.P.H. program, completion of MPH/MSPH core or equivalent, or approval of instructor.

CPH 941 PROFESSIONAL SEMINAR IN HEALTH ENHANCEMENT. (3)
Designed as the opportunity to link academic work in health enhancement with application in public health practice and to prepare the student for a leadership role in public health. Prereq: Admission to the Dr.P.H. program, CPH 940, or approval of instructor.

CPH 950 WELL MANAGED PUBLIC HEALTH CARE ORGANIZATION. (3)
The Well Managed Public Health Care Organization is an advanced course addressing effective senior management of public and private organizations focusing upon public health. Prereq: Admission to the Dr.P.H. program, completion of MPH/MSPH core or equivalent, or approval of instructor.

CPH 951 PROFESSIONAL SEMINAR IN PUBLIC HEALTH MANAGEMENT AND PRACTICE. (3)
Designed to link academic work in public health management with application in public health practice, and to prepare the student for a leadership role in public health. Prereq: Admission to the Dr.P.H. program, CPH 950, or approval of instructor.

CPH 995 DOCTORAL SEMINAR IN PUBLIC HEALTH RESEARCH METHODS. (3)
A survey course in a seminar style covering both classical and recent literature in public health services, including description and critique of research. Prereq: HSM 601/CPH 602, STA 570 or 580, and admission to the Dr.P.H. program or post-doctoral fellowship; or consent of instructor.

CPH 996 PUBLIC HEALTH PROJECT OR DISSERTATION RESEARCH. (1-12)
Public health project or dissertation research for residency credit. To be repeated unlimited. Prereq: Completion of the Dr.P.H. Determinative Examination.

CPH 997 DOCTORAL PUBLIC HEALTH FIELD PRACTICUM. (2-4)
Required public health field work is the integrative component of the curriculum and an opportunity to apply and test didactic learning. May be repeated twice. Laboratory, eight to sixteen hours per week. Prereq: Admission to the Dr.P.H. program, completion of MPH/MSPH core or equivalent, second year status, or approval of instructor.

CPH 998 SPECIAL TOPICS IN PUBLIC HEALTH (SUBTITLE REQUIRED). (1-4)
Designed to address contemporary topics of significance in the field of public health as well as the study of specific topics and problems. May be repeated three times. Prereq: Admission to the Dr.P.H. program, consent of instructor.

CPH 999 DIRECTED STUDIES IN PUBLIC HEALTH. (1-4)
Study and research on contemporary and specific topics and problems of significance to the field of public health, and the interests of individual students. May be repeated to a maximum of six hours. Prereq: Admission to the Dr.P.H. program, consent of instructor.

CS Computer Science

CS 100 THE COMPUTER SCIENCE PROFESSION. (1)
An introductory seminar which covers the fundamental activities, principles, and ethics of the computer science profession. An overview of the discipline of computer science, examples of careers, the history of computing and experience with elementary computing tools are included.

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 115 INTRODUCTION TO COMPUTER PROGRAMMING. (3)**
This course teaches introductory skills in computer programming using an object-oriented computer programming language. There is an emphasis on both the principles and practice of computer programming. Covers principles of problem solving by computer and requires completion of a number of programming assignments. Lecture, 2 hours; lab, 1 hour per week.

***CS 215 INTRODUCTION TO PROGRAM DESIGN, ABSTRACTION, AND PROBLEM SOLVING. (4)**
The course covers introductory object-oriented problem solving, design, and programming engineering. Fundamental elements of data structures and algorithm design will be addressed. An equally balanced effort will be devoted to the three main threads in the course: concepts, programming language skills, and rudiments of object-oriented programming and software engineering. Prereq: CS 115, 221, or equivalent.

CS 216 INTRODUCTION TO SOFTWARE ENGINEERING. (3)
Software engineering topics to include: life cycles, metrics, requirements specifications, design methodologies, validation and verification, testing, reliability and project planning. Implementation of large programming projects using object-oriented design techniques and software tools in a modern development environment will be stressed. Prereq: CS 215.

***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: Not open to students who have received credit for CS 115.

CS 275 DISCRETE MATHEMATICS. (4)
Topics in discrete math aimed at applications in Computer Science. Fundamental principles: set theory, induction, relations, functions, Boolean algebra. Techniques of counting: permutations, combinations, recurrences, algorithms to generate them. Introduction to graphs and trees. Prereq: MA 113, CS 115.

CS 315 ALGORITHM DESIGN AND ANALYSIS. (3)
Introduction to the design and analysis of algorithms. Asymptotic analysis of time complexity. Proofs of correctness. Algorithms and advanced data structures for searching and sorting lists, graph algorithms, numeric algorithms, and string algorithms. Polynomial time computation and NP-completeness. Prereq: CS 215, CS 275, and engineering standing.

#CS 316 WEB PROGRAMMING. (3)
This course introduces students to the World Wide Web, languages and techniques used for web programming, data transfer over the Internet, and the tools available in the web environment. Prereq: CS 216.

***CS 321 INTRODUCTION TO NUMERICAL METHODS. (3)**
Floating point arithmetic. Numerical linear algebra: elimination with partial pivoting and scaling. Polynomial and piecewise interpolation. Least squares approximation. Numerical integration. Roots of nonlinear equations. Ordinary differential equations. Laboratory exercises using software packages available at computer center. Prereq: MA 114 and knowledge of a procedural computer language is required. (Same as MA 321.)

CS 335 GRAPHICS AND MULTIMEDIA. (3)
This course focuses on the graphical human-machine interface, covering the principles of windowing systems, graphical interface design and implementation, and processing graphical data. There is an emphasis on medium-scale programming projects with graphical user interfaces using a high-level procedural programming language and concepts such as object-oriented design. Prereq: CS 216 and engineering standing.

***CS 340 APPLICABLE ALGEBRA. (3)**
Topics include: Euclid's algorithm, unique factorization moduli arithmetic, Fermat's and Euler's theorems, Chinese remainder theorem, RSA public key encryption, Pollard rho factoring, pseudo primes, error correcting codes, Hamming codes, polynomial rings and quotient rings, field extensions, finite fields and BCH codes. Prereq: MA 322 or MA 213. (Same as MA 340.)

CS 375 LOGIC AN THEORY OF COMPUTING. (3)
Topics in logic and discrete math aimed at applications in Computer Science. Propositional calculus: truth tables, logical relations, proofs, tautologies, soundness. Predicate calculus: variables, quantifiers, equivalencies. Models of computation: logic circuits, finite automata, Turing machines. Prereq: MA 113, CS 215, CS 275 and engineering standing.

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 383 INTRODUCTION TO EMBEDDED SYSTEMS. (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. Prereq: EE 280 and EE/CS 380. (Same as EE 383.)

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 405G INTRODUCTION TO DATABASE SYSTEMS. (3)
Study of fundamental concepts behind the design, implementation and application of database systems. Brief review of entity-relationship, hierarchical and network database models and an in-depth coverage of the relational model including relational algebra and calculi, relational database theory, concepts in schema design and commercial database languages. Prereq: CS 315 and graduate or engineering standing.

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 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 441G 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 315 and engineering standing.

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 463G LOGIC AND ARTIFICIAL INTELLIGENCE. (3)
The course covers basic techniques of artificial intelligence, including introduction to logic as it applies to artificial intelligence. The topics covered in this course are: search and game-playing, logic systems and automated reasoning, knowledge representation, intelligent agents, planning, and reasoning under uncertainty. The course will cover both theory and practice, including programming assignments that utilize concepts covered in lectures. Prereq: CS 315, CS 375, and graduate or engineering standing.

CS 470G INTRODUCTION TO OPERATING SYSTEMS. (3)
This course provides an introduction and overview of operating system design, internals, and administration. Topics include classical operating systems (process management, scheduling, memory management, device drivers, file systems), modern operating systems concepts (kernel/microkernel designs, concurrency, synchronization, interprocess communication, security and protection), and operating system administration. Prereq: CS 315, CS 380, and graduate or engineering standing.

CS 471G NETWORKING AND DISTRIBUTED OPERATING SYSTEMS. (3)
Broad overview of concepts in networking and distributed operating systems with examples. Topics will include protocol stacks, link, network, transport, and application layers, network management, the client-server model, remote procedure calls, and case studies of distributed OS and file systems. Prereq: CS 315 and graduate or engineering standing.

***CS 480G ADVANCED COMPUTER ARCHITECTURE. (3)**
This course focuses on advanced computer architectures and low-level system software. Topics include RISC architectures, vector and multiprocessor architectures, multiprocessor memory architectures, and multiprocessor interconnection networks. Peripheral devices such as disk arrays, NICs, and video/audio devices are covered. Topics also include device drivers, interrupt processing, advanced assembly language programming techniques, assemblers, linkers, and loaders. Prereq: CS/EE 380. (Same as EE 480.)

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 499 SENIOR DESIGN PROJECT. (3)
Projects to design and implement complex systems of current interest to computer scientists. Students will work in small groups. Prereq: CS 315 and engineering standing.

CS 505 INTERMEDIATE TOPICS IN DATABASE SYSTEMS. (3)
The course introduces a variety of modern techniques in database and distributed database systems. The major topics include, but are not limited to: object-oriented database systems; distributed, heterogeneous and web-based databases; knowledge based systems; physical database design; and security. The course covers a variety of methods that allow for a solution of database problems where the traditional relational database techniques are not viable or not sufficient. Prereq: CS 405 or consent of instructor.

CS 515 ALGORITHM DESIGN. (3)
The design and analysis of efficient algorithms on data structures for problems in sorting, searching, graph theory, combinatorial optimization, computational geometry, and algebraic computation. Algorithm design techniques: divide-and-conquer, dynamic programming, greedy method, and randomization, approximation algorithms. Prereq: CS 315 and engineering standing.

CS 521 COMPUTATIONAL SCIENCES. (3)
Study of computer science techniques and tools that support computational sciences and engineering. Emphasis on visualization, performance evaluation, parallel computing, and distributed computing. Prereq: CS 115, CS/EE 380, and engineering standing.

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 535 INTERMEDIATE COMPUTER GRAPHICS. (3)
Three-dimensional graphics primitives such as 3D viewing, lighting, shading, hidden line/surface removal, and more advanced topics such as solid modeling, image storage and representation, advanced raster graphics architecture and algorithms, advanced modeling techniques, and animation will be covered. Prereq: CS 335, CS 315, CS 321, and engineering standing.

CS 536 SITUATED COMPUTING. (3)
This course covers the fundamental concepts involved in understanding and engineering a closed-loop, sensing, reasoning, and actuating agent. Biological models of sensing and actuation will be discussed and related to modern artificial counterparts. The course consists of three major topic areas: vision, brain, and robotics. It will introduce students to the issues in computer and biological vision, to models of belief representation and modification, architectures for percept processing and reasoning, machine learning for vision, neural networks, path planning, intelligent localization based on visual cues, and to forward and inverse kinematics, intelligent grasping, and the integration of perception and action. Prereq: CS 460G or consent of instructor.

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 541 COMPILER DESIGN. (3)
Intermediate aspects of a compilation process with an emphasis on front-end issues. Practical issues in using compiler writing tools. Code generation for expressions, control statements and procedures (including parameter passing). Symbol tables, runtime organization for simple and structured variables. Using compilers and translators for automation (filters, programs writing programs). Prereq: CS 441 or consent of instructor.

CS 555 DECLARATIVE PROGRAMMING. (3)
The course covers fundamentals of propositional and predicate logic, and their uses in declarative programming to model and solve computational problems. Topics include propositional satisfiability, satisfiability testing techniques such as the DPLL algorithm, automated reasoning techniques for predicate logic such as resolution with unification and logic programming. Prereq: CS 315 and CS 375 or consent of instructor.

CS 570 MODERN OPERATING SYSTEMS. (3)
Brief review of classical operating system concepts (process and memory management, process coordination, device drivers, file systems, starvation/deadlock). Modern topics of files systems (log-structured file systems, distributed file systems, memory-based file systems), operating system design (monolithic, communication-kernel, extensible/adaptable, distributed shared memory), multiprocessor issues (scheduling, synchronization, IPC), security (internet attacks, encryption, defenses). Inspection and modification of actual operating system code (Linux). Prereq: CS 470 and engineering standing.

CS 571 COMPUTER NETWORKS. (3)
Principles of computer networks using current Internet technologies and protocols as examples. Routing algorithms and protocols; end-to-end transport; flow control; congestion avoidance and control; mail, web, and file transfer protocols; designing and implementing applications using common network APIs. Advanced topics, included as time permits, include network security, multicast, and quality of service. Prereq: CS 471G or consent of instructor.

CS 575 MODELS OF COMPUTATION. (3)
The formal study of computation, including computability and computation with limited resources. Church's thesis and models of computation. Formal languages and machines as recognizers of languages. The Chomsky Hierarchy of language types. Topics may include Turing machines or other basic models of computation; decidability and undecidability; basic complexity theory; finite automata and regular languages; pushdown automata and context-free languages. The course will cover primarily theory, including assignments that utilize concepts covered in lectures. Prereq: CS 375 and engineering standing, or consent of instructor.

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 611 RESEARCH IN COMPUTER SCIENCE. (3-9)
Doctoral students conduct research work in computer science under supervision of a faculty member from the Department of Computer Science. May be repeated to a maximum of 4 semesters (18 credits, maximum). Prereq: 36 credit hours of graduate course work in computer science and approval of the Departmental Committee on Higher Degrees.

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 616 SOFTWARE ENGINEERING. (3)
This course provides an overview of the software engineering discipline: software requirements, software design, software construction, software management, and software quality. Testing and validation techniques will be emphasized throughout the course. Programs and program fragments will be developed and studied throughout the course to illustrate specific problems encountered in the lifecycle development of software systems. Prereq: At least nine hours of graduate computer science courses.

#CS 617 REQUIREMENTS ENGINEERING. (3)
The course examines the requirements phase of the Systems Engineering and Software Engineering lifecycles in detail. Topics include: requirements elicitation, requirements specification, and requirements analysis. Verification and validation techniques are emphasized throughout the course. Students work in small groups to research and present a related topic. Prereq: Nine hours of graduate study.

#CS 618 SOFTWARE DESIGN. (3)
This course provides an overview of the software design field: software design overview, software design process, a survey of software design method (such as structured design methods, object-oriented design methods, concurrent design methods), design reviews, as well as discussing current topics such as aspect-oriented programming, refactoring, and design patterns. Testing and validation techniques are emphasized through the course. Program designs are developed and validated throughout the course. Readings and summaries of current and seminal journal papers and texts are required. Prereq: Nine hours of graduate study.

CS 621 PARALLEL AND DISTRIBUTED COMPUTING. (3)
This course provides graduate students in computer science and in other fields of science and engineering with experience of parallel and distributed computing. It gives an overview of parallel and distributed computers, and parallel computation. The course addresses architectures, languages, environments, communications, and parallel programming. Emphasis on understanding parallel and distributed computers and portable parallel programming with MPI. Prereq: Two 500 level CS courses, or consent of the 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 623 PARALLEL ITERATIVE COMPUTING. (3)
The course will present advanced computational science techniques needed to support large scale engineering and scientific computations. Emphasis on iterative methods for solving large sparse linear systems and parallel implementations of iterative techniques. Prereq: CS 537 or consent of the instructor.

CS 630 FREE-FORM SOLID MODELING. (3)
This course covers the path from a conceptual vision of a shape to a concrete computer-based description that is suitable for manufacturing. It covers various solids modeling techniques, including volume representations, boundary representations, instantiation and Boolean combinations of shapes, and procedural generation such as sweeps. It discusses effective data structures and consistent and unambiguous part description formats to transfer a shape from a designer to a fabrication house, as well as problems with maintaining unambiguous topology in the presence of finite-precision geometry. Prereq: CS 535 or consent of instructor.

CS 631 COMPUTER-AIDED GEOMETRIC DESIGN. (3)
Overview of current concepts and issues in CAGD with emphasis on free-form surface design; mathematics of free-form curve and surface representations, including Coons patches, Gregory patches, Bezier method, B-splines, NURBS, triangular interpolants, and their geometric consequences; creating objects with smooth surfaces, covering assembling spline patches, geometric and parametric continuity, texture mapping onto complex shapes, subdivision surfaces, surface evolution, and global optimization. Prereq: CS 535 and CS 321, or consent of instructor.

CS 633 3D COMPUTER ANIMATION. (3)
This course covers the underlying principles and techniques of 3D computer animation. The topics covered include (1) modeling: the process of building the forms that will be animated, (2) rendering; the process of defining how the final picture in the model will look, (3) animation techniques: the process of creating in-between frames and keyframes, (4) compositing and special effects: the process of assembling various pieces of an image to get special two-dimensional effects, and (5) recording: the principles and techniques involved in putting animation frames onto film or video. Prereq: CS 335 or CS 535, or consent of instructor.

CS 634 MULTIMEDIA SYSTEMS. (3)
This course covers fundamental techniques in multimedia systems for capturing, managing, accessing and delivering digital media over local, wide-area and wireless network technology. The core topics will emphasize the digital media (images, video, audio) and the algorithms to generate, store, access and process it. Network concepts will be presented at a high level only. Prereq: CS 335 or consent of instructor.

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)
This course covers digital image processing as well as advanced topics in computer vision. Initial topics include image formation, digital filtering, sensor modeling and feature detection techniques. The course will discuss how these algorithms are used to address general computer vision problems including three-dimensional reconstruction, scene understanding, object recognition, and motion analysis. Prereq: CS 536 or consent of instructor.

CS 637 EXPLORING VIRTUAL WORLDS. (3)
This course covers a mixture of core techniques related to systems for constructing and modeling virtual environments, such as model-building, image-based rendering, head-mounted hardware, stereo image generation, head-tracking, and immersive display technology. The core topics will be presented using textbooks and papers from the current literature. A substantial group project will provide hands-on experience with the concepts, algorithms and technology. Prereq: CS 335 and CS 635.

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 655 PROGRAMMING LANGUAGES. (3)
Overview of programming-language styles: imperative, functional, declarative, object-oriented, concurrent, simulation, glue. Non-local referencing environments, combinatorial control structures (backtracking, coroutines), higher-order types, lazy/eager evaluation. This course looks at features, not complete languages, touching on such languages as Ada, CLU, FP, Haskell, Icon, Lisp, ML, Modula-2, Modula-3, Pascal, Post, Prolog, Russell, CSim, Simula-67, and Smalltalk-80. Students will not become proficient in any of these languages, but rather will learn what contributions each has made to the state of the art in language design. Compiler-construction issues will be touched on only in passing. Prereq: CS 450G or consent of instructor.

CS 663 ARTIFICIAL INTELLIGENCE. (3)
Overview of modern artificial intelligence. Covers topics such as searching and game trees, knowledge representation techniques, methods to represent uncertain information and to reason about it, reasoning about action and planning, expert systems, machine learning and neural networks. Prereq: CS 555 or consent of instructor.

CS 670 DISTRIBUTED OPERATING SYSTEM THEORY. (3)
This course covers advanced distributed operating system algorithms and theory. Topics such as distributed mutual exclusion, distributed event ordering, distributed deadlock detection/avoidance, agreement protocols, consistent global snapshot collection, stable predicate detection, failure recovery, faulty-tolerant consensus, leader election, process groups and group communication. Case studies of distributed operating systems such as LOCUS, Grapevine, V System, ISIS, Amoeba, Sprite, and Mach will be used as illustrations of the above algorithms. Prereq: CS 570 or consent of instructor.

CS 671 ADVANCED COMPUTER NETWORKS. (3)
This course is intended to provide students with a solid understanding of the state of the art in computer network systems and protocols. Topics are covered in some depth, including both abstract and concrete aspects. The course begins with a study of implementations of the current Internet Protocols (TCP, UDP and IP); this provides a concrete backdrop for the rest of the course. The emphasis is on learning by doing, with programming and other hands-on assignments associated with most topics. Prereq: CS 571 or consent of instructor.

CS 673 ERROR CORRECTING CODES. (3)
The problem of correct transmission of data in a noisy environment. The design and analysis of codes that efficiently (in terms of data rate and encryption and decryption speed) correct errors. Linear and nonlinear block codes, general encoding and decoding techniques, fundamental bounds, dual codes, cyclic codes. Specific codes will be studied, including Hamming, BCH, Reed-Muller, Reed-Solomon, trellis, and convolutional codes. Prereq: CS 515 or consent of the instructor.

CS 674 HEURISTIC ALGORITHMS. (3)
Solving problems that are intractable. Exact techniques such as search integer programming and dynamic programming. Approximation techniques including local search, divide and conquer, and greedy algorithms. Methods based upon natural models such as force-directed iteration, simulated annealing, genetic algorithms, and neural networks. Examples will be selected from active research areas. Prereq: CS 515 or consent of instructor.

CS 675 COMPUTABILITY AND COMPLEXITY. (3)
The formal study of computation, including computability and computation with limited resources. Church's thesis and models of computation. Topics will include Turing machines or other basic models of computation; reductions; computable and computably enumerable sets; Rice's Theorem; decidability and undecidability; basic complexity theory; NP-completeness and notions of intractability. Additional topics may include primitive recursive functions and Grzegorczyk hierarchy; nondeterminism; the arithmetic hierarchy; formal complexity measures; time and space hierarchy theorems; the polynomial hierarchy and PSPACE; probabilistic complexity classes; circuit complexity. Prereq: CS 575 or consent of instructor.

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 678 CRYPTOGRAPHY. (3)
The study of security in communications and electronic computing. The encryption of data using public key systems, block ciphers, and stream ciphers. The basic tools for the design and analysis of such systems. Topics may include information theory, authentication, digital signatures, secret sharing schemes, complexity theoretic issues, probabilistic encryption, electronic commerce and others. Prereq: CS 515 or consent of the instructor.

CS 684 SPECIAL TOPICS IN VISION, GRAPHICS AND MULTIMEDIA (SUBTITLE REQUIRED). (3)
Advanced topics in computer graphics, computer vision, and multimedia systems. Specific topics include but are not limited to: isophotes, volume rendering, displacement mapping, geographic information systems (GIS), remote sensing topics, large scale sensor networks, video and audio encoding, visualization, immersive environments, and multimedia interfaces. May be repeated to a maximum of up to 6 credit hours, with no more than 3 in the same topic. Prereq: Consent of instructor.

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 687 SPECIAL TOPICS IN SYSTEMS. (3)
This course is a special topics course. The topic and syllabus will change each time the course is offered, reflecting the interests of the instructor. Typically the course will survey new research in the topic area but may also look back at canonical and ground breaking work from the past. Example course topics might include things such as web operating systems, global file systems, distributed object-based systems, fault tolerance/distributed check pointing, high-speed networking, network security, active networking, group communication models, compilers for parallel/distributed computing, recent programming languages, and data mining. Prereq: Consent of instructor.

CS 689 SPECIAL TOPICS IN NUMERICAL AND SCIENTIFIC COMPUTING (SUBTITLE REQUIRED). (3)
Advanced topics in numerical analysis, scientific computation, and complexity of continuous problems. Specific topics may include, but are not limited to: iterative methods, advanced parallel algorithms in numerical linear algebra, multivariate function approximation and integration. Prereq: CS 537 or consent of instructor.

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.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

CSC Clinical Sciences

CSC 528 LABORATORY TECHNIQUES FOR NON-CLS STUDENTS. (2)
Basic clinical laboratory principles and techniques; includes laboratory safety, sterilization procedures, pipetting, microscopy, routine culture and staining procedures, chamber counts, laboratory math calculations and statistics, quality control, quality assurance, chain of custody and laboratory reporting. Consent of instructor required for non-CSC students.

CSC 600 HUMAN PATHOPHYSIOLOGY. (4)
A study of disease processes, pathognomonic parameters, and pathologic factors that mediate disease. Diagnostic testing used to validate disease process will be used to emphasize to the student the role of clinical sciences in the diagnosis of these complex disease states. Variances in disease in relationship to age will be examined. Prereq: Admission to the Clinical Sciences graduate program or consent of the course faculty committee.

CSC 601 HEALTH CARE POLICY AND ETHICS. (3)
The focus of this integrative course will be on policy and ethical issues confronting health care providers, health care systems, and particularly those issues specific to clinical sciences. Emphasis will be placed on current trends and anticipated challenges in providing humane and cost-effective health care services, with particular reference to the medically underserved and other at-risk populations. The different needs of special populations such as the aging, socioeconomically disadvantaged, insured and underinsured persons, ethically and culturally diverse groups such as recent immigrants and minorities will be explored. Discussion of technology dissemination delivery models, funding sources, human resources required to provide health care, alternative methods of coordinating these resources, and shifting from an "illness" orientation to a "wellness" approach will be included. The bioethics of health care delivery addressed will also include global considerations relative to health care, population dynamics, health care rationing, health care economics and assisted reproduction and transplantation issues.

CSC 602 CLINICAL SCIENCES SEMINAR (SUBTITLE REQUIRED). (1)
Provides skills required of successful scientist to communicate effectively with peers, clients and general public. Each student will demonstrate an ability to interact with community, to function in an educator role by investigating a topic and preparing and delivering a presentation to the class and a community group. May be repeated up to five times. Prereq: Admission to the Clinical Sciences graduate program or consent of instructor.

CSC 603 QUALITY ASSURANCE AND LABORATORY REGULATIONS. (4)
Accreditation processes are evaluated with special emphasis on standards established by agencies and organizations such as JCAHO, CAP, FDA, NCCLS (FCC). The continuing quality control demands of the Clinical Laboratory Improvement Act of 1988 (CLIA '88) and the various accrediting bodies are addressed through a statistical approach that examines descriptive and inferential analysis to include hypothesis testing (t-test), power and confidence intervals, OVA-testing and regression analysis, TEA algorithms, reference range establishment, interference studies, bias studies, method comparison, validation studies, and, unstable error studies. Performance and utilization management systems, standard compliance issued related to Medicare laboratory fee schedules, CPT and ICD coding, reimbursement strategies and other billing practices are presented. The course concludes with a unit on OSHA that delineates chemical and infectious hazards and safety in the laboratory. Prereq: Admission to the Clinical Sciences graduate program or consent of the course faculty committee.

CSC 604 RESEARCH METHODS FOR THE CLINICAL SCIENCES. (3)
Introduction to experimental design, data collection and data analyses for clinical biomedical research. Students will also examine ethical issues in biomedical science research using a case-study approach. Representative issues to be addressed may include data selection and retention, plagiarism, scientific review of grants and manuscripts, review of protocols by human studies committees (institutional review boards or IRB) and informed consent.

CSC 605 EPIDEMIOLOGY AND BIOSTATISTICS. (3)
This course will provide a foundation in the principles and methods of the epidemiological investigation of disease with special emphasis on the distribution and dynamic behavior of disease in a population. Etiologic factors, modes of transmission and pathogenesis will be examined. Topics to be covered include epidemics and the spread of infectious disease, epidemiological aspects of non-infectious disease; rates of morbidity and mortality; sensitivity, specificity, and predictive values; strategies used in epidemiological studies to include measures of disease effect, validity, reliability, sampling methods and computer-based biostatistical analysis that emphasize the generalized linear model and forms of SEM.

CSC 606 ADVANCED LABORATORY STATISTICS AND ADMINISTRATIVE ANALYSIS. (3)
Applications-based statistical and analytical software is used to demonstrate Continuing Quality Improvement (CQI) adherence to Federal regulation, NCCLS/IFCC protocols, and other accrediting agency requirements. Special emphasis is on defining and controlling unstable error through a statistical modeling approach. Documentation structures for quality operations policy; and processes, procedures and implementation of a quality system are examined with special attention to assuring quality of point-of-care testing. Detailed computerized study of method comparison includes receiver operator charting (ROC). Computerized diagnostic screening programs are used to evaluate prevalence, sensitivity, specificity, and predictive values. Utilization of management systems to track expenses, budget/inventory management, employee scheduling, productivity evaluations, process improvement and restructuring are demonstrated. Computerized performance management systems and innovations in compliance strategies are featured. Student evaluation will be based on examinations, projects, and papers.

CSC 620 ANDROLOGY. (3)
Review of the male reproductive system including hormonal control, early development, spermatogenesis and fertilization. Basic and advanced andrology procedures will be discussed and laboratories will focus on semen analysis, sperm function tests, and preparation of partner and donor semen for artificial insemination. Prereq: BIO 549.

CSC 621 EMBRYOLOGY/ASSISTED REPRODUCTIVE TECHNOLOGY. (3)
Review of female reproductive system including hormonal control, early development, oogenesis, the menstrual cycle, fertilization and early implantation. Assisted reproductive technology procedures will be discussed with the aid of photographs and videos and laboratories will focus on culturing and manipulating mouse embryos. Prereq: BIO 549, CSC 620.

CSC 623 REPRODUCTIVE IMMUNOLOGY. (1)
Immunology associated with fertilization, implantation, and early development in humans. Various procedures for detecting antibodies associated with reproduction will be discussed and the laboratories will assess both direction and indirect antibodies on spermatozoa. Prereq: BIO 494G, CSC 620, CSC 621.

CSC 624 GAMETE AND EMBRYO CRYOPRESERVATION. (1)
Principles of cryopreservation will be covered; includes sessions on cryopreservation of human sperm and mouse embryos. Legal, ethical and policy issues associated with cryopreservation will be introduced. Prereq: CSC 620 and CSC 621.

CSC 625 POLICY, MANAGEMENT, ETHICAL AND LEGAL ISSUES IN ASSISTED REPRODUCTION. (2)
Current and anticipated regulations of assisted reproductive technology will be discussed. Legal and ethical concerns associated with ART will be introduced and case studies will focus on specific issues. Prereq: CSC 620, 621, 624.

CSC 626 CLINICAL PRACTICUM IN ANDROLOGY LABORATORY. (2)
Students must complete the checklist procedures while working under supervision. Andrology procedures will include semen analysis, sperm function tests, microbiology, preparation for artificial insemination, and cryopreservation of male gametes. Prereq: CSC 620, 621, 623, 624, 625.

CSC 627 CLINICAL PRACTICA IN ART LABORATORY. (3)
Students must complete the checklist procedures while working under supervision. All ART procedures including in vitro fertilization, ICSI, zona hatching and cryopreservation of gametes and embryos will be practiced under supervision using appropriate models for practice. Prereq: CSC 620, 621, 623, 624, 625.

CSC 630 RLS RESEARCH. (1-5)
Research projects for students in Reproductive Laboratory Science. Students will complete web-based modules, "The Scientific Method and the Art of Research" prior to project initiation. Projects should be related to the student's individual interest and should address an area in reproductive laboratory science. Projects should be under the supervision of a faculty member with expertise in the project area. Prereq: CSC 528, CSC 615, CSC 616, and CSC 617 or consent of instructor. Additional CSC courses in the RLS track may be required as prerequisites depending on the nature of the research project.

CSC 670 HISTOCOMPATIBILITY AND IMMUNOGENETICS. (3)
In-depth study of the human histocompatibility polymorphisms will include genetic inheritance, alleles, typing methodologies, and matching requirements for solid organ and tissue transplantation. The human leukocyte antigen (HLA or MHC) system and its role in transplant rejection will be the major focus, however minor histocompatibility systems will also be examined. Specific and detailed correlation of didactic information will be integrated with case studies to explore current concepts of immunologically-based molecular methods of antigen detection and their impact on clinical practice. Prereq: Immunology course.

CSC 671 MOLECULAR IMMUNOPATHOGENESIS. (3)
Human immunology with an emphasis on experimental methods, signal transduction, cell-cell interactions, cytokine production and activity, cell marker expression during normal cell development, pathogenic expression of cell markers and their detection, immunotherapy, vaccine production and acquired immunity. Analysis of immunologic systems mediating the response to allogenic foreign molecules such as transplanted tissues and organs will be emphasized. Contemporary issues and trends in immunology, with an emphasis on malignancy and immunodeficiencies, will be examined. Prereq: Immunology course.

CSC 672 TRANSPLANTATION SCIENCE. (3)
Course content includes immunological, biochemical and genetic concepts and molecular biology related to the clinical process of transplantation. Cellular and molecular mechanisms will be an intense focus of this course. Solid organ and tissues transplantation, the need for donor organs and tissues, compatibility requirements for successful transplantation of each type of organ and tissue, immunosuppressive therapy, and research opportunities that may impact successful transplantation and tissue availability will be examined. Literature review and presentation of papers on assigned topics will be required. Prereq: CSC 670 or consent of instructor.

CSC 673 FLOW CYTOMETRY. (3)
This course focuses on principles, applications and quality assurance of flow cytometry in research and clinical use in hematology and transplantation. Emphasis is placed on the biological and physical principles underlying flow cytometry, specimen processing, operation and specific application in the identification of various hematopoietic and other cells. The use of flow cytometry to screen transplant recipients, cross-match donor and potential recipient, post-transplant monitoring, identifying HLA antigens, diagnosing hemoproliferative disorders, monitoring immunosuppressive therapy and stem cell isolation is presented. Evolving applications in other disciplines such as microbiology and clinical chemistry, will also be explored. Prereq: CSC 670, or CSC 674 and CSC 675, or consent of instructor.

CSC 674 HEMOPOIESIS. (3)
Normal and abnormal hemopoiesis is examined. Special emphasis is placed on understanding the relationship of hemopoiesis to hemoproliferative and immunologic disease; transplantation science, and medical applications. Prereq: Course(s) in hematology and hematologic disease, or consent of instructor.

CSC 675 MYELOPROLIFERATIVE DISORDERS. (3)
Advanced review of hemoproliferative disorders, including acute and chronic leukemia, and lymphomas. Current knowledge and theory of disease course, laboratory diagnosis, testing techniques, and treatment are emphasized. Prereq: CSC 674.

CSC 676 ADVANCED HEMOSTASIS. (3)
This course will review current knowledge and hypotheses regarding both hypo and hyper coagulable states, drug induced disorders of hemostasis, treatment regimes, and the present state of the art in laboratory testing for high-risk individuals. Prereq: Course in hemostasis including normal mechanisms and pathological states, or consent of instructor.

#CSC 677 ERYTHROCYTE DISORDERS. (3)
Advanced review of inherited and acquired disorders of erythrocyte production, destruction and loss including the hemoglobinopathies. The course will address the pathophysiology, laboratory testing and treatment of each disorder. Prereq: CSC 674.

CSC 690 CLINICAL SCIENCES THESIS RESEARCH. (1-6)
Research, design, protocol development and production of thesis are included. Grade will be reported following evaluation of written product by the thesis committee. Prereq: Successful completion of final/comprehensive examinations for the Clinical Sciences graduate program.

CSC 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 CSC 769 residence credit following the successful completion of the qualifying exams.

#CSC 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

CSC 772 GENE THERAPY. (3)
Processes involved in constructing vectors with desired genes for implantation and examples of effective gene therapy will be discussed. The application of gene therapy to areas of student interest and research approaches to such applications will be examined. Prereq: CSC 600 and 601.

CSC 774 BIOSYNTHESIS, STRUCTURE AND FUNCTION OF MACROMOLECULES. (3)
The molecular biology and molecular genetics of protein synthesis, assembly and configuration of macromolecules, and the functions of the biological molecules involved in signal transduction, cell reproduction and fertilization will be addressed. Biochemical structure, physiological function, and cellular metabolism of carbohydrates, amino acids, nucleotides and lipids will be stressed. Prereq: Course work in cell biology and genetics, or consent of instructor.

CSC 776 MOLECULAR GENETICS AND CHROMOSOME ANALYSIS OF HEMATOPOIETIC DISORDERS. (3)
This course explores laboratory methods in molecular diagnostics and their application in the diagnosis and assessment of hematologic diseases. Special emphasis is on clinical utility of gene rearrangement studies and other emerging research topics. Prereq: CSC 673, 674 and 675.

CSC 777 HEMATOPOIETIC STEM CELL AND BONE MARROW TRANSPLANTION: NONTRADITIONAL APPLICATIONS. (3)
Innovative efforts to treat or cure various disorders by transplantation of hematopoietic stem cells or bone marrow will be explored. Analysis of the research design of current and recent clinical investigations, ex vivio expansion of stem cells and other contemporary topics will be explored. Prereq: CSC 671, 674 and 676.

CSC 778 CLINICAL MOLECULAR CYTOMETRY. (3)
In-depth examination of cytometric analysis of DNA in neoplasms and tumors, ploidy and proliferative fractions, gene product and nucleic acid analysis and quality assurance measures. Prereq: CSC 600 and 673.

CSC 787 TEACHING APPRENTICESHIP. (2)
Candidates for the doctoral degree in Clinical Sciences will complete a teaching assignment in collaboration with and with direct supervision by a graduate faculty member. Students will apply educational principles, including those related to course development, delivery of instruction, and evaluation. Principles will be applied and experience acquired in classroom, laboratory and distance learning environments. Prereq: Admission to the Clinical Sciences doctoral program.

CSC 789 RESEARCH APPRENTICESHIP. (1-4)
The goal of this course is to ensure that the student understands and can apply research methods to identifying a research problem, developing a proposal, conducting an investigation, and preparing a journal-quality research paper. Students will work closely with a clinical sciences researcher to develop these research skills. The course requirements and format will vary depending upon the student's prior experience. Prereq: Admission to the Clinical Sciences doctoral program.

CSC 790 CLINICAL SCIENCES DISSERTATION RESEARCH. (0-12)
Research design, protocol development and production of written dissertation after completion of the dissertation research. Grade will be issued following evaluation of the dissertation by committee. Candidates for the degree must complete nine credit hours in each of two successive semesters of dissertation research. Prereq: Successful completion of the Clinical Sciences qualifying examinations.

DIP Diplomacy and International Commerce

DIP 700 DYNAMICS OF DIPLOMACY. (3)
This course explores the historical evolution of diplomacy, then focuses on post WWII diplomatic practice and especially the dynamics of diplomacy since the end of the Cold War. Emphasis will be placed on diplomacy's role in the international system, new tasks for diplomacy, and enhancing diplomatic skills in a new paradigm. Prereq: Permission of instructor.

DIP 710 GREAT BOOKS OF WORLD POLITICS. (3)
Overview of classic texts on war and statecraft. Prereq: Consent of instructor. (Same as PS 734.)

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 740 GLOBALIZATION. (3)
This course examines the phenomenon of globalization by applying core theories of the international political economy. Subjects to be covered include economic and political definitions of globalization, the technological, economic, and political causes of globalization, and the effects of globalization on national politics and wealth. By the end of the course, students should be able to apply the basic international political economy analysis to both trade and financial issues, giving them the necessary skills to prepare convincing policy analyses, political advocacy programs, and business plans. Lecture/Discussion hours per week. Prereq: Graduate status, a modest undergraduate or graduate background in Foreign Affairs or permission of the 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 750 DEFENSE STATECRAFT. (3)
Students will gain familiarity with the key military policy issues that confront government officials, and they will learn to evaluate the claims of journalists and advocacy organizations that confront informed American opinion on a day-to-day basis. Prereq: Graduate status.

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 201, STA 291, MA 113 or MA 123, 162.

DIS 310 BUSINESS COMPUTING SYSTEMS. (3)
The course provides an understanding of how systems can be utilized to improve computer-based organizational productivity and effectiveness. Prereq: CS 101; open only to Business Minors. Not available for credit for Business and Economics majors.

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, data base management concepts and design methods, with emphasis on managerial problems related to these systems. Prereq: CS 101; admission to upper division B&E.

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 INFORMATION TECHNOLOGY FOR ORGANIZATIONAL DECISION MAKING. (3)
The purpose of this course is to integrate analytical techniques and information technology in developing tools to assist in organizational decision making. In prior courses, students are introduced to analytical techniques that are commonly used in organizational decision making as well as current information technologies. As the capstone course in Decision Sciences and Information Systems, the objective of this course is to combine students' abilities in both areas. Specifically, this course enhances students' abilities in developing computer-based tools that employ analytical techniques for the purpose of aiding organizational decision-makers. Prereq: Senior standing in the College of Business and Economics and DIS 350 plus two other DIS courses.

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 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 695 INDIVIDUAL WORK IN DSIS. (3)
Students confer individually with instructor. May be repeated to a maximum of six credits. Prereq: Consent of the instructor.

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 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 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 520 TEXTILES FOR INTERIORS. (3)
Selection, cost, expected performance and care of textiles used in residential and commercial interiors. Prereq: MAT 120.

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 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 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 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 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

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

DSP Discovery Seminar Program

DSP 110 SOCIAL SCIENCES: (SUBTITLE REQUIRED). (3)
An introductory course of an interdisciplinary, topical, or experimental nature which may be used toward partial fulfillment of the social science requirement in the University Studies Program. Each proposal must include the discipline in which the course is being offered and the options available to the student to complete the USP social science requirement. Each proposal must be approved by the College of Arts and sciences and the Dean of Undergraduate Studies.

DSP 120 HUMANITIES: (SUBTITLE REQUIRED). (3)
An introductory course of an interdisciplinary, topical, or experimental nature which may be used toward partial fulfillment of the humanities requirement in the University Studies Program. Each proposal must include the discipline in which the course is being offered and the options available to the student to complete the USP humanities requirement. Each proposal must be approved by the College of Arts and sciences and the Dean of Undergraduate Studies.

DSP 130 NATURAL SCIENCES: (SUBTITLE REQUIRED). (3)
An introductory course of an interdisciplinary, topical, or experimental nature which may be used toward partial fulfillment of the natural science requirement in the University Studies Program. Each proposal must include the discipline in which the course is being offered and the options available to the student to complete the USP natural science requirement. Each proposal must be approved by the College of Arts and sciences and the Dean of Undergraduate Studies.

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 401 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 402 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 and ECO 401 taken previously or concurrently.

***ECO 410 CURRENT ISSUES IN ECONOMICS (SUBTITLE REQUIRED). (3)**
The course addresses relevant topics in economics. May be repeated for a maximum of six credits under different subtitle. Prereq: ECO 202 and/or ECO XXX to be identified by instructor upon time of offering.

ECO 411 BUSINESS ECONOMICS. (3)
Applies basic economic principles to the types of problems faced by business decision makers. Particular attention is paid to the economics of organizations and to the economics of firm strategy. Topics covered will include the nature of the firm, the make or buy decision, corporate governance, distribution channels, external market structure, selling decisions, and rivalry and strategy. Prereq: ECO 202 or equivalent.

ECO 412 MONETARY ECONOMICS. (3)
A detailed discussion of the financial sector of basic static macroeconomic models, including views of both the monetarist and new-Keynesian schools. Institutional aspects of the financial system are discussed. The course stresses problems of economic stabilization. Prereq: ECO 202 or equivalent.

***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 401 or equivalent 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 401 or equivalent.

***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 401 or equivalent or consent of instructor.

***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 401 or equivalent.

***ECO 471 INTERNATIONAL TRADE. (3)**
This is advanced economic course in international trade. The first part of the course covers the basics of why countries trade, what explains the pattern of trade that we observe and what are the effects of trade on welfare and the distribution of income. The second part of the course covers issues concerning trade policy and looks at the positive and normative effects of trade policy and trade agreements as well as investigating topics of current interest. While the focus of the course is on theory, students will also be exposed to many applications of the theory as a means of both explaining the economic intuition and encouraging students to analyze the world around them from an economic perspective. Prereq: ECO 401 or equivalent. (Same as AEC 471.)

#ECO 472 INTERNATIONAL MONETARY ECONOMICS. (3)
This course deals with macroeconomic and financial aspects of the open economy. Main subjects include the balance of payments, exchange rate determination, and macroeconomic theory and policy in an open economy. Students are exposed to basic concepts such as purchasing power parity, interest parity, monetary models of the exchange rate, and the Mundell-Fleming model. Current issues for discussion include currency crises, pros and cons of international capital flows, and the choice of exchange rate regime. Prereq: ECO 402 or consent of instructor.

***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 401 or equivalent or consent of instructor.

***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 401 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 401 or equivalent. Agricultural Economics majors may substitute AEC 303 for this prerequisite. (Same as AEC 479.)

***ECO 491G APPLIED ECONOMETRICS. (3)**
To provide the student with a firm foundation in the design and estimation of economic models, empirical analysis of economic relationships, and forecasting. Emphasizes the structure and utilization of economic models. Prereq: ECO 391, ECO 401, and ECO 402 or equivalent or consent of instructor.

***ECO 499 SEMINAR IN ECONOMICS (SUBTITLE REQUIRED). (3)**
Reading, 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 391, ECO 401, and ECO 402 or equivalent.

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 401 and MA 113, or consent of instructor. (Same as AEC 590.)

ECO 601 ADVANCED MICROECONOMIC THEORY. (3)
An intensive course covering microeconomic theory and its various methodological and analytical techniques. Prereq: ECO 401 or consent of instructor.

ECO 602 MACROECONOMIC THEORY. (3)
An analysis of a market clearing, general equilibrium macroeconomic model. Emphasis on theoretical foundations of relevant behavioral functions and comparative statics. Not open to those with credit in ECO 761. Prereq: ECO 402 or consent of instructor.

ECO 603 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.

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 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. ECO 201 or equivalent. (Same as HA/PA 652.)

ECO 653 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: The economics prerequisite can be met in three ways: (a) an undergraduate principles course in microeconomics and HA/PA 652; (b) an undergraduate microeconomics principles course and a graduate course in managerial economics; or (c) an undergraduate microeconomics principles course and an intermediate microeconomics course. (Same as HA/ PA 636.)

ECO 654 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 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 471 and ECO 412 or consent of instructor.

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 692 ECONOMETRICS FOR POLICY ANALYSTS. (3)
Maximum likelihood estimation, ordinary least squares (OLS) regression, instrumental variables (IV) regression, heteroscedasticity-consistent regression, fixed and random effects models, probit, logit and tobit models, and identification and two-state least squares estimation of simultaneous equations models. Prereq: Any undergraduate statistics course. MPA, MPP or PUAD program status for priority registration, other students with permission of instructor. (Same as PA 692.)

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 701 NEOCLASSICAL MICROECONOMIC THEORY. (3)
The Neoclassical theory of consumer behavior, production, market equilibrium and imperfect competition. Prereq: ECO 601 and ECO 590, or consent of instructor.

ECO 702 ADVANCED MACROECONOMIC THEORY. (3)
Analysis of general equilibrium macroeconomic models and factors responsible for deviations from general equilibrium. Emphasis on issues from recent professional literature. Prereq: ECO 602 or consent of instructor.

ECO 703 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: ECO 590 and either ECO 603 or STA 525, or consent of instructor.

ECO 704 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 701 or consent of instructor.

ECO 705 MACROECONOMIC DYNAMICS. (3)
Theoretical and empirical assessment of dynamic issues in macroeconomics. Topics include neoclassical and endogenous growth models and vector autoregressions. Prereq: ECO 702 or consent of instructor.

ECO 706 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 703 or consent of instructor.

ECO 710 ECONOMICS OF ORGANIZATION. (3)
The Economics of Organization applies transactions costs and principal-agent theories to study the internal organization of the firm. Topics covered include the boundaries of the firm, corporate governance, and internal incentive systems. Prereq: ECO 610 or equivalent.

ECO 711 ECONOMICS OF FIRM STRATEGY. (3)
The Economics of Firm Strategy applies economic tools to the analysis of firm strategy. Topics to be covered include basic cost and demand conditions, economies of scale and scope, product differentiation, entry and mobility conditions, price discrimination and commodity bundling, vertical control, and rivalry and strategy. Prereq: ECO 610 or equivalent.

ECO 721 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 724 ENVIRONMENTAL ECONOMICS. (3)
This seminar in environmental economics deals with market failure, benefit-cost analysis, no market failure, valuations of environmental changes, and selected topics in environmental economics. Central to the course is valuing changes in health risks, risk perception, and behavior related to health risk. Selected topics include international issues, environmental equity and markets for environmental quality. This course and ECO 725 Health Economics are the two courses that are the basis for the area in Environmental and Health Economics in the Ph.D. Program in Economics. Prereq: ECO 601 and ECO 703 or consent of instructor.

#ECO 725 HEALTH ECONOMICS. (3)
This course rigorously examines the organization, financing, and management of the US health care system and programs, and emphasizes economic analysis contemporary health policy concerns. By the end of the semester, students should have the institutional knowledge and analytic tolls needed to contribute to current public policy debates about health and medical care. This course and ECO 724 Environmental Economics are the two courses that are the basis for the area in Environmental and Health Economics in the Ph.D. program in Economics. Prereq: ECO 601 and 703 or consent of instructor.

ECO 731 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 601 or consent of instructor.

ECO 732 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 601 or consent of instructor.

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 601 or consent of instructor.

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 751 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 601 or consent of instructor.

***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 and PA 750 or equivalent and Ph.D. program status or consent of the instructor. (Same as PA 752.)

ECO 753 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 601 or consent of instructor.

***ECO 761 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 701, ECO 702 or consent of instructor.

***ECO 762 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 766 or consent of instructor.

#ECO 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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: INTERNATIONAL MONEY AND FINANCE. (3)
International finance and open economy macroeconomics; the balance of payments; theory of exchange rate determination; macroeconomic policy issues in open economies. Prereq: ECO 602.

ECO 772 INTERNATIONAL ECONOMICS: TRADE THEORY AND POLICY. (3)
Theory and empirical analysis of the effects of trade and trade policy. Prereq: ECO 601.

ECO 773 OPEN ECONOMY MACROECONOMICS. (3)
Development of rigorous models to enhance knowledge of open economies. Topics include: impact on an economy of changes in trade, the current account balance, exchange rates, and international financial markets. Prereq: ECO 702.

ECO 790 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 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. (1-9)
Students confer individually with the instructor. May be repeated to a maximum of nine credits. Prereq: Permission of the Director of Graduate Studies is required.

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 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 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 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 501 TEACHING INTERNSHIP. (1-12)
Supervised practice teaching under competent leadership. Observation, instruction, independent study which parallels field experience, and conferences with supervising instructor included. This course is designed primarily for students in Allied Health Professions, Education, Library and Information Science, Home Economics, and Social Work. May be repeated to a maximum of 12 hours. Prereq: EDC 500 or permission of instructor.

EDC 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. (Same as ENG 509.)

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/LIN 513.)

EDC 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 ENG/LIN 514.)

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 FOR DISTANCE EDUCATION AND MULTIMEDIA. (3)
A variety of video applications for distance education and multimedia are discussed. Classroom exercises and projects develop basic video skills and production experience needed for distance education course delivery and development and multimedia projects. Topics include instructional video research, video equipment, terminology and systems, and message design issues.

EDC 544 USE AND INTEGRATION OF INSTRUCTIONAL 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)
This course assists future educators in developing strategies to create an equitable teaching/learning environment where all students are validated, stimulated, and nurtured. Course participants explore the rationale for their current belief systems and perceptions of other cultures; investigate how and why their personal attitudes, behaviors, and expectations affect the academic and social development of children and youth, and examine contemporary educational issues. (Same as AAS 550.)

EDC 554 CULTURE, EDUCATION AND TEACHING ABROAD. (3)
Introduction to theory and practice of intercultural communication, cross-cultural (especially international experience), and teaching with a global perspective, plus an opportunity for country-specific research. Required for those wishing to student teach overseas. (Same as EPE 554.)

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 AUTHORING 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 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 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 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 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 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 M.A./M.S. 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 709 SOCIAL DESIGN OF INTERACTIVE SYSTEMS. (3)
The purpose of this course is to examine the growing research and design literature for on-line communities and networked learning groups that support cooperative, collaborative and social instructional activities. Framed by concepts from Activity Theory, Social Networking Theory and Social Learning Models students will read current books, research articles and be introduced to research methods and tools (such as tracking utilities and on-line data collection) for examining on-line communities. Students will design and collect data for an original research project as part of required course work. Prereq: EDC 608, EDC 612, or consent of instructor.

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 GUIDING AND ANALYZING EFFECTIVE TEACHING. (3)
A course designed for educators who are preparing to supervise teachers and who wish to analyze their own practice. Research, policies, and trends are examined and practices analyzed in the context of how to promote effective teaching. Principles apply to elementary and secondary education.

#EDC 726 CURRICULUM INQUIRY MIXED METHODS FOR RESEARCH. (3)
A mixed methodology conceptual framework is used to examine various approaches for designing, implementing and analyzing practitioner data generated in a variety of instructional settings. Topics include epistemological, methodological and ethical issues involved in action research, classroom discourse analyses and mixed methods curriculum inquiry. Prereq: EDA 651, EPE 621 and EPE 663 or permission of instructor.

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 instructional 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, 633, 634 or 635). Admission to 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

EDL Educational Leadership Studies

***EDL 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.

***EDL 601 INTRODUCTION TO SCHOOL LEADERSHIP AND ADMINISTRATION. (3)**
Study of school leadership and administrative responsibilities, with emphases on understanding schools as complex organizations and facilitating leadership to create a work climate supportive of excellence in teaching and learning.

***EDL 610 SCHOOL LEADERSHIP PRACTICUM I. (1)**
Study and observation of the role and responsibilities of the school principal in practice. Practicum students are required to spend time at school site locations. Prereq: Twelve hours of program course work completed, or consent of instructor.

***EDL 611 SCHOOL LEADERSHIP PRACTICUM II. (1)**
Study and observation of the role and responsibilities of the school principal in practice. Practicum students are required to spend time at school site locations. Prereq: Twelve hours of program course work completed and EDL 610 completed, or consent of instructor.

***EDL 612 SCHOOL LEADERSHIP PRACTICUM III. (1)**
Study and observation of the role and responsibilities of the school principal in practice. Practicum students are required to spend time at school site locations. Prereq: Twelve hours of program course work completed and EDL 610, EDL 611 completed, or consent of instructor.

***EDL 625 SCHOOL SAFETY AND DISCIPLINE LEADERSHIP. (3)**
Study of processes and programs effective in promoting school wide safety and discipline. Emphasis on school connections to community security and resources. Prereq: Admission to Department Program or Consent of instructor.

***EDL 627 SCHOOL FINANCE AND SUPPORT SERVICES. (3)**
Study of concepts in school finance and school business management. Attention is given to national, state, and local issues. Emphasis is also given to school support services including transportation, facility planning and maintenance, food service, and risk management. Prereq: Program status or consent of instructor.

***EDL 628 SCHOOL LAW AND ETHICS. (3)**
Study of legal and ethical issues as related to practical problems of school administration. Constitutional provisions and court decisions are examined as they impact education. Prereq: Program status or consent of instructor.

***EDL 631 LEADERSHIP FOR SCHOOL PROGRAM COLLABORATION. (3)**
This course prepared school leaders to administer integrated instructional support programs in schools and districts. Attention is also given to leadership requirements needed to facilitate collaboration among school and community-based programs that provide and support student learning. Prereq: Program status or consent of instructor.

***EDL 632 LEADING ORGANIZATIONAL CHANGE. (3)**
This course focuses on understanding the field of organizational change as well as emphasizing the nature, characteristics, responsibilities, and contextual determinants that influence a leader's role in changing educational organizations. Prereq: Admission to Department program or consent of instructor.

***EDL 634 LEADERSHIP FOR HUMAN RESOURCES DEVELOPMENT IN SCHOOLS. (3)**
Study of human resources development practices in school systems, with emphases on central office and school unit responsibilities for attracting, selecting, developing, evaluating, and retaining competent faculty and staff. Prereq: Program status or consent of instructor.

***EDL 638 THE SUPERVISOR OF INSTRUCTION. (3)**
A study of the role and responsibilities of the supervisor of instruction as a member of the leadership team for the school district. Prereq: Admission to program or consent of instructor.

***EDL 639 THE SCHOOL SUPERINTENDENCY. (3)**
Role of the school district superintendent is studied including: historical and current job responsibilities of the position; knowledge, skills and dispositions necessary to serve successfully in the position; future challenges of the position. Prereq: Admission to the program and consent of instructor.

***EDL 646 SCHOOL AND COMMUNITY COLLABORATION LEADERSHIP. (3)**
Study of issues in administering integrated support programs in schools and districts serving specific student or community populations while increasing school and community collaboration. Prereq: Program status or consent of instructor.

***EDL 649 SCHOOL SYSTEM ADMINISTRATION. (3)**
Study of overall school district management and operations including administration of auxiliary services, federal programs, financial management, and human resources. Prereq: Admission to program or consent of instructor.

***EDL 650 LEADERSHIP FOR SCHOOL PROGRAM IMPROVEMENT. (3)**
Study focusing on the preparation of school leaders to guide, facilitate and support curriculum, instruction, and assessment and to create a learning environment that promotes student achievement. Prereq: Program status or consent of instructor.

***EDL 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.

***EDL 659 STRATEGIC MANAGEMENT IN EDUCATION. (3)**
Study of strategic management procedure applications in school administration utilized at both the school district and individual school site levels. Prereq: Admission to program or consent of instructor.

***EDL 669 LEADERSHIP FOR SCHOOL PROBLEM SOLVING. (3)**
Principles and methods of systematic site-based problem identification, diagnosis, and solution for the improvement of practice in school settings. Prereq: Program status or consent of instructor.

***EDL 679 SCHOOL SUPERINTENDENT PRACTICUM I. (1)**
Study and observation of the role and responsibilities of the school superintendent in practice. Students are required to spend time in field settings. Prereq: Admission to school superintendency certificate program or consent of instructor.

***EDL 680 SCHOOL SUPERINTENDENT PRACTICUM II. (1)**
Study and observation of the role and responsibilities of the school superintendent in practice. Students are required to spend time in field settings. Prereq: Admission to school superintendency certificate program and completion of EDL 679 or consent of instructor.

***EDL 681 SCHOOL SUPERINTENDENT PRACTICUM III. (1)**
Study and observation of the role and responsibilities of the school superintendent in practice. Students are required to spend time in field settings. Prereq: Admission to school superintendency certificate program and completion of EDL 679 plus EDL 680, or consent of instructor.

***EDL 694 THE ADMINISTRATION OF CAREER AND TECHNICAL EDUCATION. (3)**
A course designed for superintendents, high school principals, and other administrators. Its purpose is to prepare administrators and supervisors for leadership in career and technical education. (Same as AED/HEE 694.)

***EDL 700 KNOWLEDGE BASE FOR LEADERS. (3)**
This course reviews the quest for a knowledge based in educational administration. It begins with a survey of the history of education and organizational thought in the United States, examining scientific management, human relations, bureaucracy, and the theory movement. The course also reviews more recent attempts to capture the knowledge base including the University Council of Educational Administration's article bank, PRIMIS, and the Standards for School Leaders from the Interstate School of Leadership Licensure Consortium. The course emphasizes epistemologies used to generate a knowledge base in educational administration tracing the evolution of thought and vocabulary within the profession. Prereq: Permission of instructor.

***EDL 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.

***EDL 702 LEADERSHIP IN EDUCATIONAL ORGANIZATIONS II. (3)**
This course emphasizes understanding changing demographic, social, economic, and political contexts as well as the role of school leaders within educational organizations in achieving social and organizational justice. Organizational and leadership theories will be used to critically examine prevailing practice and develop perspectives appropriate to improving education for all children. Students will analyze and critique conventional practice and offer recommendations for appropriate corrective action. Prereq: Admission to Department program or consent of instructor.

#EDL 705 INTERNATIONAL PERSPECTIVES ON EDUCATIONAL REFORM. (3)
The course focuses on international education reform, the function of schools in national social, economic and political development, as well as emerging perspectives on educational leadership and professional preparation. Prereq: Admission to a doctoral degree program at the University of Kentucky, completion of EPE 555, its equivalent, or consent of the instructor.

***EDL 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.

#EDL 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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

***EDL 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. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

***EDL 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.

***EDL 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.

***EDL 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.

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 548 EDUCATIONAL PSYCHOLOGY. (3)
An introduction to the application of principles of psychology to classroom learning and teaching problems.

EDP 557 GATHERING, ANALYZING, AND USING EDUCATIONAL DATA. (3)
The course covers applications of statistical and graphical methods for educational and evaluation data. Basic descriptive statistics, correlation, normal distributions and hypothesis testing will be covered. An emphasis is placed on exploratory data analysis and interpretation of results within the broad contexts of education and evaluation. Prereq: MA 109 or equivalent; undergraduate (with permission) or graduate status in the College of Education; or consent of the instructor. (Same as EPE 557.)

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 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 616 MULTICULTURAL PSYCHOLOGY. (3)
This course is designed to increase one's sensitivity to and respect for individual differences. Models, frameworks, techniques and experiential exercises are presented to increase one's skill level in working with persons from racially and ethnically diverse backgrounds. Prereq: EDP 600 or equivalent or consent of instructor. (Same as AAS 616.)

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, ECPP, ECPE, EEPS, ESPY, ECPS, ESPP 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. May be repeated to a maximum of six credits. Prereq: EDP 630 (with a grade of "B" or better) and enrollment in a professional program in Educational and Counseling Psychology or 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. May be repeated to a maximum of six credits. Prereq: Successful completion of EDP 630 with a grade of B or better or equivalent and enrollment in a professional program in Educational and Counseling Psychology.

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 605, EDP 652 and EDP 661 (all with grades of "B" or better), 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. Prereq: EDP 557 or equivalent.

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 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 652, EDP 630 (both with a grade of "B" or better), 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 12 credits. Lecture, three hours; laboratory, eight hours per three credit hours. Prereq: All required counseling coursework. EDP 605, EDP 630, EDP 652 and EDP 661 (minimum competency courses with grades of "B" or better), application for practicum the semester prior to practicum placement and permission of CPAC.

EDP 665 POST-MASTERS PRACTICUM IN COUNSELING PSYCHOLOGY. (1-6)
Supervised experience in application of diagnostic and interviewing techniques in a counseling service. Prereq: EDP 630, EDP 605, EDP 652, EDP 661 and EDP 649 (all with grades of "B" or better). Application for practicum the semester prior to practicum placement and permission of CPAC.

EDP 666 PSYCHOLOGY OF CAREER COUNSELING. (3)
A survey of theories and methods used in Career Counseling. Contemporary approaches to career counseling are studied within developmental and decision-making frameworks. Prereq: EDP 652 and EDP 630 (both with a grade of "B" or better).

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 652 and EDP 661 (both with a grade of "B" or better) 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 652 and EDP 661 (both with a grade of "B" or better) or corequisite EDP 604 or 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: Consent of instructor and EDP 661 (with a grade of "B" or better).

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 EDP 661 (both with a grade of "B" or better) or consent of instructor.

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 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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: 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 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 522 CHILDREN AND FAMILIES. (3)**
The purpose of this course is to provide students with information related to working with young children with and without disabilities and their families. This course will focus both on presenting new information and providing opportunities for students to practice skills necessary for working with families. (Same as IEC 522.)

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 546 TRANSDISCIPLINARY SERVICES FOR YOUNG CHILDREN. (3)**
This course will focus on the philosophical issues related to teaching young children with multiple disabilities. Topics related to planning for the population of children, participants in the areas of communication, physical and motor development, health, vitality and sensory input will be presented. Strategies presented for planning will include transdisciplinary assessment persons centered planning and activity based instruction. Prereq: EDS 375 or EDS 600. (Same as IEC 546 and RC 546.)

EDS 547 COLLABORATION AND INCLUSION IN SCHOOL AND COMMUNITY SETTINGS. (3)
This course will focus on inclusion of students with moderate to severe disabilities in all aspects of school and community life, with special consideration given to the individual student planning variables that must be addressed in meeting the needs of each school-age student and for preparing students to function as fully and independently in their communities as possible. The course is designed to meet the needs of those pursuing certification in Moderate and Severe Disabilities and pursuing degrees in Elementary and Secondary Education, Vocational Rehabilitation, School Psychology, Social Work, Physical Therapy, Communication Disorders, and related disciplines. Prereq: Consent of instructor. (Same as RC 547.)

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 has 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. (Same as RC 558).

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 takes 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. (1-6)
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 613 LEGAL AND PARENTAL ISSUES SCHOOL ADMINISTRATION. (3)
This course is designed as a required course for certification in the school administration program or elective in graduate or post baccalaureate degree. Essential course questions will emphasize the delivery of a free and appropriate public education for children with disabilities within a practical application format that is accessible and useful to educational professionals. In addition, the course will consider the implications of federal requirements in state and local policy. Particular attention will be given to leadership within an educational reform environment as well as the legal and programmatic implications for children with disabilities and their families. Finally, the course will model appropriate ways in which educational professionals working with families can maximize educational results for children with and without disabilities. Prereq: Be admitted to an Administrator preparation program, or received permission of instructor. (Same as RC 613.)

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. While enrolled in this course, students will be required to apply for the Teacher Education Program. Prereq: Admission to the Master's program in Special Education or permission of the 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 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 651 DISTANCE EDUCATION: DELIVERY. (3)
This course has been designed for those faculty or future faculty who plan to teach via distance education technology. This course will review current literature on how to deliver distance education content with attention to developing materials, setting delivery timelines, facilitating interactions, and using appropriate teaching strategies. Prereq: Master's degree.

#EDS 652 DISTANCE EDUCATION: MANAGEMENT AND SUPPORT. (3)
This course has been designed for those faculty or future faculty who plan to manage or direct programs delivered through distance education technology. The course will focus on current issues and challenges in distance education administration, including such topics as provision of quality support services; policy issues at the local, state, national, and international level; model administrative structures; instruction and technology funding; and virtual institutions. Prereq: Master's degree.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

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 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 M.A./M.S. in Education (Initial Certification Option-Secondary Education).

EDV Education – Vocational

AGRICULTURAL EDUCATION

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.

BUSINESS EDUCATION

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.

VOCATIONAL EDUCATION

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 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.

#EDV 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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, principles and analysis techniques for DC and AC linear circuits whose elements consist of passive and active components used in modern engineering practice including the determination of steady state and transient responses. Prereq: MA 114; prereq or concur: PHY 232, 242.

EE 221 CIRCUITS II. (3)
Analysis and design methods for analog linear circuits whose elements consist of passive and active components used in modern engineering practice, including transfer functions, network parameters, and a design project involving modern design practices. 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 standard integrated circuits. Prereq: CS 115.

EE 281 LOGICAL DESIGN LABORATORY. (2)
A laboratory involving the design and implementation of logic circuits. Combinational and sequential (both synchronous) design examples using small and medium scale integrated circuits. Lecture, one hour; laboratory, one three-hour session. Prereq or concur: EE 280.

EE 305 ELECTRICAL CIRCUITS AND ELECTRONICS. (3)
A service course covering electrical engineering principles for engineering or science students with majors outside of electrical engineering. Topics include: circuits analysis, power, electronics, digital logic and instrumentation. Prereq: PHY 232, MA 114.

EE 360 INTRODUCTION TO SEMICONDUCTOR DEVICES. (3)
Electronic properties of solid-state materials and calculation of charge carriers in semiconductors; structure and physical model of p-n junctions and various diode devices, bipolar transistors, field effect transistors; semiconductor fabrication technologies and microelectronics manufacturing issues. Prereq: PHY 232 and CHE 105.

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 383 INTRODUCTION TO EMBEDDED SYSTEMS. (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. Prereq: EE 280 and EE/CS 380. (Same as CS 383.)

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 treatment of electronic circuits emphasizing laboratory work. Topics include AC circuits, filters, theory and operation of transistors and other semiconductor devices and a simple treatment of operational amplifiers. Lecture, two hours per week; laboratory, three hours per week. Prereq: PHY 242 or EE 305 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.

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; prereq or concur: EE 461G.

EE 468G INTRODUCTION TO ENGINEERING ELECTROMAGNETICS. (4)
Applications of electromagnetic theory; electrostatic and magnetostatic fields; Maxwell's field equations; plane waves; transmission lines and waveguides; antennas and radiation. Prereq: MA 213; prereq or concur: EE 221.

#EE 480 ADVANCED COMPUTER ARCHITECTURE. (3)
This course focuses on advanced computer architectures and low-level system software. Topics include RISC architectures, vector and multiprocessor architectures, multiprocessor memory architectures, and multiprocessor interconnection networks. Peripheral devices such as disk arrays, NICs, and video/audio devices are covered. Topics also include device drivers, interrupt processing, advanced assembly language programming techniques, assemblers, linkers, and loaders. Prereq: CS/EE 380. (Same as CS 480G.)

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: Engineering standing and completion of all required 300 and 400-level EE courses.

***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, MA 320, 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, EE 422G, engineering standing or consent of instructor.

***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, EE 421G, 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, EE 421G, and engineering standing.

#EE 521 INTRODUCTION TO WIRELESS COMMUNICATIONS. (3)
Study of analog RF electronics for wireless communications through a combination of course and laboratory work. Topics covered in the course include: modulation/demodulation, filters, RF transformers, mixers, transistor switches and amplifiers, class A, B, AB, C, D, E, and F amplifiers, quartz crystals, transmission lines, impedance inverters, acoustics, oscillators, audio circuitry, noise and inter-modulation, and antennas. Prereq: 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 524 SOLID STATE PHYSICS. (3)
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: PHY 520, or consent of instructor. Engineering standing required for EE 524. (Same as PHY 524.)

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 and engineering standing, 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 537 ELECTRIC POWER SYSTEMS I. (3)**
A study of power flow, elements of power factor correction, the one-line diagram, the per-unit system, transformer modeling, generator modeling, transmission line modeling, transmission line performance calculations from equivalent circuits, and general methods for network calculations. Prereq: EE 468G and engineering standing.

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 praetersonic 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 360, 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 360, EE 461G and engineering standing.

***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: EE 360, EE 468G, or PHY 417G, 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, EE 360 or MSE 402G, or consent of instructor. (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, EE 422G, engineering standing, and consent of instructor.

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 579 NEURAL ENGINEERING: MERGING ENGINEERING WITH NEUROSCIENCE. (3)
A multidisciplinary approach combining engineering principles for systems analysis and control, knowledge of biological control mechanisms, and computational properties of biological neural networks in the development of engineering neural networks for control applications. Topics include: equivalent circuit models for biological neurons and networks, non-linear differential equation representations, biological control strategies for rhythmic movements, design and development of controller for robot function, proposal development and presentation. Prereq: EE 422G and Engineering Standing or consent of instructor. (Same as BME 579.)

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 582 HARDWARE DESCRIPTION LANGUAGES AND PROGRAMMABLE LOGIC. (3)**
A study of hardware description languages including netlists, VHDL and Verilog; their use in digital design methodologies including modeling techniques, design verification, simulation, synthesis, and implementation in programmable and fabricated logic media. Programmable logic topics include CPLD and FPGA architectures, programming technologies and techniques. Prereq: EE/CS 380 and engineering 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: EE 360, EE 461G and engineering standing 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 586 COMMUNICATION AND SWITCHING NETWORKS. (3)
Fundamentals of modern communication networking and telecommunications, data transmission, multiplexing, circuit switching networks, network topology routing and control, computer communication, packet switching networks, congestion control, frame relay, ATM switching networks, traffic and congestion control. Prereq: EE 280.

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 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 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 624 COMPUTATIONAL ELECTROMAGNETICS: THE FINITE-DIFFERENCE TIME-DOMAIN. (3)
A course on the application of the finite-difference time-domain (FDTD) technique for the full-wave simulation of time-dependent electromagnetic waves in complex media. Representative topics in the course include: The Yee-algorithm, numerical dispersion and stability, physical source models, absorbing boundaries and perfectly matched layered media, near-field to far-field transformations, modeling of microwave circuits and antennas, parameter extraction, lumped load models, non-uniform and non-orthogonal grid methods, and current topics in FDTD. Prereq: EE 621 or consent of instructor.

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 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 661 SOLID-STATE ELECTRONICS. (3)**
A study of semiconductor fundamentals including crystal structure, basic quantum mechanics, energy-band theory, carrier distributions, carrier transport, and recombination-generation. Analysis of semiconductor devices including PN junction diodes, bipolar-junction transistors, metal-semiconductor diodes, and metal-oxide semiconductor field effect transistors. Prereq: EE 360 and EE 461G or consent of instructor.

***EE 663 OPTOELECTRONIC DEVICES. (3)**
Theory and applications of photodetectors, solar cells, semiconductor lasers, light emitting diodes and display devices, nanocrystalline structures and organic semiconductors applications in optoelectronic devices. Prereq: EE 360 or MSE 402G, consent of instructor and/or graduate standing. (Same as MSE 663.)

EE 664 MULTIDISCIPLINARY SENSORS LABORATORY. (3)
A multidisciplinary laboratory course with laboratory experiences in areas related to sensors and sensing architectures, typically including chemistry, chemical and materials engineering, and electrical engineering. Lecture, 1 hour; laboratory, 2 hours. Prereq: One year of college chemistry, calculus and physics. GS 660 or by consent of instructor. (Same as CHE/CME/MSE 664.)

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 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 101 INTRODUCTION TO ENGINEERING. (4)
This course introduces the engineering profession and the skills and expectations required for success. Engineering applications of calculus are also presented. Lecture, three hours; laboratory, two hours per week.

EGR 199 TOPICS IN ENGINEERING: TITLE TO BE ASSIGNED. (1-6)
An experimental, topical or interdisciplinary course devoted to special topics of interest in engineering. Course offerings must be approved by the Deans and Chairpersons of all cosponsoring academic units. A particular title may only be offered twice under the EGR 199 number. Students may not repeat this course under the same title. May be repeated to a maximum of twelve hours. Prereq: Enrollment in the College of Engineering, or permission of the instructor.

EGR 394 BS/MBA SEMINAR. (0-1)
Participation in team development exercises, seminars, company visits, and activities associated with the BS/MBA program. Prereq: Admission to the BS/MBA program.

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.)

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 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, EM 221 and MA 214.

END Endodontics

END 820 ANTERIOR ENDODONTICS. (2)
This is a lecture-laboratory course which is designed to introduce the student to the diagnostic terminology of pulpal and periapical disease and the techniques of endodontics in anterior teeth. Lecture, 10 hours; laboratory, 30 hours. Prereq: RSD 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 822 POSTERIOR ENDODONTICS. (2)
This is a lecture-laboratory course which is designed to introduce the student to the diagnostic terminology of pulpal and periapical disease and the techniques of endodontic in posterior teeth. Lecture, 10 hours; laboratory, 30 hours. Prereq: END 820 and RSD 824, or consent of course director.

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.

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 104 WRITING: AN ACCELERATED FOUNDATIONAL COURSE. (4)
An intensive course in writing emphasizing critical inquiry and research, formulation of academic writing projects, and orientation to university study. Instruction and practice in reading critically, thinking logically, responding to texts, developing research skills, writing substantial essay through systematic revision, addressing specific consequences, developing a fluent, precise, and versatile prose style, and expressing ideas in standard and correct English. Focus on topics pertinent to university disciplines, activities, and environs. Notes: (a) credit or exemption not available by CLEP or by special departmental examination; (b) exemption possible by ACT, SAT, or AP English Language exam score.

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 201 ETYMOLOGY. (3)
A study of words and their fundamental values with reference to development of a writing vocabulary. (Same as JOU 250.)

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 210 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. (Same as LIN 210.)

ENG 211 INTRODUCTION TO LINGUISTICS I. (3)
This course is an introduction to the scientific study of human language, with an emphasis on the fundamental principles of linguistic theory, and applications of these principles in the investigation of grammatical structure, language change, language universals and typology, writing systems. The course will also focus on the application of linguistic study to real-world problems, e.g. language and technology. Credit will not be given to students who already have credit for ENG 414G. (Same as LIN 211.)

ENG 212 INTRODUCTION TO LINGUISTICS II. (3)
This course is the second semester of a two-semester sequence introducing the study of Linguistics, the scientific study of human language as a system. This course focuses on the social aspects of linguistic study: Semantics, pragmatics, conversational interaction, language variation and register, dialects, linguistic aspects of sign languages, second language acquisition, and the acquisition of language by children. Prereq: ENG/LIN 211. (Same as LIN 212.)

ENG 230 INTRODUCTION TO LITERATURE. (3)
An introduction to close reading and argumentative writing about literature, in relation to a significant theme. The course involves studying selected texts revolving around a single theme, learning how to relate texts to contexts, to read closely and use basic literary terms and concepts. Attention will be paid to student writing, particularly to devising a thesis, crafting an argument, and learning how to use supporting evidence.

ENG 231 LITERATURE AND GENRE. (3)
A course exploring one or two different literary forms or genres, i.e. the formal categories into which literary works are placed. Students will explore the conventions of each genre and their sub-genres. Attention will be paid to student writing.

ENG 232 LITERATURE AND PLACE. (3)
A course exploring literary representations of nature and/or of the construction of local, regional, national, as well as transnational and imaginative spaces and identities. Attention will be paid to student writing.

ENG 233 LITERATURE AND IDENTITIES. (3)
A course exploring a number of selected literary texts, with special attention to the construction of personal, ethnic, racial, or national identity. The course may consider how race, class, sexuality, and/or nationality influences representations of experience. Attention will be paid to student writing.

ENG 234 INTRODUCTION TO WOMEN'S LITERATURE. (3)
This course will introduce students to a sampling of the rich body of women's writing, focusing on some important issues and representative examples. Students will read canonical and non-canonical works, discuss continuities and differences among women writers, and master some of the concepts of gender studies. Attention will be paid to student writing.

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). (Same as AAS 264.)

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 283 JAPANESE FILM. (3)
Study of Japanese films as an expression of Japanese culture. Viewing of films outside of class required. (Same as JPN 283.)

ENG 301 STYLE FOR WRITERS. (3)
This course is designed for those who wish to improve their own writing style or the style of others. While the course may include some account of historical changes in prose style and require some stylistic analysis of literary texts, the emphasis is on editing contemporary prose, both in exercises and in the students' own writing. Students will learn and practice principles such as economy, coordination, subordination, precision, parallelism, balance, coherence, rhythm, clarity, and grace. Prereq: Fulfillment of the University Writing requirement and consent of instructor.

ENG 306 INTRODUCTION TO PROFESSIONS IN WRITING. (3)
This course introduces students to rhetorical studies, advanced composition, and research in rhetoric and composition. The course aims to begin preparation for careers in the teaching of writing in secondary schools, two- and four-year colleges, Teaching English as a Second Language (TESOL), as well as in publishing and freelance writing. Prereq: Fulfillment of the University Writing Requirement.

ENG 310 AMERICAN ENGLISH. (3)
The study of the varieties of modern American English: regional, social, and ethnic varieties, gender differences in communication, creoles and pidgins, stylistic variation. History and methods of American dialect study. (Same as LIN 310.)

ENG 330 TEXT AND CONTEXT: (SUBTITLE REQUIRED). (3)
This course will provide the opportunity to read closely a concentrated set of texts within their social and historical dimensions. Required for English majors.

ENG 331 SURVEY OF BRITISH LITERATURE I. (3)
A survey of British literature from Beowulf to Milton. Students will explore a variety of important writers in light of their historical contexts.

ENG 332 SURVEY OF BRITISH LITERATURE II. (3)
A survey of British literature from Dryden to the present. Students will explore a variety of important writers in light of their historical contexts.

ENG 333 STUDIES IN A BRITISH AUTHOR OR AUTHORS: (SUBTITLE REQUIRED). (3)
A course offering intensive study of the work of a British or Irish author, or a small number of such authors.

ENG 334 SURVEY OF AMERICAN LITERATURE I. (3)
A survey of American literature from origins to the Civil War. Students will explore a variety of important writers in light of their historical contexts.

ENG 335 SURVEY OF AMERICAN LITERATURE II. (3)
A survey of American literature from the Civil War to present. Students will explore a variety of important writers in light of their historical contexts.

ENG 336 STUDIES IN AN AMERICAN AUTHOR OR AUTHORS: (SUBTITLE REQUIRED). (3)
A course offering intensive study of the work of an American author, or a small number of such authors.

ENG 340 SHAKESPEARE. (3)
A study of a representative selection of Shakespeare's plays, including comedies, tragedies, and histories and covering the important phases of his career.

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 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 literary nonfiction (essays), responding to literature, cultural critique, and composing law and justice. 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)
This course is designed for students interested in the basics of editing and publishing and offers instruction and extensive practice in editing and revising both the student's own writing and the prose works of others. In addition to learning techniques of revision, verification of sources, and preparation of manuscripts, students will be expected to learn about the editing profession generally and to follow trends in editing and publishing. Not for students with writing deficiencies. Prereq: ENG 306 or ENG 301 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 480G STUDIES IN FILM (SUBTITLE REQUIRED). (3)
Studies in the history, criticism, and theory of film. Viewing of films outside of class is required. Topics announced the preceding semester. May be repeated to a maximum of 18 credits under different subtitles. Prereq: ENG 281.

ENG 481G STUDIES IN BRITISH LITERATURE: (SUBTITLE REQUIRED). (3)
A British Literature course on a period, a theme, a genre, or one or more authors. May be repeated to a maximum of 18 hours under different subtitles.

ENG 482G STUDIES IN AMERICAN LITERATURE: (SUBTITLE REQUIRED). (3)
An American Literature course on a period, a theme, a genre, or one or more authors. May be repeated to a maximum of 18 hours under different subtitles.

ENG 483G STUDIES IN AFRICAN AMERICAN OR DIASPORIC LITERATURE: (SUBTITLE REQUIRED). (3)
An African American or Diasporic Literature course on a period, a theme, a genre, or one or more authors. May be repeated to a maximum of 18 hours under different subtitles.

ENG 484G COMPARATIVE STUDIES IN LITERATURE: (SUBTITLE REQUIRED). (3)
A comparative literature course on a period, a theme, a genre, or one or more authors. Possible areas of study include transatlantic connections, or comparisons between English language authors and foreign authors in translation. May be repeated to a maximum of 18 hours under different subtitles.

ENG 485G STUDIES IN LITERATURE AND GENDER: (SUBTITLE REQUIRED). (3)
Variable in content and context, this course focuses on any aspect of gender in literary studies, such as gender and genre, gender issues in a particular literary period, masculinity, minority women writers, or feminist literary theory. (May be repeated to a maximum of 18 hours under different subtitles.)

ENG 486G STUDIES IN THEORY: (SUBTITLE REQUIRED). (3)
A course on any aspect of literary or critical theory, in relation to selected texts. May be repeated to a maximum of 18 hours under different subtitles.

ENG 487G CULTURAL STUDIES: (SUBTITLE REQUIRED). (3)
A course on any aspect of cultural studies, in relation to selected texts. May be repeated to a maximum of 18 hours under different subtitles.

ENG 488G GENDER AND SEXUALITY STUDIES: (SUBTITLE REQUIRED). (3)
A course on any aspect of gender and sexuality studies, in relation to selected texts. May be repeated to a maximum of 18 hours under different subtitles.

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. (Same as EDC 509.)

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 the equivalent; or consent of instructor. (Same as LIN 512.)

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/LIN 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/LIN 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 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.

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 601 ESSAYS AND CREATIVE NONFICTION. (3)
Study and practice in nonfiction writing, including literary nonfiction, literary journalism, personal essays, and creative nonfiction. May not be repeated for graduate credit. Prereq: Admission to the graduate program or consent of instructor.

ENG 605 EDITING. (3)
ENG 605 offers instruction in the history of U.S. publishing and extensive practice in verification of sources, fact checking, copy editing, and manuscript preparation. Prereq: Admission to Graduate School or consent of instructor.

ENG 607 GRADUATE WRITING WORKSHOP (SUBTITLE REQUIRED). (3)
A course for experienced writers who have some knowledge of contemporary American literature. Equal emphasis on students' original work and outside reading. Each student will produce a chapbook of poems or stories and write a short introduction to it. May be repeated with the same subtitle to a maximum of six credits. Prereq: Consent of instructor.

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 612 STRUCTURE AND STYLISTICS OF FRENCH. (3)
A study of the history and structure of French with an emphasis on contemporary features. (Same as FR/LIN 612.)

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 RENAISSANCE LITERATURE: 1500-1660. (3)
Intensive study of selections from the drama, poetry, and prose of the period.

ENG 625 STUDIES IN RENAISSANCE DRAMA EXCLUSIVE OF SHAKESPEARE. (3)
A study in depth of selected writers.

ENG 626 STUDIES IN SPENSER, SHAKESPEARE, MILTON. (3)
Intensive study of one or more major authors and the relevant criticism and scholarship. Prereq: ENG 425 or ENG 426 or ENG 428 or equivalent.

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 ROMANTICISM. (3)
Readings in selected authors and relevant scholarship.

ENG 638 STUDIES IN VICTORIAN LITERATURE. (3)
Readings in the poetry and prose non-fiction of the period with relevant scholarship.

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 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. (Same as AAS 656.)

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 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 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 691 READINGS IN RHETORIC (SUBTITLE REQUIRED). (1)
This reading course allows graduate students to integrate readings in Rhetoric and Composition scholarship and provides an opportunity to discuss research with faculty associated with Rhetoric and Composition. In addition to readings, students will be expected to keep a reading journal or complete a brief annotated bibliography. May be repeated to a maximum of three credits. Prereq: ENG 609 and ENG 610 or consent of instructor.

ENG 700 TUTORIAL FOR PH.D. CANDIDATES. (3)
This course allows Ph.D. candidates who have completed all course work requirements to work together under the direction of a senior faculty member in preparing for and taking the Qualifying Examination. May be repeated to a maximum of twelve 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 RENAISSANCE STUDIES (SUBTITLE REQUIRED). (3)
Advanced work on a specific author or topic. Recent topics: Eco-Milton, Romance narrative. May be repeated to a maximum of nine 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 ABT/ASC 360.)

ENT 395 INDEPENDENT WORK. (1-3)
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. (3)
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 genome replication, prokaryotic and eukaryotic transcription, and translation of DNA, as well as RNA processing, recombination and the theoretical underpinnings of genetic engineering. Prereq: ABT/ASC/ENT 360 or BIO 304 or consent of instructor. (Same as ABT 460.)

ENT 461 INTRODUCTION TO POPULATION GENETICS. (3)
This survey course examines the population dynamics and equlibria 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: ABT 360 (or equivalent) and one course in probability/statistics. (Same as ABT/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 or ENT 310 or ENT 320.

#ENT 550 SPIDER ECOLOGY AND BEHAVIOR. (3)
Spiders are fascinating in their own right, and also are major predators in terrestrial food webs. This course examines the ecology and behavior of spiders as model predators in systems ranging from undisturbed forests and meadows to agroecosystems and the urban landscape. While focusing on spiders, the course also intertwines two general sub-themes: (1) the advantages of employing diverse approaches (e.g. field and laboratory experiments, non-manipulative observations, and meta-analyses) in ecological and behavioral research; and (2) the strengths, and limitations, of using model organisms to develop and test theory. Prereq: One year of undergraduate biology.

***ENT 561 INSECTS AFFECTING HUMAN AND ANIMAL HEALTH. (3)**
Discussion of arthropod parasites and disease vectors. Topics include an overview of disease transmission and public health, epidemiology, vector biology, important arthropod groups and their control. 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 567 APPLICATIONS OF GENETICS.

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 574 ADVANCED APPLIED ENTOMOLOGY. (4)
The objective of this course is to present the student with advanced concepts of applied entomology in a system-specific context. Each week, the insect problems associated with a different commodity/production system will be presented so as to illustrate a different broadly-based theme. Prereq: An introductory entomology course and consent of instructor.

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 325 or FOR 340 or ENT 665, or consent of instructor. (Same as BIO/FOR 605.)

ENT 606 CONCEPTUAL METHODS IN ECOLOGY AND EVOLUTION. (3)
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. The latter part of the course will consist of collaborative modeling projects, in which small groups of students will work with the instructor to address an important contemporary research problem and will report their results in a public talk and a project writeup. Prereq: One year of calculus and BIO 325 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 304 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 325 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 325 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 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 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 684 PHYLOGENETIC SYSTEMATICS. (3)
Theory and methods of phylogenetic analysis and cladistics will be explained. Applications of phylogenetic analysis, such as historical biogeography, biological classification, and testing of ecological hypotheses will be explored. (Same as BIO 684.)

ENT 695 SPECIAL TOPICS IN ENTOMOLOGY (SUBTITLE REQUIRED). (3)
Special topical or experimental courses in entomology for advanced graduate students. Special title required and must be approved by the chairperson of the Department of Entomology. A particular title may be offered twice at most under ENT 695. May be repeated to a maximum of six credits. Students may not repeat under the same subtitle. Prereq: Will be set by instructor.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 ACAROLOGY. (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 ACAROLOGY. (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 174 THEORIES OF COLLEGE STUDENT SUCCESS. (3)
The objective of the course is to introduce theories of student development and the organizational structure of teaching and learning in college.

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 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 554 CULTURE, EDUCATION AND TEACHING ABROAD. (3)
Introduction to theory and practice of intercultural communication, cross-cultural (especially international experience), and teaching with a global perspective, plus an opportunity for country-specific research. Required for those wishing to student teach overseas. (Same as EDC 554.)

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 557 GATHERING, ANALYZING, AND USING EDUCATIONAL DATA. (3)
The course covers applications of statistical and graphical methods for educational and evaluation data. Basic descriptive statistics, correlation, normal distributions and hypothesis testing will be covered. An emphasis is placed on exploratory data analysis and interpretation of results within the broad contexts of education and evaluation. Prereq: MA 109 or equivalent; undergraduate (with permission) or graduate status in the College of Education; or consent of the instructor. (Same as EDP 557.)

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 619 SURVEY RESEARCH METHODS IN EDUCATION (SUBTITLE REQUIRED). (3)
Survey research is one of the most common and useful methods for gathering data in educational research. Obtaining valid and reliable research results requires the administration of instruments that provide valid and reliable measures of the variables selected for observation. This course will focus on principles of measurement and procedures for developing a variety of survey instruments and for determining their validity and reliability. It is designed to teach students both how to improve the questions and design instruments. The theory and practice of survey research relies on contributions from disciplines such as psychology, sociology, statistics, and computer science. The purpose of this course is to familiarize participants with basic features of the design and implementation of surveys, and acquaint them with some principles and underlying theory from disciplines that have traditionally used surveys most heavily. The course will cover major stages of the survey process, including hypothesis and problem formulation, study design, sampling, questionnaire design, interviewing techniques, pretesting, modes of data collection, and data cleaning, management, and analysis The course involves lectures, readings, and discussions. Students are encouraged to bring materials related to their own research interests. The course will provide an overview of the theoretical and experimental literature related to question and questionnaire design as well as focusing on practical issues in the design, critique, and interpretation of survey questions that are often not taught in formal courses. There will be exercises both in and outside of class to reinforce both theory and practice. Prereq: EPE/EDP 557 or an equivalent course; an introductory statistics course.

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 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 669 ORAL HISTORY. (3)
This course is an introduction to oral history methodology and theory. It is designed for persons intending to use oral and life history interviews in historical or other qualitative research. The course examines how: oral history projects are initiated, projects are administered, interviews are conducted, and oral history interviews are preserved in archives and libraries. The course also explores the reliability of memory and the utilization of oral histories in public presentations. Readings in the course focus on the development of oral history as a research methodology. Assignments and discussions will provide experience with interviewing, recording and transcribing, editing and publishing oral histories.

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 680 POLITICS OF HIGHER EDUCATION. (3)
Survey and analysis of the political forces and processes which influence the development and implementation of higher education policies, financing and programs at the federal, state and institutional levels.

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 684 HIGHER EDUCATION AND ATHLETICS: A HISTORICAL ANALYSIS. (3)
Historical analysis of the politics, economics and philosophical implications of intercollegiate athletics programs as part of the American college and university.

EPE 685 THE RESEARCH UNIVERSITY. (3)
Historical analysis of the changing character, missions and roles of research universities in the United States. Emphasis will be on critical examination of large-scale sponsored research and graduate programs.

EPE 686 PHILANTHROPY AND HIGHER EDUCATION. (3)
Social, historical and philosophical perspective on the development of philanthropy as a significant factor in the character of American higher education and non-profit sector.

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 703 PREPARING RESEARCH PROPOSALS. (3)
The goal of this seminar is to provide advanced graduate students with individualized guidance and direction on the preparation of successful research proposals. Typically such proposals will involve masters theses, doctoral dissertations, or various forms of sponsored research. Prior to enrolling in the seminar, students will be expected to have successfully completed graduate level courses in research methodology, data collection techniques, and qualitative and/or quantitative data analysis procedures. Prereq: 6 hours graduate level research methods courses.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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. (1-3)
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. (1-6)
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, 5-20 hours per week. May be repeated to a maximum of 12 credits. Prereq: Twelve hours graduate course work in the department and permission of the director of graduate studies.

EPE 797 HISTORICAL RESEARCH ON EDUCATION. (3)
Advanced historical research and writing on issues in the study of education.

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 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 843 EMERGENCY MEDICINE. (4)
This course will provide the students with an introduction to the field of Emergency Medicine, Emergency Medical Services (EMS), and the approach to the acutely ill or injured patient. The students will complete an ACLS class during this rotation. Laboratory, 40 hours per week. Prereq: Admission to fourth year of medical curriculum. (Same as MD 843.)

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 ENVIRONMENTAL HEALTH. (3)**
An introduction to the theory and practice of assessing, correcting, controlling, and preventing environmental health hazards that may adversely affect the health of current and future generations. Prereq: Undergraduate chemistry and biology, or permission of instructor. (Same as CPH 601.)

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 Experiential Education Learning Contract and submission of contract to Career Center prior to course registration.

***EXP 397 EXPERIENTIAL FIELDWORK. (1)**
A course designed for undergraduates involved in full-time internship studies. Students will be engaged in preprofessional positions such as internships and cooperative education under the supervision of a faculty member. Enrollment in the course constitutes full-time student status. Pass/Fail only. Laboratory, 20-40 hours per week. May be repeated to a maximum of 4 times. Prereq: Completion of Experiential Education Learning Contract and submission of contract to Career Center prior to course registration.

EXP 500 INTRODUCTION TO SERVICE-LEARNING. (3)
This interdisciplinary course is designed to introduce students to the theories, concepts, and practices of Service-Learning. Service-Learning is a form of experiential education which engages the students in enhancing the common good through the application of classroom learning to service. Prereq: Upper division status. (Same as MC 500.)

FA Fine Arts

FA 501 ARTS-STUDY TOUR. (3)
Domestic or foreign tour for intensive study of the arts in major cultural centers. Seminars, tours, and performances are planned according to specific itineraries. Attendance at all scheduled seminars on campus and arts events during the tour plus maintenance of a journal and completion of a substantial course project is required. May be repeated to a maximum of six credits.

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 INTRODUCTION TO FAMILY SCIENCE. (3)
Introduction to the scientific study of the family. Topics covered will include the important theoretical frameworks in family science, historical trends in marriage and family life, gender role theory, family life cycle theory, parenthood, communication, economics of family life, conflict, divorce, step-families and step-parenting, family strengths. Students will analyze contemporary family issues and take informed, written positions on those issues. FAM 252 is a University Studies Program course.

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.

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. (Same as IEC 256.)

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 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 360 INTRODUCTION TO FAMILY INTERVENTION: WORKING WITH FAMILIES AND INDIVIDUALS. (3)
Survey course to introduce students to the various skills, strategies and professional ethical standards used by family scientists in helping relationships. The emphasis will be on learning the skills required to provide support for families and individuals. Prereq: Family Studies majors only; and FAM 251 and 252.

FAM 383 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: FAM 250, FAM 251, and FAM 360.

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: Family Studies majors only; plus FAM 252 and STA 200.

FAM 399 PRACTICUM IN FAMILY STUDIES. (3)
Supervised practicum in a community or educational setting. Emphases on observing individuals and families and developing competencies in providing services on either an individual, small or large group basis. Weekly discussion will provide analysis of problems related to those competencies. Lecture, one hour bi-weekly; laboratory, eight hours per week. Prereq: Family Studies majors only and FAM 252, and 360.

FAM 401 NORMAL FAMILY DEVELOPMENT AND PROCESS. (3)
An examination of normal family development and processes from a family systems perspective that will include (a) the major models of family functioning; (b) emerging family forms; and (c) social and developmental contexts in which families live. Emphasis will be on examining beliefs about family normality and developing a framework from which to work with individuals and families. Prereq Family Studies majors only; plus FAM 360 and SOC 101.

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 383.

FAM 473 FAMILY LIFE EDUCATION. (3)
Historical development, current programs, and emerging trends in family life education with particular emphases on programs and techniques for teaching sex education, marital relations, parenting and human development. Prereq: Family Studies majors only; plus FAM 360.

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 INTERNSHIP IN FAMILY LIFE EDUCATION. (3)
Supervised internship in a community or educational setting. Students will be required to design, implement and evaluate a family life education program. Lecture, one hour; laboratory, eight hours per week. May be repeated for a maximum of six credits. Prereq: FAM 383 and FAM 473, senior standing, Family and Consumer Sciences majors only.

FAM 502 FAMILIES AND CHILDREN UNDER STRESS. (3)
An investigation of the stressors and crises experienced by families and their members and their efforts to cope with them. Special attention is given to prevention, management and enrichment strategies. Implications for practitioners will be drawn from conceptual frameworks and recent research. Prereq: FAM 401.

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.)

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 553 PARENT-CHILD RELATIONSHIPS ACROSS THE LIFECYCLE. (3)
Exploration of the parenting process from a lifespan perspective. Current theory and research, with childrearing application, will be emphasized. Emphasis will be on parent education methods and the changing parental role over the life cycle. Prereq: FAM 360.

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 260 and six hours of 300 level or above in social and behavioral sciences or consent of instructor.

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. (Same as IEC 557.)

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 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/GRN 585.)

FAM 601 SYSTEMIC FAMILY DEVELOPMENT. (3)
An advanced exploration of normal family functioning from family systems theory and family development/life cycles perspectives. The diversity among normal families due to various contextual factors (e.g., ethnic/cultural/gender/family structure/ and historical factors) will be examined. Recent theory development and research pertaining to the study of families, as well as critiques of this work, will be included. Prereq: Advanced undergraduate courses in family development.

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 622 THE FAMILY'S ROLE IN EARLY CHILDHOOD EDUCATION. (3)
The purpose of this course is to provide students with information related to working with young children with and without disabilities and their families. This course will focus both on presenting new information and providing opportunities for students to practice skills necessary for working with families. (Same as EDS 622.)

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 640 USING THE DSM IN MFT ASSESSMENT. (3)
Students will be trained to use the Diagnostic and Statistical Manual of Mental Disorders (DSM) in family therapy assessment and practice. This will include a basic understanding of the process and procedures for diagnosing individual and family disorders, with the intent that students working with families in the context of a traditional mental health milieu will be able to make appropriate, basic diagnoses. Emphasis on assessing and treating disorders relating to family violence, child abuse, addictions, and substance abuse will be included. Prereq: Admission to the MFT master's program or consent of instructor.

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 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. (Same as GRN 660.)

FAM 668 ALLOCATION OF FAMILY RESOURCES. (3)
Study of the contributors to and the recipients of family resources. Emphasis on the methods of assisting families to better allocate family resources through understanding money beliefs and attitudes and practicing financial planning strategies.

FAM 673 FAMILY LIFE EDUCATION. (3)
Demographic, social, economic, political, and professional issues related to emerging trends in family life education will be examined. Emphasis will be placed on the development, implementation, and evaluation of family life education curriculum materials. Prereq: FAM 690; FAM 652 or FAM 654; 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. (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: FAM 657 or consent of instructor.

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 FAMILIES IN CRISIS: INTERVENTION STRATEGIES. (3)
An examination of nonnormative, crisis events experienced by families and appropriate clinical interventions. Both transitional and situational crisis events will be explored along with typical family dynamics. Emphasis will be placed on intervention strategies for clinicians. Prereq: FAM 501 or consent of instructor.

FAM 690 FAMILIAL AND DEVELOPMENTAL RESEARCH METHODS. (3)
The study of research techniques and methodological problems involved in 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 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 740 COUPLE AND SEX THERAPY. (3)
Study and application of established theories and techniques in couple therapy and in sex therapy. Emphasis on developing and demonstrating knowledge skills, issues, and treatment procedures in marriage and family therapy. Prereq: Admission to the MFT master's program 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 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 FAM 769 residence credit following the successful completion of the qualifying exams.

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 763 SEMINAR IN PRIMARY PREVENTION FOR FAMILY SCIENCE AND HUMAN DEVELOPMENT. (3)
Designed to provide students with a background in prevention science with applications in family science and child development. Topics will include primary prevention of mental health problems among families and children, principles of prevention, prevention research design, ethical issues, and national agendas in primary prevention research. Prereq: Admission to a doctoral program in the social or behavioral sciences.

#FAM 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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

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

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.

FAM 790 ADVANCED METHODS IN FAMILY STUDIES RESEARCH. (3)
Advanced study of research methods used in family studies. Designed to prepare students for the development of their dissertation proposal. Includes study of advanced statistical methods including MANOVA, MANCOVA, discriminant analysis, path analysis, canonical correlation, multiple regression, and LISREL. Prereq: FAM 690 or equivalent.

FAM 796 SPONSORED RESEARCH DEVELOPMENT IN FAMILY SCIENCE AND HUMAN DEVELOPMENT. (2)
Application of content knowledge and research skills to the proposal development process. Students will work in teams to respond to state and federal research program announcements. May be repeated to 6 credits. Prereq: Admission to the doctoral program in family studies is required.

FCS Family and Consumer Sciences

***FCS 110 INTRODUCTION TO CAREER AND TECHNICAL EDUCATION. (3)**
The history, status, philosophy, and objectives of career and technical education in relation to general education. (Same as AED 110.)

#FCS 350 DESIGN ISSUES FOR FAMILY AND CONSUMER SCIENCES EDUCATORS. (3)
This course will provide a broad understanding and appreciation of the housing and interior design fields. Topics will cover the many issues faced with selecting and personalizing a home. Various housing and design options are presented to help recognize the wide variety of choices available for addressing different needs and life situations. FCS Education students will design lesson plans to correspond with housing and design topics. Design projects will be completed.

#FCS 362 FIELD EXPERIENCES IN CAREER AND TECHNICAL EDUCATION. (3)
Supervised experiences in schools and other agencies. Required of all Career and Technical Education majors. Includes observation, participation, experience, field trips, inspection of programs, and professional organizations. Prereq: Majors only. (Same as AED 362.)

#FCS 371 ADVISING A CAREER AND TECHNICAL STUDENT ORGANIZATION. (3)
This course is designed to assist students in developing skills and competencies needed to plan, implement, advise, and evaluate a Career and Technical Student Organization as part of the total CTE program. (Same as AED 371.)

***FCS 435 DESIGNING CURRICULUM AND ASSESSMENT IN CAREER AND TECHNICAL EDUCATION. (3)**
Instructional methodology course focused on analyzing the principles of learning and teaching and designing curriculum and instruction for teaching subjects in formal and informal settings. (Same as AED 435.)

***FCS 535 PRINCIPLES AND PHILOSOPHY OF CAREER AND TECHNICAL EDUCATION. (3)**
Study is made of philosophy, accepted principles, and legislation affecting programs in career and technical education. (Same as AED 535.)

***FCS 580 FOUNDATIONS OF TEACHING CAREER AND TECHNICAL EDUCATION. (3)**
Course focuses on the foundation of teacher development including: effective teacher characteristics, principles of teaching and learning, and preparation of lesson plans. Prereq: Admission into the Teacher Education Program. (Same as AED 580.)

***FCS 586 METHODS OF TEACHING CAREER AND TECHNICAL EDUCATION. (3)**
Development of teaching competencies with emphasis on: discussion, demonstration, problem-solving, cooperative learning, service learning methods. Prereq: Admission into the Teacher Education Program and AED/FCS 580. (Same as AED 586.)

***FCS 590 TEACHING EXPERIENCE IN CAREER AND TECHNICAL EDUCATION. (12)**
Supervised experience in teaching Career and Technical Education. Requires observation, lesson plan development, and incorporation of effective teaching methods and strategies. Regularly scheduled seminars included as an integral part of course. Prereq: Admission into the Teacher Education Program and successful completion of AED/FCS 580 and AED/FCS 586. (Same as AED 590.)

***FCS 670 ADVANCED METHODS IN TEACHING CAREER AND TECHNICAL EDUCATION. (3)**
The principles of method applied to teaching in the field of career and technical education. Prereq: Experience in teaching vocational education. (Same as AED 670.)

***FCS 671 YOUTH ORGANIZATIONS IN CAREER AND TECHNICAL EDUCATION. (3)**
A study of the underlying philosophy and principles for organizing and advising youth organizations in career and technical education. Emphasis on activities that will enrich and motivate the instructional programs, and develop leadership, cooperation and citizenship. (Same as AED 671.)

***FCS 679 ADULT EDUCATION IN CAREER AND TECHNICAL EDUCATION. (3)**
Preparation for teaching adult classes in career and technical education including organization of classes, development of curriculum, and methods of teaching. (Same as AED 679.)

#FCS 682 RESEARCH METHODS. (4)
Research methods and skills for communicators, educators, and leadership development programs. Topics include design and analysis, data gathering techniques, assessment tools, and issues such as the politics of information. (Same as AED/CLD 682.)

***FCS 684 CURRENT TRENDS IN CAREER AND TECHNICAL EDUCATION. (3)**
Class work in current trends and significant developments in career and technical education. May be repeated to a maximum of nine credits. (Same as AED 684.)

***FCS 686 EVALUATION AND ASSESSMENT IN CAREER AND TECHNICAL EDUCATION. (3)**
A course to acquaint teachers of career and technical education with techniques used in measuring attainment in career and technical education in middle and high school, college, and adult education. (Same as AED 686.)

***FCS 693 SUPERVISION IN CAREER AND TECHNICAL EDUCATION. (3)**
This course includes practice in teaching for observation by others, student teaching, and school visiting. (Same as AED 693.)

***FCS 694 THE ADMINISTRATION OF CAREER AND TECHNICAL EDUCATION. (3)**
A course designed for superintendents, high school principals, and other administrators. Its purpose is to prepare administrators and supervisors for leadership in career and technical education. (Same as AED/EDA 694.)

***FCS 695 SPECIAL PROBLEMS IN CAREER AND TECHNICAL EDUCATION. (3)**
An independent work course for students interested in career and technical education. Students make individual investigations and report on special problems. (Same as AED 695.)

***FCS 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. (Same as AED 748.)

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

***FCS 779 SEMINAR IN CAREER AND TECHNICAL EDUCATION. (1-3)**
A critical study of selected problems in career and technical education. May be repeated to a maximum of nine credits. (Same as AED 779.)

***FCS 789 INDEPENDENT WORK IN CAREER AND TECHNICAL 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 career and technical education. May be repeated to a maximum of nine credits. (Same as AED 789.)

***FCS 799 RESEARCH IN CAREER AND TECHNICAL EDUCATION. (1-3)**
Individual research of importance to career and technical education. May be repeated to a maximum of nine credits. (Same as AED 799.)

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 201, ECO 202, ACC 201, ACC 202, MA 123, STA 291 or equivalent.

FIN 350 PERSONAL INVESTING AND FINANCIAL PLANNING. (3)
An overview of financial planning, decision making and investing activities. Emphasis is on financial assets such as stocks, bonds, options and futures and their use in meeting investment goals. Discusses IRA's, 401k's and other retirement programs. Also considers mutual funds, real estate, insurance and other alternatives. Includes a discussion of asset selection and allocation strategies, risk management methods, and alternative wealth maximization strategies. Requires a financial calculator. Prereq: An introductory course in statistics; not available for credit for Finance majors.

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 is 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: ACC 300, ECO 391, and a grade of B 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 430 FINANCIAL MODELING. (3)
The rapidly increasing computational power of personal computers in combination with the development of dynamic software solutions for computational needs have in the recent few years brought the advantage of fairly sophisticated financial models into the reach of a broader audience. The increasing flow of financial information is converting the skill of quantitative modeling using computers from an advantage into a necessity. This course is designed to provide students with the skills necessary to apply modern financial theories to real world applications using advanced spreadsheet and visual-basic programming tools. Prereq: MA 213, or grade of B or better in FIN 450.

#FIN 431 DERIVATIVE ASSET PRICING. (3)
This course covers advanced topics and computer programming concepts related to derivative assets. Prereq: A grade of C or better in FIN 430.

#FIN 432 QUANTITATIVE PORTFOLIO MANAGEMENT. (3)
This course covers the complex characteristics and analysis of individual securities as well as the theory and practice of optimally combining securities into portfolios. Stressing the economic intuition behind the subject matter, this course presents advanced concepts of investment analysis and portfolio management. Prereq: A grade of C or better in FIN 430.

FIN 445 CAPITAL INVESTMENT AND FINANCING DECISIONS. (3)
A study of the factors that drive firm decisions to invest in new plant, capital equipment or technology and/or to pursue acquisitions of other firms. Optimal strategies for financing such investments are also a focal point of this capstone course, which involves extensive application of financial concepts and tools. Prereq: FIN 300 with a grade of C or better, ACC 300, and ECO 391.

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 300, ECO 391, and a grade of C or better in FIN 300.

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: ECO 412; and C or better in FIN 450.

FIN 460 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. The course will cover topics related to urban economics, mortgage finance, and real estate valuation. Prereq: A grade of C or better in FIN 300 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 450.

FIN 470 FINANCIAL RISK MANAGEMENT. (3)
Financial price risk in the form of unexpected movements in the foreign exchange rates, interest rates, and commodity prices and their impacts on a firm's earnings, cash flows, value, and competitiveness are the focus of this course. Various financial derivatives such as forwards, futures, options, and swaps and different hedging techniques, principles, and strategies will be studied. The course also includes the design, development, execution, and evaluation of corporate risk management program. Lecture, discussion, readings, case study, and internet access approaches will be employed. Prereq: FIN 445, FIN 450.

FIN 475 VENTURE CAPITAL. (3)
This is an intermediate to advanced course in the financial management of a new venture. Its objective is to provide the student with an applied, realistic view of finance as it relates to new venture formation and development. To achieve this objective, a combination of class lecture, student discussion, and participative case studies will be utilized. Specific areas to be covered are: organizing and financing a new venture; measuring and evaluating new venture financial performance; financial planning for a new venture: long-term and short-term; types and costs of financial capital; securities law fundamentals; the creation and calibration of value; venture capital valuation methods; professional venture capital; other financing alternatives; financial distress: turnaround opportunity or liquidation; and harvesting the business venture investment. Prereq: FIN 445 with a grade of "C" or better.

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 412; and a grade of C or better in FIN 450.

FIN 490 SPECIAL TOPICS IN FINANCE (SUBTITLE REQUIRED). (3)
Readings, projects, lecture and/or discussion to illuminate current topics of special interest or concern in finance. 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 three times under the FIN 390 number. Prereq: 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 412 and a grade of C or better in FIN 450; 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.

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 650 INVESTMENTS. (3)
Analysis and valuation of securities and the effects on investment decisions. Prereq: Appropriate undergraduate courses in accounting and finance.

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 for 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.

FM Family and Community Medicine

***FM 841 OFF-SITE PRECEPTORSHIP IN FAMILY MEDICINE. (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.

APPROVED ELECTIVES:

***FM 850 ACTING INTERNSHIP IN FAMILY MEDICINE**

***FM 852 INTERDISCIPLINARY APPROACH TO SPORTS MEDICINE**

***FM 853 INTERNATIONAL CLERKSHIP IN PRIMARY CARE**

***FM 855 HOSPICE AND PALLIATIVE CARE: A CONTINUUM OF CARING**

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 325 ECONOMIC BOTANY: PLANTS AND HUMAN AFFAIRS. (3)
Plants have played a major role in human affairs. Course will relate plant life processes and chemistry to human uses: food crops, spices, medicinals, and materials. Major units are the origins agriculture and early domesticates, ethnobotany, and a selection of plants and plant products with major historical impacts — potato, nutmeg, pepper, chocolate, sugar cane, cotton, quinine, rubber, tobacco. Contemporary themes include herbal medicine and plant-based pharmaceuticals. Prereq: PLS 104, PLS 210, one year of introductory biology, or permission 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 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. (3)
This survey course examines the population dynamics and equlibria 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: ABT 360 (or equivalent) and one course in probability/statistics. (Same as ABT/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 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 601 RESEARCH METHODS IN FORESTRY. (3)
A study of research methods, procedures, and techniques used in forestry. Major emphasis will be placed on problem analysis and methods of conducting organized research. Prereq: Graduate standing.

***FOR 602 RENEWABLE NATURAL RESOURCES IN A GLOBAL PERSPECTIVE. (3)**
An advanced course that examines world and transboundary issues related to renewable natural resources. Students will attend a series of lectures, discuss assigned readings, and identify issues for further study. Student research papers related to those issues will be presented and discussed in a seminar format. Prereq: Graduate standing.

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 325 or FOR 340 or ENT 665, or consent of instructor. (Same as BIO/ENT 605.)

FOR 606 CONCEPTUAL METHODS IN ECOLOGY AND EVOLUTION. (3)
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. The latter part of the course will consist of collaborative modeling projects, in which small groups of students will work with the instructor to address an important contemporary research problem and will report their results in a public talk and a project writeup. Prereq: One year of calculus and BIO 325 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 304 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 325 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 325 or FOR 340 or consent of instructor. (Same as BIO/ENT 609.)

FOR 612 FOREST ECOSYSTEM DYNAMICS. (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 607. (Same as BIO/PLS 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 or consent of coordinator. Prereq or concur: BCH 607. (Same as BIO/PLS 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 (SUBTITLE REQUIRED). (1)
Reports and discussions on recent research and current literature. Credit is given to those who satisfactorily present papers. Required of all graduate students. Can be repeated to a maximum of three credits. Prereq: Graduate standing.

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.

FP Family Practice and Community 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 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.

FR French Language and Literature

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 103 FRENCH FILM. (3)
A history of the French cinema from the early twentieth century to the present. Emphasis on the primary aesthetic movements of French cinematic expression in social and historical context. Attention given to the formal elements specific to film, techniques of film analysis, and the nature of visual culture. Viewing of films outside of class required. Taught in English, with no knowledge of French necessary.

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 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. (Same as AAS 263.)

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 204.

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 204.

FR 306 INTERMEDIATE FRENCH COMPOSITION. (3)
Intermediate grammar review and theme writing. Vocabulary expansion and practice in writing stylistically appropriate French. Prereq: FR 204 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 204.

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 495 SENIOR PAPER. (1)
Preparation of a research paper and oral presentation that require students to synthesize the analytical skills acquired and conceptual questions explored over four years. Prereq: Must be French major, senior standing.

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 510 LINGUISTIC STRUCTURE OF MODERN FRENCH. (3)
An introduction to the basic phonological, syntactic and semantic categories and processes of contemporary French as studied in the light of current linguistic theory and practice. Prereq: FR 306 or equivalent.

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 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 612 STRUCTURE AND STYLISTICS OF FRENCH. (3)
A study of the history and structure of French with an emphasis on contemporary features. (Same as ENG/LIN 612.)

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 irradors. 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: FSC 304, FSC 306 or equivalent; one course in histology or biochemistry or consent of instructor. (Same as ASC 630.)

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 estrusion; 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; physiochemical 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. (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: ENG 102 or ENG 104 or HON 101 or equivalent.

GEN 109 SPECIAL INTRODUCTORY COURSE: (SUBTITLE REQUIRED). (1-6)
Interdisciplinary, topical or experimental courses offered at the introductory level to be approved by the Dean of the College of Agriculture. A particular title may be offered at most twice under the GEN 109 number. Students may not repeat under the same title; repeatable to a maximum of six credit hours. Prereq: To be set by the instructor.

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.

GEN 302 INTERNATIONAL EXPERIENCE IN AGRICULTURE AND NATURAL RESOURCES. (1-6)
Credit for international experiences and travel abroad related to College of Agriculture degree programs. Students must work with faculty to determine if the experience is appropriate for credit. Credit will be determined by Associate Dean of the College depending on type of activity and requirements to be completed by students. Student may not use more than six hours toward degree requirements.

GEN 401 JOB SEARCH SEMINAR. (1)
This course will address the selection of appropriate career choices, job search activities and the transition to the world of work. It will emphasize the application of communicative and team building skills in the area of career development. Pass/Fail only. Prereq: Junior or senior standing in the College of Agriculture.

GEN 501 AGRICULTURAL AND ENVIRONMENTAL ETHICS. (3)
This course illuminates the major moral considerations of public policy issues concerning agriculture and the environment. The course will provide an overview of major moral theories, as well as opportunities to apply these theories to critical analysis of the major contemporary moral issues associated with agriculture and the environment. Prereq: Senior Standing.

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 occupance of the earth's surface, including basic concepts of diffusion, population, migration, settlement forms, land utilization, impact of technology on human occupance 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 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.

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 309 DIGITAL GEOGRAPHIC DATA: SOURCES, CHARACTERISTICS, PROBLEMS, AND USES. (3)
Introduction to Geographic Information Systems and Science. This course introduces students to the use of geographic information systems and their basic principles. Topics addressed include data collection, processing and output. Students will learn about types of geographic information and data: sources, constraints, and uses; browsing and analyzing geographic information on the world wide web; collection of spatial data using global positioning systems (GPS) and other technologies.

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.

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. (Same as AAS 328.)

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 GEO 160 or GEO 172 or consent of instructor.

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. (Same as AAS 336.)

GEO 351 PHYSICAL LANDSCAPES. (3)
A study of earth surface processes and land forms. The focus is on the analysis and interpretation of earth surface features and topography in terms of process-response mechanisms, and on an understanding of the fundamental physical, chemical, biological, and human processes which create and modify landscapes. The course emphasizes the dynamic nature of land forms and Landscapes, and the interrelationships between land forms and hydrology, climate, soils, and the biosphere. Prereq: GEO 130, or consent of instructor.

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 406G FIELD STUDIES (SUBTITLE REQUIRED). (1-9)
Field-based, regionally specific study of selected topics in cultural, environmental, political, social, urban, or economic geography. May be repeated to a maximum of 18 credits with change in field site. Prereq: Consent of instructor.

GEO 409G GEOGRAPHIC INFORMATION SYSTEMS AND SCIENCE: FUNDAMENTALS. (3)
Investigation of geographic information systems (GIS) and science (GIScience). 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: GEO 309.

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 441G FLUVIAL FORMS AND PROCESSES. (3)
An examination of erosion, deposition, and sediment transport processes associated with flowing water, landforms associated with fluvial processes, and landscape evolution in areas dominated by fluvial dissection and deposition. Field trips may be required. Prereq: GEO 351 or GLY 341.

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.

GEO 491G JAPANESE LANDSCAPES. (3)
A study of the landscapes of Japan as vivid portrayal of Japanese culture and their value system, including review and analysis of major primary and secondary components of the Japanese landscape. Prereq: JPN 334 or GEO 334 or consent of instructor. (Same as JPN 491G.)

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 506 and consent of instructor.

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 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 512 GI SYSTEMS & SCIENCE: ANALYTICAL ISSUES. (3)
This course introduces advanced spatial statistical techniques under the rubric of spatial analysis. The course is organized as a seminar. Participants will first learn advanced spatial analysis techniques and apply them to exercises. Following these exercises, participants will learn statistical techniques including Monte Carlo simulations and kriging. A project that teams of students develop with the instructor will be required of all participants. Prereq: GEO 409G.

GEO 514 GI SYSTEMS & SCIENCE: TECHNICAL ISSUES. (3)
This course merges issues and approaches from geography, computer science, information management in the practically oriented development of geographic information applications. The exercises focus on developing the necessary skills for constructing robust GIS applications, culminating in a project, complemented by parallel lectures that introduce relevant aspects of geographic information processing. A student prepared project is the keystone in this course and will include various aspects of developing geographic information applications ranging from algorithms to applications. Prereq: GEO 409G or consent of instructor.

GEO 516 GI SYSTEMS & SCIENCE: MANAGEMENT ISSUES. (3)
Examination of managerial aspects of geographic information systems and science that includes information system design, cost/benefit analysis, elementary programming, and metadata production. Course will also examine organizational and legal aspects of developing GIS in private and public sectors. Issues including access, copyright, and data protection will be discussed in their relevance to GIS. Prereq: GEO 409G or consent of instructor.

GEO 530 BIOGEOGRAPHY AND CONSERVATION. (3)
An introduction to the geographic patterning of biological diversity, exploring its origins, dynamics, and present trends. Examines the interplay among physical conditions, ecological interactions, evolutionary processes, and the historical movements of organisms and land masses as they have combined to affect the distribution of species, with particular attention to the application of biogeographic knowledge to current problems of species loss and conservation. Prereq: Two semesters of introductory biology or physical geography, or consent of the instructor. (Same as BIO 530.)

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 546 TOURISM AND RECREATION GEOGRAPHY. (3)
Tourism is the world's fastest-growing economic sector, creating and transforming places, regions and broader geographies of travel, movement, and investment. The course will examine concepts, models, and theories in the study of tourism and recreation. Selected themes include major travel flows and patterns; economic, environmental, and socio-cultural impacts; mass vs. "new" (e.g., eco-tourism, adventure tourism, extreme tourism) types of tourism; heritage tourism; marketing; place boosterism; tourism and recreation planning; and the politics of tourism. Local, national, and international examples in both developed and developing countries are discussed. Prereq: GEO 152, 172, 455, 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 551 JAPANESE MULTINATIONAL CORPORATIONS. (3)
A study of the giant Japanese multinational corporations in the world economy and their impact on development and environment of selected countries. Topics include: geographical organization of multinational corporate system; their locational decisions; affect of multinationals policies on the environment; and local economy. Prereq: Consent of instructor. (Same as JPN 551.)

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/GRN 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 610 INTRODUCTION TO METHODS IN GEOGRAPHY. (3)
A broad survey of methods and methodological debates of research in human/physical geography. Emphasis on contemporary research examples. Prereq: Graduate standing.

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 705 ADVANCED GEOGRAPHIC METHODS (SUBTITLE REQUIRED). (3)
In-depth study and application of one or more research methods/techniques (e.g., qualitative methods, ethnography, textual analysis, visual analysis, GIS). Intended to offer M.A. and Ph.D. students advanced methodological specialization in geography. May be repeated to a maximum of six credits under different subtitles. Prereq: GEO 600 or equivalent.

GEO 706 ADVANCED FIELD STUDIES (SUBTITLE REQUIRED). (1-9)
Field-based, regionally specific study of selected topics in cultural, environmental, political, social, urban, or economic geography. May be repeated to a maximum of 18 credits with change in field site. Prereq: Consent of instructor.

GEO 707 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.

GEO 708 GEOGRAPHIC INFORMATION SYSTEMS RESEARCH METHODOLOGIES. (3)
Following a brief overview of GIS, remote sensing, GPS, and other relevant information technologies as information collection, presentation, and analytical aids, this course will consider current developments of geographic information technologies. These include, but are not limited to, field GIS, public participation GIS, participatory information technology, collaborative environments, and spatial decision-making. Discussion of these developments will be complemented by a rigorous examination of theoretical and methodological issues. Prereq: GEO 409G or its equivalent, or consent of instructor.

GEO 711 CULTURAL STUDIES AND GEOGRAPHY (SUBTITLE REQUIRED). (3)
Seminar in cultural studies and geography, including, for example, interpretation and analysis of the built environment; space and representation; the political economy of landscape production; regional imagery; media studies; popular culture; the social construction of community; historic preservation; recreation, tourism and society. May be repeated to a maximum of nine credits under different subtitles.

GEO 712 DEVELOPMENT STUDIES AND GEOGRAPHY (SUBTITLE REQUIRED). (3)
Seminar in selected topics in the policies, practices, and processes of development, including, for example, political economy perspectives on development; anti-development and postcolonial theory; economic restructuring and transition economies; gender and development; the relations between development and migration, transportation and tourism; environmental management and sustainable development. May be repeated to a maximum of nine credits under different subtitles.

GEO 713 ECONOMIC GEOGRAPHY: (SUBTITLE REQUIRED). (3)
A seminar in economic geography, including, for example, global, regional, and local economic restructuring, global financial systems; foreign direct investment and trade; geography of multinational corporations; geography of labor; spaces of production and spaces of consumption; gender and economic space; space-time convergence; information and communications. May be repeated to a maximum of nine credits under different subtitles.

GEO 714 POLITICAL GEOGRAPHY: (SUBTITLE REQUIRED). (3)
A seminar in political geography, including, for example, electoral systems; state theory; post-Cold War democratization; the geography of revolutionary change; critical geopolitics; political economy of environmental movements; political economy of globalization discourses and practices. May be repeated to a maximum of nine credits under different subtitles.

GEO 715 GEOGRAPHY AND SOCIAL THEORY (SUBTITLE REQUIRED). (3)
Seminar in geography and social theory, including, for example, theories of human spatiality; marxist, neo-marxist, and post-marxist theory; postmodernism and poststructuralism; feminist theory; actor network theory; identity theory; geographic thought and society; technology and society. May be repeated to a maximum of nine credits under different subtitles.

GEO 717 URBAN GEOGRAPHY (SUBTITLE REQUIRED). (3)
Seminar in urban geography, including, for example, urban morphology; urban systems; the local state; urban social fragmentation; conflicts over urban growth and development; urban transportation planning; urban historical geography; gender and urban space; race and urban space; urban landscapes. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GEO 720 REGIONAL STUDIES (SUBTITLE REQUIRED). (3)
Seminar in the study of selected topics in cultural, environmental, political, social, urban or economic geography, set within a regional context. May be repeated with change in regional focus to a maximum of nine credits under different subtitles.

GEO 721 TOPICAL SEMINAR IN PHYSICAL GEOGRAPHY (SUBTITLE REQUIRED). (3)
Examination of selected topics in geomorphology, hydrology, pedology, biogeography, climatology, and earth system science. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GEO 722 SOCIAL GEOGRAPHY (SUBTITLE REQUIRED). (3)
Seminar in social geography, including, for example, race and gender, feminist geography, health care, disease and society; the geography of AIDS; the geography of aging and the life course; poverty and social policy; human behavior in space and time; population and migration studies; spatial structure of social networks; transportation of disadvantaged groups. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GEO 731 EARTH SURFACE SYSTEMS. (3)
A treatment of earth surface systems from the perspective of complex systems theory. The course takes a holistic viewpoint, emphasizing interactions between the atmo-, litho-, hydro-, and biospheres and the manifestations of those signatures in soils, landforms, and ecosystems. Prereq: Consent of instructor.

GEO 740 RESEARCH INTERNSHIP (SUBTITLE REQUIRED). (1-6)
To provide students with course credit for faculty supervised internships with governmental and non-governmental organizations. May be repeated to a maximum of nine credits.

GEO 741 TEACHING PRACTICUM. (1)
Introduction to teaching, with particular focus on pedagogical issues in geography courses. Intended to provide students with background sufficient to enable them to assume full responsibility for university and college level courses.

GEO 742 PREPARING FUTURE FACULTY IN GEOGRAPHY. (1)
Introduction to the professoriate, with particular focus on geography within the academy. Intended to provide students with background sufficient to assume responsibility as new faculty members in universities and colleges.

GEO 743 RESEARCH PROPOSALS AND GRANT WRITING. (1)
Introduction to basic geographic research proposal design standards, with particular emphasis on the requirements of granting agencies.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

GER German Studies

GER 011 GERMAN 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, 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 103 FAIRY TALES IN EUROPEAN CONTEXT. (3)
Introduction to major types of fairy tales in European historical and literary context, covering the period from the Renaissance to the present. Taught in English.

GER 104 TURNING POINTS: (SUBTITLE REQUIRED). (3)
An introductory course exploring the many ways in which art, architecture, literature and film have come to define and represent major urban centers in the German-speaking world. Focus in a given semester will be on an individual city such as Berlin, Vienna or Munich in times of innovation and upheaval during which it has contributed significantly to developments in literature and the visual arts and was or continues to be at the center of world historical events. May be repeated once with new subtitle.

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 equivalent or placement test.

GER 202 INTERMEDIATE GERMAN. (3)
Continuation of GER 201. Prereq: GER 201 or equivalent or placement test.

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 201 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 201 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 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 202 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 202 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 202 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 352 GERMAN-SPEAKING EUROPE: (SUBTITLE REQUIRED). (3)
This course will place an important aspect of German culture in the broader context of European cultural and historical developments. Focus in a given semester will be on a special topic through which significant developments in literature and the arts may be considered in relation to the historical context of such developments. Possible topics include Literature of the Holocaust, Terrorism in the German Context, The Culture of Sport, and Children's Literature. All readings will be in English. Students taking the course for a German major or minor will complete a number of assignments in the German language. May be repeated to a maximum of six credits under different subtitles.

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. (1-3)
This course is designed for students who wish to do advanced work in German on any subject. May be repeated up to a maximum of six credit hours. 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 612 STUDIES IN LITERARY THEORY. (3)
Course will explore such fundamental issues as the definition of literature, interpretation and evaluation, the reading process, and literary life from the perspective of competing theoretical systems.

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 EARLY MODERN ERA. (3)
The Age of Renaissance, Reformation, and 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 650 MULTIDISCIPLINARY GERMAN STUDIES SEMINAR (SUBTITLE REQUIRED.) (3)
A team-taught, multidisciplinary exploration of a set of issues that effect cultural, literary, geographical, historical, political, philosophical or social developments in Germany in relation to surrounding geographical areas. The seminar will foster multidisciplinary perspectives in the study of Germany, its inhabitants, and cultural traditions, in historical, contemporary, and comparative contexts. Seminar readings in German, discussion in English. Seminar foci will vary year to year, including such topics as "Individual and Collective Identity Formations in post-Enlightenment Germany," "Constructions of German Heimat," and "Freud, Culture, Society." May be repeated to a maximum of six credits.

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 721 SPECIAL TOPICS IN GERMAN LITERARY AND CULTURAL HISTORY. (3)
This course allows for the in-depth study of specific topics in German literary and cultural history encountered in the broadly conceived period courses of the 620-630 series. With changes in topic the course may be repeated to a maximum of nine credits. 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 INDEPENDENT STUDIES IN GERMAN. (3)
Course allows individual students to pursue independent research on a selected aspect of German linguistic, literary or cultural history. May be repeated once if topic changes. Prereq: Permission of Director of Graduate Studies.

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 110 ENDANGERED PLANET: AN INTRODUCTION TO ENVIRONMENTAL GEOLOGY. (3)
An introductory course that applies basic geological concepts to current environmental issues including the availability and use of water and soil resources, pollution causes, effects and solutions, and causes and prediction of environmental hazards including floods, landslides, subsidence, earthquakes and volcanoes.

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 115 INTRODUCTORY GEOLOGY LABORATORY. (1)
This course is designed to cover essential elements of the field of geology through hands-on, laboratory exercises. Starting with basic earth materials, we emphasize observation and data collection to understand the formation of rocks and minerals, and put them in perspective of their plate tectonic origins. Emphasis on application of this knowledge to society (use of geologic resources, geological hazards) is woven throughout the course materials. Laboratory, two hours per week.

GLY 120 SUSTAINABLE PLANET: THE GEOLOGY OF NATURAL RESOURCES. (3)
An introduction to the geologic and societal controls that govern the distribution and cost of using geologic resources: minerals, soils, and energy and industrial materials. Topics include the geological processes responsible for forming these resources, controls on their distribution, quality and abundance, economic factors that drive their recovery, and the legal/political arena in which we attempt to utilize them.

GLY 130 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 and afterwards, dinosaur interactions with other organisms and the environment, as well as their indirect influence on mammals, particularly on the much later evolution of humankind, will be examined.

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 150 EARTHQUAKES AND VOLCANOES. (3)
An introduction to earthquakes and volcanoes, primarily through case studies. Using the basic principles of plate tectonics, students will learn why, where and how earthquakes and volcanoes occur. The hazards associated with earthquakes and volcanic eruptions will be discussed at length, as well as their societal implications in both the United States and developing world. Earthquake and volcanic hazard mitigation techniques will be addressed. Finally, earthquake hazards in the central United States will be discussed.

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, two hours per week; laboratory, three hours per week. Credit may not be received for both GLY 101 and GLY 160. Not available for credit to students who have received credit for GLY 220.

#GLY 170 BLUE PLANET: INTRODUCTION TO OCEANOGRAPHY. (3)
Survey of oceanography, including the geologic evolution of the ocean floor; composition and dynamics of ocean water; interaction of lithosphere with hydrosphere; ocean-atmosphere interaction and oceanic controls on climate dynamics; marine life and ecosystems; impact of human activity on marine ecosystems.

GLY 210 HABITABLE PLANET: EVOLUTION OF THE EARTH SYSTEM. (3)
Earth is a 4.55-billion-year-old planet undergoing continuous evolution. We will explore aspects of Earth's evolutionary changes that have affected both climate and life through time. The chemical and physical interactions between the solid Earth, the atmosphere, the hydrosphere, and the biosphere are investigated, providing the basis for understanding how Earth behaves as a self-regulating system that controls the global environment. The effect of human activity on modern Global Change will also be emphasized.

GLY 220 PRINCIPLES OF PHYSICAL GEOLOGY. (4)
How the Earth Works: an integrated course in physical geology, covering the physical, chemical and biological processes that combine to produce geological processes. Attention is focused on plate tectonics, earth surface processes, and properties and formation of earth materials. Lab exercises emphasize identification and interpretation of geologic materials and maps. Lecture/Discussion, three hours per week; laboratory, three hours per week.

GLY 223 INTRODUCTION TO GEOLOGY IN THE ROCKY MOUNTAINS. (6)
An integrated course in physical geology and historical geology, taught as a field-based course in the Rocky Mountains. Attention is focused on properties and formation of earth materials, plate tectonics, earth surface processes and understanding geologic time. Lab and field exercises emphasize identification and interpretation of geologic materials, maps and history. Offered only during the summer session, this course involves daily field trips, laboratory and lecture activities, with at least 40 hours of field-related class time per week. Medical release required.

GLY 230 FUNDAMENTALS OF GEOLOGY I. (3)
Field and laboratory methods for identification and description of rocks and minerals with emphasis on sedimentary rocks and rock-forming minerals. Field study of geologic structures. Interpretation of geologic maps. Laboratory, three hours per week. Eight days in the field. Prereq: GLY 220.

GLY 235 FUNDAMENTALS OF GEOLOGY II. (3)
Laboratory and field methods for identification and description of rocks and minerals with emphasis on igneous and metamorphic rocks and rock-forming minerals. Field study of geologic structures. Interpretation of geologic maps. Laboratory, four hours per week. Four days in the field. Prereq: GLY 220 and 230.

GLY 295 GEOSCIENCE ORIENTATION. (1)
Survey of geoscience disciplines and post-baccalaureate career options for Geology majors. Introduction to the range of geoscience research approaches and means of dissemination of geoscience information. Guest speakers from industry, government, and academia will discuss career issues specific to geology, including consideration of appropriate educational preparation for potential career paths. Pass/Fail only. Prereq: GLY 220 and sophomore standing.

GLY 311 WORKSHOP IN ANALYTICAL METHODS FOR THE GEOSCIENCES. (1)
This course is designed for geology majors currently taking calculus. Students will work through geologically relevant analytical problems that draw on the concepts and methods they are learning in their formal calculus courses. Basic problem-solving skills and techniques will also be developed. The course will provide applied, real-life perspectives to help students develop skills and understanding necessary for future success in the study of geology and related geological phenomena. Offered only on a pass/fail basis. May be repeated for a maximum of four credits. Concurrent registration in calculus (MA 113, 114, 213 or 214) is required. Prereq: Concurrent registration in calculus (MA 113, 114, 213 or 214) is required.

GLY 323 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 230 and GLY 235.

GLY 341 LANDFORMS. (3)
A study of the origin and distribution of landforms. Lecture, two hours; laboratory, three hours per week. Prereq: GLY 220.

GLY 350 REGIONAL HISTORICAL GEOLOGY. (3)
Integration of basic rock types, geologic structures, geomorphology, and natural resources in the context of geologic history of the major regions of North America. Global plate tectonics as a framework for evolution of the North American continent. Prereq: GLY 230.

GLY 360 MINERALOGY. (4)
The study of mineral structure and composition, and mineral classification through crystallographic and crystal chemical techniques. Laboratory work includes study of minerals via crystallography, X-ray diffraction, mineral chemical analysis, and optical petrographic techniques. Lecture, three hours per week; laboratory, three hours per week. Prereq: CHE 105 and GLY 220. Prereq or concur: GLY 230 or GLY 235.

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 PALEOBIOLOGY 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 230.

GLY 430 ENVIRONMENTAL GEOHYDROLOGY. (3)
A course dealing with the occurrence and movement of water on and beneath the land surface, and its place in the hydrosphere, emphasizing the geologic perspective. Prereq: GLY 220.

GLY 450G SEDIMENTARY GEOLOGY. (4)
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, three hours per week; laboratory, three hours per week. Prereq: GLY 230 and GLY 360.

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 230 and 235 and GLY 360.

GLY 480 ADVANCED TOPICS IN GEOLOGICAL SCIENCES (SUBTITLE REQUIRED). (1-6)
Advanced topical course in the geological sciences. May be repeated to a maximum of six credits under different subtitles. Prereq: Consent of instructor.

GLY 490 EARTH DYNAMICS. (3)
Basic planetary changes through geological time, including continental drift, formation of supercontinents, paleoclimate, and the growth of the earth's crust. Students will be required to take the Fundamentals component of the ASBOG professional geologist certification exam (fee required). Prereq: Senior standing with at least 30 credits in a Geological Sciences curriculum.

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 360, MA 114, or consent of instructor.

#GLY 550 FUNDAMENTAL GEOPHYSICS. (3)
Survey of active geophysical measurements and passive geophysical observations and their relation to Earth's structure and composition. Investigation of the relationship between Earth's elastic, potentiometric, and thermodynamic properties and traditional geophysical methods for measurement (e.g., gravity, magnetics, seismic, and heat flow). Material will help students improve their quantitative problem-solving abilities, but will also emphasize the visual learning skills commonly developed in the broader geology curricula. Prereq: MA 113, PHY 211 or 213, or consent of instructor. (MA 114 suggested).

GLY 555 STRATIGRAPHY. (3)
Principles of stratigraphy, depositional systems, sequence stratigraphy, and tectonic framework of sedimentation. Prereq: GLY 450G.

GLY 560 GEOPHYSICAL FIELD METHODS. (4)
An introduction to the principles and applications of geophysics in the field. The course will present the geophysical methods used to assess the configuration and physical properties of the Earth's subsurface, as well as to explore for natural resources. Designed for geology students (upper-division or first-year graduate) and other science or engineering students without prior formal instruction in geophysics. To understand the discussions and exercises, the student should be familiar with first-year calculus and physics. Prereq: MA 113, 114; PHY 211, 213 or PHY 231, 232 or consent of instructor. MA 114, PHY 213 or PHY 232 may be taken concurrently.

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: Senior or graduate standing in Geological Sciences.

GLY 579 GROUNDWATER GEOPHYSICS. (3)
Application of geophysical methods to groundwater exploration, emphasis is placed on the use of shallow seismic and potential field methods in the analysis of groundwater aquifers. Lecture, two hours; laboratory, three hours per week. Prereq: MA 114 and PHY 231, 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 220 and MA 113 or 123.

GLY 610 TOPICS IN HYDROGEOLOGY AND SURFICIAL PROCESSES (SUBTITLE REQUIRED). (3)
Study of topics in hydrogeology and surficial processes. Recent topics include: models of surface processes; contaminant hydrogeology; modeling in hydrogeology. May be repeated to a maximum of nine credits under different subtitles. Prereq: 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 ADVANCED STRUCTURAL GEOLOGY. (3)
An advanced study of the theory, principles, and application of structural geology. Prereq: GLY 420G.

GLY 625 TOPICS IN APPLIED GEOPHYSICS AND ENGINEERING GEOLOGY (SUBTITLE REQUIRED). (3)
Study of topics in Applied Geophysics and Engineering Geology. Past topics include: Seismic Processing; Seismic Stratigraphy; Geologic Hazards. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GLY 645 TOPICS IN PETROLOGY AND GEOCHEMISTRY (SUBTITLE REQUIRED). (3)
Study of selected topics in petrology and geochemistry. Past topics include: Carbonate Petrology; Igneous Petrology; Organic Petrology; Isotope Geochemistry. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

GLY 652 TECTONICS AND STRATIGRAPHY. (3)
Use of stratigraphic data in the interpretation of tectonic framework of sedimentation, tectonic controls on paleogeography, and interactions between sedimentary rocks and geologic structures. Prereq: GLY 420G and 450G or equivalent.

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 730 SEMINAR IN TECTONICS AND STRATIGRAPHY (SUBTITLE REQUIRED). (3)
Seminar in Tectonics and Stratigraphy. Past topics include: Tectonics and Stratigraphy of the Appalachians; Tectonics and Sedimentation; Basin Analysis. May be repeated to a maximum of nine credits under different subtitles. Prereq: 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 360 or consent of instructor. (Same as PLS 741.)

GLY 745 SEMINAR IN PETROLOGY AND GEOCHEMISTRY (SUBTITLE REQUIRED). (3)
Seminar in Selected Topics in Petrology and Geochemistry. Past topics include: Carbonate Petrology; Igneous Petrology; Organic Petrology; Isotope Geochemistry. May be repeated to a maximum of nine credits under different subtitles. Prereq: Consent of instructor.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 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 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/GEO 585.)

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 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/PGY 612.)

GRN 615 SEMINAR IN TEACHING MEDICAL SCIENCE (MED SCIENCE TEACHING I). (2)
A two (2) credit seminar course in which issues related to the theory and practice of life science education are discussed in a Socratic manner. May be repeated to a maximum of three credits. Prereq: Current enrollment in a life science graduate program. (Same as PGY 615.)

GRN 618 EPIDEMIOLOGY OF AGING. (3)
This course introduces the application of epidemiologic methods to the study of older persons. Prereq: Enrollment in a Public Health degree and SPH 605/PM 620 Intro to Epidemiology and GRN 650, or consent of instructor. (Same as SPH 618.)

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 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 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. (Same as FAM 660.)

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. (Same as ANA/PGY/PHA 710.)

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. (Same as HA 715.)

GRN 720 GERONTOLOGY/GERIATRIC DENTISTRY. (1)
This course is designed to help students gain an appreciation for the significant opportunities as well as challenges the aging population will bring to their oral health practice. This course will provide students basic knowledge and information in gerontology/geriatric dentistry. Lecture, 17 hours. May be repeated to a maximum of two credits. Prereq: Admission to the College of Dentistry or discretion of course director. (Same as CDS 822.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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

GRN 770 SPECIAL TOPICS IN GERONTOLOGY. (1-3)
This course is designed to present contemporary topics in gerontology in either a lecture or seminar format. It is intended to provide students with opportunities to be informed of current issues in gerontology as well as to explore in-depth studies of particular gerontological topics. May be repeated to a maximum of twelve credits.

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 782 WOMEN'S HEALTH AND AGING. (3)
This class explores the issues related to health and well-being among older women. Using a multidisciplinary approach that blends humanities, social and medical science and public policy, the course examines social, economic and cultural contexts of chronic physical and mental health. Prereq: Upper level/graduate class in social science. (Same as BSC 782.)

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. (1)
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. (1)
This seminar is the second in a two-course sequence involving students and gerontology program faculty in in-depth exploration of major health and aging-related issues. Course details are the same for GRN 790. 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 610 COLLEGE TEACHING. (1)
This one-credit-hour seminar addresses teaching and learning issues in the college classroom. It is intended for graduate students who want to prepare for future academic careers and enhance current teaching activities. The seminar will examine pedagogical issues in a general format with opportunities for discipline-specific applications. This course can serve to augment any department-based programs.

GS 620 TEACHING IN THE 21ST CENTURY. (1-2)
This seminar, part of the Preparing Future Faculty program, is a rotating series of 1-2 credit hour courses on various aspects of life in institutions of higher education. Participating graduate students from a range of disciplines will have the opportunity for an in-depth exploration of the research and practice surrounding a special topic in college teaching and learning. The seminars will involve both classroom activities and experience-based learning. For example, the course on first-year students will include a study of current research on the first-year experience, interviews with first-year students, and an experiential component where participants serve as mentors for first-year students. Participants will be asked to produce a paper that integrates the theoretical and experiential aspects of the course and develops implications for teaching in their content areas. May be repeated to a maximum of three enrollments.

GS 630 INSTRUCTIONAL TECHNOLOGY. (1)
This seminar addresses pedagogically sound and effective applications of instructional technologies (IT) in college teaching. Course goals include examining the impact of IT on learning outcomes, teaching strategies, and instructional assessments; developing proficiency in creating PowerPoint presentations, designing and managing instructional Web sites, facilitating Internet dialogue, and conducting distance learning courses; and considering how IT affects faculty roles and responsibilities, the nature of the college classroom, and the future of higher education.

GS 640 GRANT WRITING. (3)
This course prepares graduate students to be PI on a state, federal, other large competitive grant. Students prepare and critique proposal. Prereq: GS 650.

GS 650 PREPARING FUTURE FACULTY. (2)
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.

GS 660 MULTIDISCIPLINARY SENSING TECHNOLOGY SEMINAR. (1)
A multi-disciplinary seminar in Sensors and Sensing Architectures. May be repeated to a maximum of four credits. Prereq: Graduate status.

GS 695 SPECIAL PROBLEMS IN COLLEGE TEACHING AND LEARNING. (1-3)
This special problems course is designed to provide opportunities for graduate students and postdoctoral scholars pursuing a Certificate in College Teaching and Learning to explore special problems related to college teaching that bridge or fall outside the domain of departmental efforts; graduate students exploring faculty development as a career option; and students who currently hold full-time teaching positions in colleges or universities and who are interested in professional development or credentialing in College Teaching and Learning. An "Independent Graduate Work Initiation Form" must be filed with the Certificate Director prior to registration for this course. May be repeated to a maximum of six credits. Prereq: EPE 672; GS 610 or equivalent; consent of instructor.

GS 699 PRACTICUM IN COLLEGE TEACHING. (3)
The Practicum is a mentored teaching experience that not only immerses the graduate student in teaching by also fosters reflection on the experience, provides structured feedback and plans for improvement, and guides students in developing a teaching portfolio. The practicum requires that the graduate student assume full responsibility for a course, under the guidance of a mentor teacher. Supervision for the practicum experience is a joint responsibility of the Teaching and Learning Center, certificate faculty, and the student's mentor. The practicum is distinct from many mentored Teaching Assistant experiences because the student must have full responsibility for the course, including syllabus and materials development, assessment, instructional responsibilities, and grade assignments. Credit will not be assigned until the graduate student has submitted a teaching portfolio that includes the practicum experience. Prereq: EPE 672; GS 610 (or equivalent); consent of instructor required.

GS 758 CAPSTONE RESIDENCY. (0)
Completion of capstone project for plan B (non-thesis) students; course may not be repeated. All course work toward the degree must be completed. Prereq: All course work toward the degree must be completed.

GWS Gender and Women's Studies

***GWS 200 INTRODUCTION TO GENDER ANDWOMEN'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.

***GWS 201 INTRODUCTION TO GENDER AND 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.

***GWS 300 TOPICS IN GENDER AND 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: GWS 200 or GWS 201 or permission of instructor.

***GWS 350 INTRODUCTION TO FEMINIST THEORIZING. (3)**
An interdisciplinary course that acquaints undergraduate students with the central issues and texts in contemporary feminist theories. It will examine what feminist and womanist theories are and the ways in which they analyze and explain the workings of our social world. The course will clarify basic concepts in feminist thought such as gender, difference, patriarchy, and post-colonialism and will provide students with tools to analyze these theories and explore contemporary applications. Prereq: GWS 200 or GWS 201.

***GWS 395 UNDERGRADUATE RESEARCH IN GENDER AND WOMEN'S STUDIES. (1-3)**
The purpose of this course is to give students the opportunity to engage in independent faculty-directed library or field research focused upon significant issues and problems confronting women in contemporary society. May be repeated to a maximum of 6 hours. Prereq: GWS 200 or GWS 201 and written agreement of a Women's Studies Affiliated faculty member, who will direct the study.

***GWS 399 INTERNSHIP IN GENDER AND 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: GWS 200 or GWS 201 and declared minor in Women's Studies and consent of instructor.

***GWS 416 CROSS-CULTURAL PERSPECTIVES IN GENDER AND WOMEN'S STUDIES. (3)**
This course will introduce students to questions about women and gender from a cross-cultural perspective with a focus on the post-colonial world. It explores the similarities and differences among several cultures in terms of women's conditions, relevant issues and categories as they define them, and their various strategies and practices. Assignments and readings are designed to assist students in developing their capacity for critical and analytical thinking. Prereq: GWS 200 or GWS 201.

***GWS 506 HISTORY OF SEXUALITY IN THE U.S. (3)**
An overview of the history of beliefs about sexuality, sexual cultures and norms, and sexuality's relationship to power in American society from the colonial period to the present. (Same as HIS 506.)

***GWS 595 ISSUES IN GENDER AND WOMEN'S STUDIES (SUBTITLE REQUIRED). (3)**
Discussion, readings, and papers focusing on relevant topics in Women's Studies directed by a faculty member with expertise in the topic under study. Courses will be interdisciplinary, although they will also include materials from particular relevant disciplines. May be repeated under different subtitles to a maximum of six credits. Prereq: GWS 200 or GWS 201 or permission of instructor.

***GWS 600 TOPICS IN GENDER AND 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.

***GWS 610 WOMEN AND "MADNESS". (3)**
This course explores the social construction of mental illness as it pertains to gender. We will consult narratives from different disciplines: Literature, Psychology, Cultural Studies, Anthropology, History and Feminist Theory. Our focus will concern the ways in which all women are constructed as "sick" as well as the perspectives of women who feel a sense of psychic dislocation and disability in their lives. Readings by women of color and lesbians will suggest the particular ways culture defines such women as "abnormal."

***GWS 616 COLONIALISM/ POST-COLONIALISM AND GENDER. (3)**
This course is designed to expose students to a range of theories and debates centering on or pertinent to women, gender, and sexuality in the field of postcolonial studies. Here, the field is understood in its widest and most interdisciplinary sense, inclusive of studies of Empire, the independent so-called "Third World", and diasporas. Topics for study will include classical texts in the field, current postcolonial readings on gender and sexuality in empire, representation, trans/nationalism, and diasporas. Course credit may be used to help satisfy the international component of the Women's Studies Graduate Certificate requirements.

***GWS 620 COMPARATIVE CONSTRUCTIONS OF GENDER AND SEXUALITY. (3)**
This course is designed to give students an understanding of an array of diversely situated theories and debates about gender and sexuality mainly outside of mainstream U.S. culture. Countries/communities of focus will vary.

***GWS 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.).

***GWS 675 ADVANCED FEMINIST THEORY. (3)**
An advanced topics course in feminist theory. Prereq: Permission of instructor.

***GWS 690 GRADUATE RESEARCH IN GENDER AND WOMEN'S STUDIES. (3)**
The purpose of this course is to provide graduate students the opportunity to engage in independent faculty-directed research in Women's Studies. Prereq: Written agreement of a Women's Studies Affiliated Faculty Member, who will direct the study.

***GWS 750 READINGS IN GENDER AND 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: GWS 650 or consent of instructor.

HA Health Administration

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 PA 671.)

***HA 602 ORGANIZATIONAL CHANGE AND STRATEGIC PLANNING. (3)**
This course is designed to focus on the future needs of the health care organization as contrasted to day-to-day operational management. Strategies for the design and implementation of organizational change including techniques of quality and process improvement will be addressed. The strategic planning components of needs assessment, demands analysis, generation of alternative, priority setting and evaluation form the basis of the course. 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: MPA/MHA program status and PA/HA 621.

HA 603 LEGAL ASPECTS OF HEALTH ADMINISTRATION. (2)
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.

HA 604 MANAGERIAL ETHICS. (1)
Case studies are used to examine ethical dilemmas and advance ethical decision making. The philosophical foundations of ethical decision making are covered.

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. Lecture, two hours; laboratory, one hour per week. Prereq: MPA or MHA program status. (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.

HA 623 DECISION ANALYSIS AND DECISION SUPPORT SYSTEMS. (3)
An introduction to organizational decision making under conditions of certainty, uncertainty, risk and multiple objectives. Concepts of analysis from the areas of economics, mathematics, probability, and statistics will be utilized in terms of administrative decision making in public administration. Course work includes use of various management information systems with a focus on how such systems can be used to support and inform decision making. Lecture, two hours; laboratory, one hour per week. Prereq: PA/HA 621, PUAD or HLAD program status or consent of instructor. (Same as PA 623.)

HA 624 INFORMATION SYSTEMS IN HEALTH CARE. (3)
This course will focus on the life cycle approach to information systems development. Phases of this approach include systems analysis, design, implementation, maintenance and evaluation. This approach has a technological, financial, and human factors component. The decision making and planning role of administration as well as the need on how to maximize the utilization of current systems is stressed. Topics include the information needs of the strategic planning process, administrative function and clinical care. The course will involve site visits. Prereq: HA 602 and 642.

HA 628 PERSONNEL MANAGEMENT IN HEALTH AND PUBLIC ADMINISTRATION. (3)
This course will present an overview of career development, human resource planning, staffing, training and development in the public and health care sectors. Prereq: MPA or MHA program status. (Same as PA 628.)

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.

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: The economics prerequisite can be met in three ways: (a) an undergraduate principles course in microeconomics and HA/PA 652; (b) an undergraduate microeconomics principles course and a graduate course in managerial economics; or (c) an undergraduate microeconomics principles course and an intermediate microeconomics course. (Same as ECO 653/ 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 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/MHA program status. (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. ECO 201 or equivalent. (Same as ECO/PA 652.)

HA 656 MANAGERIAL EPIDEMIOLOGY. (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.

HA 673 HEALTH POLICY DEVELOPMENT. (2)
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: MHA/MPA program status. HA 601/PA 671 and HA 611, 621 or 622. (Same as PA 673.)

***HA 711 PRACTICUM IN HEALTH ADMINISTRATION. (3)**
Practical field experience in a health administration setting under the direction of an academic and a workplace supervisor. Prereq: MHA program status.

HA 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. (Same as GRN 715.)

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 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 PA 785.)

HDI Human Development Institute

HDI 600 INTERDISCIPLINARY APPROACHES TO THE NEEDS OF PERSONS WITH DEVELOPMENTAL DISABILITIES AND SPECIAL HEALTH CARE NEEDS. (2)
This course provides a base of core knowledge and experience in interdisciplinary services and supports for persons with developmental 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 persons with disabilities and their families. Lecture, three hours per week. Prereq: Graduate standing and consent of instructor.

HDI 601 INTERDISCIPLINARY APPROACHES TO THE NEEDS OF PERSONS WITH DEVELOPMENTAL DISABILITIES AND SPECIAL HEALTH CARE NEEDS: PRACTICUM. (2)
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 persons with developmental disabilities and/or special health care needs and their families. Lecture: one hour; laboratory: eight hours per week. Prereq: Graduate standing and consent of instructor.

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 persons with developmental disabilities and other special health care needs. Topics covered include: Epidemiology, Prevention of Developmental Disabilities, Micro Environment, Early Childhood, School Age and Adult Issues, Cultural Diversity, the Rural and Underserved Population, Politics, Law and Health Care Reform Issues and Advocacy. Lecture, three hours per week. Prereq: Graduate standing and consent of instructor.

HDI 603 INTERDISCIPLINARY SUPPORTS PRACTICUM. (2)
The course will include practical experiences in interdisciplinary assessments and/or activities, as well as a long-term individualized student practicum. The practicum seminars will focus upon problem-solving strategies in providing high quality supports to persons with developmental disabilities and their families. Lecture: one hour every two weeks; laboratory: eight hours per week. Prereq: Graduate standing and consent of instructor.

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 persons with developmental disabilities and their families. The course will utilize faculty and Institute staff from a wide range of disciplines. Lecture: three hours per week. Prereq: Graduate standing and consent of instructor.

HDI 605 INTERDISCIPLINARY LEADERSHIP PRACTICUM. (2)
This course will include the trainee's individually designed leadership project. Options for projects include: research, development and preparation of grant applications, development and delivery of in service training, or development of evaluation plans. 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: eight hours per week. Prereq: Graduate standing and consent of instructor.

HES Human Environmental Sciences

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.

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 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.)

HIS History

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.

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 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 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 240 HISTORY OF KENTUCKY. (3)
A general survey of the chief periods of Kentucky's growth and development from 1750 to the present.

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 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. (Same as AAS 254.)

HIS 260 AFRICAN 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. (Same as AAS 260.)

HIS 261 AFRICAN 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. (Same as AAS 261.)

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 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 301 HISTORY WORKSHOP: INTRODUCTION TO THE STUDY OF HISTORY. (3)
An introduction to the skills of historical research writing. Preferably to be taken during the sophomore year. Required of all history majors. Prereq: Sophomore standing.

HIS 310 HISTORY THROUGH FICTION AND NON-FICTION. (3)
Texts contrast fictional (novels) and non-fictional accounts of events in U.S. History dealing with major themes and institutions since the American Revolution.

HIS 320 ADVANCED STUDIES IN AMERICAN MILITARY HISTORY. (3)
This course will furnish upper level UK ROTC Cadets, and qualified History majors or minors with the methodological tools and materials needed to gain a more detailed understanding of American Military History and to put together a major research paper. AMS/HIS 320 will emphasize basic research skills: understanding historiographical debates within a military framework, developing effective note taking, outlining techniques, picking a feasible research topic, finding useful primary sources and drawing inferences from them, examining American military campaigns and leaders in order to complete a battle analysis, and short research assignments. Prereq: Consent of instructor (Same as AMS 320.)

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 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 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.

HIS 351 TOPICS IN U.S. HISTORY SINCE 1789. (3)
Same as HIS 350.

HIS 352 TOPICS IN EUROPEAN HISTORY BEFORE 1789. (3)
Same as HIS 350.

HIS 353 TOPICS IN EUROPEAN HISTORY SINCE 1789. (3)
Same as HIS 350.

HIS 360 RACE AND SPORTS IN AMERICA. (3)
This reading seminar examines the history of race and sport in America. (Same as AAS 360.)

HIS 361 AMERICAN INDIAN HISTORY TO 1838. (3)
This course will examine the principle economic, social, and political structures of indigenous communities prior to European colonization of North America, as well as the impact of European contact on American Indian societies. Students will also study the relationships that emerged between American Indians and European colonists (later Americans) from the colonial period to the forced removal of tribes living east of the Mississippi River to the Indian Territory.

HIS 362 AMERICAN INDIAN HISTORY SINCE 1838. (3)
This course considers the continuing evolution of the relationship between indigenous people in North America and the federal government from 1838 to the present. Students will also explore the changing legal status and identity of indigenous peoples in American society.

HIS 370 EARLY MIDDLE AGES. (3)
A survey of European history from the fourth through the mid-10th centuries.

HIS 371 LATER MIDDLE AGES. (3)
A survey of European history from the mid-10th through the 15th centuries.

HIS 385 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 386 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 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 404 U.S. WOMEN'S HISTORY TO 1900. (3)
U.S. women's lives and experiences across cultures and regions from pre-settlement to 1900. Addresses current debates and scholarship in the field.

HIS 405 U.S. WOMEN'S HISTORY SINCE 1900. (3)
U.S. women's lives and experiences across cultures and regions from 1900 to the present. Addresses current debates and scholarship in the field.

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 470 HONORS SEMINAR IN HISTORICAL METHODS. (3)
This course will furnish qualified History majors with the methodological tools that they will need to put together an Honors thesis. It thus serves as the prerequisite to HIS 471 (Honors Seminar in Historical Research). Eligible students will have to complete both courses in order to graduate with departmental honors. HIS 470 will emphasize the honing of basic research skills: understanding historiographical debates, generating detailed bibliographies, developing effective note-taking and outline techniques, picking a feasible research topic, finding useful primary sources and drawing inferences from them, and constructing historiographical arguments in a series of short research assignments. Prereq: The course is open to History majors with a departmental grade-point average of 3.25 after at least 15 hours in history.

HIS 471 HONORS SEMINAR IN HISTORICAL RESEARCH. (3)
This course will furnish qualified History majors with the faculty supervision that they will need to draft and complete an Honors thesis. It thus serves as the sequel to HIS 470 (Honors Seminar in Historical Methods). Eligible students will have to complete both courses in order to graduate with departmental honors. HIS 471 will emphasize the mechanics of historical research and writing: learning how to skim and take notes with a particular research goal in mind; asking thematically pertinent questions of one's evidence; turning that evidence into a compelling argument; preparing a detailed "script" before writing a rough draft; drafting an effective introduction; advancing an argument by pruning irrelevant material; writing with clarity and precision; critiquing the work of other students; and making a persuasive oral presentation of one's own research. Prereq: The course is open to History majors with a departmental grade-point average of at least 3.30 after 15 credit hours in history who have already completed HIS 470 (Honors Seminar in Historical Methods).

HIS 499 SENIOR SEMINAR FOR HISTORY MAJORS (SUBTITLE REQUIRED). (3)
All History majors must complete a senior seminar with a grade of C or better. Topics will vary, but a major is required. May be repeated to a maximum of six credits under different subtitles. Prereq: HIS 301 or permission of instructor.

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 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.

HIS 506 HISTORY OF SEXUALITY IN THE U.S. (3)
An overview of the history of beliefs about sexuality, sexual cultures and norms, and sexuality's relationship to power in American society from the colonial period to the present. (Same as WS 506.)

HIS 507 U.S. LABOR HISTORY. (3)
Provides a background in the history of labor organizations and working class history in the United States from the colonial period to the present.

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 514 SPAIN: FROM RECONQUEST TO EMPIRE, 1200-1700. (3)
This course focuses on the expansion of the Christian kingdoms (Portugal, Castile, and Aragon) in the Iberian peninsula and across the Atlantic. Special attention will be paid to the interaction of Judaism, Christianity, and Islam: cultural transformations, including developments in music, literature, and the arts; political developments in Iberia and the emergence of Spain and Portugal; and the spread of Iberia's trans-Atlantic empires.

HIS 516 SCIENTIFIC WORLDVIEWS BEFORE 1650. (3)
Ideas of natural order and man's place in the cosmos, the interactions of man and environment, the relationship of scientific thought and cultural values, from the ancients to the 16th 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 EUROPE AND THE WORLD IN THE AGE OF REVOLUTION (1760-1815). (3)
A study of the political, social, economic and cultural changes that transformed Europe during the age of the French Revolution and Napoleon, with special emphasis on the relations between Europe and the non-European world during this period.

HIS 525 MODERN EUROPE: 1890-1939. (3)
This course examines European history from 1890-1939. It focuses heavily on the Great War and its aftermath through an analysis of the political cultures of the era. Prereq: HIS 105 or consent of instructor.

HIS 526 EUROPE SINCE 1939. (3)
This course examines the major cultural, social, and political developments that have shaped Europe, European history, and Europe's relationships with the world since the outbreak of World War II. Prereq: HIS 105 or consent of instructor.

HIS 529 WOMEN IN MODERN EUROPE. (3)
This course examines the historical, changing lives of women in Europe from the late eighteenth century to the present. It explores the historical contributions of both ordinary and famous women, as well as their participation in, and contributions to, major political, social, and cultural movements. The course will analyze changes and continues through the lens of gender.

HIS 534 RUSSIA IN THE 19TH CENTURY. (3)
This course examines the social, political, and cultural history of 19th Century Russia in depth, focusing on the social conditions of serfdom and its abolition, the causes of social tension in late Imperial Russia, and the long term causes of the Russian Revolution of 1917.

HIS 535 RUSSIA IN THE 20TH CENTURY. (3)
This course examines the social, political and cultural history of 20th century Russia in depth, focusing on the social conditions that caused the Revolution, the formation of the Soviet Union and its decline.

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 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, 1789-1918. (3)
This course examines the political, social, and cultural history of Germany during the century when it arose from utter defeat by Napoleon to become the strongest economic and military power in Europe, then concludes with Germany's fate in World War I.

HIS 543 GERMAN HISTORY SINCE 1918. (3)
This course examines the history of Germany from the end of World War I until the present, including the Weimar Republic, the Third Reich, the occupation regimes after World War II, East and West Germany from 1949 to 1990, and the reunified Germany since 1990. The main focus of coverage will be on political and social history, with lesser emphasis on cultural, diplomatic, and military history.

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 548 HISTORY OF THE MIDDLE EAST: 1453-1920. (3)
Emphasis is on the history of the Middle East and Balkans from the conquest of Istanbul in 1453 to the end of WWI (1920) covering the Ottoman (1453-1920), Safavid (1501-1724), Qajar (1795-1925) empires. This course focuses on the rise and disintegration of empires, theories of empire building and the reasons for their transformation and demise. Stress is placed on the institutions - military, legal, bureaucratic, religious - of Islamic imperial governance. The origins of Balkan and Middle Eastern nationalisms, including Jewish nationalism, the origins of the modern states and the role that British, French and Russian imperialism played in their creation as well as in their demise during WWI is stressed.

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.

HIS 550 STUDIES IN MID-EAST HISTORY AND POLITICS: (SUBTITLE REQUIRED). (3)
Selected topics on the history of the Middle East and its politics. The specific topics for a given semester will be listed in the class schedule book and the department's website.

HIS 551 FOREIGN POLICIES OF MIDDLE-EAST STATES. (3)
This course focuses on the foreign policies of Turkey, Iran, Israel, and the major Arab countries: Egypt, Iraq, Syria and Saudi Arabia. It will also examine the foreign policies of the smaller Arab countries such as Lebanon, Yemen and the UAE. The emphasis is on the major trends of the foreign policies of these countries since WWII.

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.

HIS 556 THE BRITISH EMPIRE, 1322-1879. (3)
This course covers the rise, fall, and rise of the British empire from its extension into Scotland and Ireland till the beginning of the age of "New Imperialism," explaining the means by which Britain came to dominate one-third of the globe, and its impact on the many cultures, economics, and geopolitical entities of the third world. It will further discuss how those cultures transformed Britain itself. Prereq: Prior experience in HIS 105 strongly recommended.

HIS 557 THE BRITISH EMPIRE AND COMMONWEALTH, 1880-2000. (3)
This course will trace the imperial theme, and the gradual decline and decomposition of Britain's empire from Victoria's day to the present; it will examine decolonization and the blending and clash of cultures, the effect of technology and western ideas on the subject peoples, and their impact on western civilization. Prereq: Prior experience in HIS 105 strongly recommended.

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.

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.

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 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 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 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.

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.)

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.

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 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 621 READINGS IN EARLY MODERN EUROPE, 1450-1648. (3)
This course is designed to give graduate students a grounding in the historiography of Europe from 1450 to 1648. Students should expect to familiarize themselves in the recent trends in political, social, cultural, religious, economic, and intellectual history of the period.

HIS 622 READINGS IN EARLY MODERN EUROPE, 1648-1815. (3)
This course is designed to give graduate students a grounding in the history of Europe from the conclusion of the Thirty Years War to the Era of The French Revolution, with a focus on political, cultural, and intellectual history.

HIS 623 READINGS IN 19TH CENTURY EUROPEAN HISTORY. (3)
Intensive survey of the literature in the political, social, and/or cultural history of nineteenth-century Europe. May be repeated to a maximum of six credits when topical coverage is sufficiently different from one semester to another. Prereq: Graduate status.

HIS 624 READINGS IN EUROPEAN HISTORY OF THE TWENTIETH CENTURY. (3)
A critical survey of problems and literature in the political, social, and cultural history of Twentieth Century Europe. 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 BRITAIN, 1688-1815. (3)
A general graduate-level introduction to the political and social history of Britain from the Glorious Revolution through the French Revolution. Focuses on: Whig justification for revolution, "Rage of Party," Walpolean oligarchy and its "country" critics, agricultural revolution, urbanization, growth of the "middling sort," plebeian culture and the limits of hegemony, growth of national identity and the "fiscal-military" state, social context of the criminal law, Wilkite and American crises. Prereq: Permission of instructor.

HIS 626 BRITAIN, 1792-1914. (3)
This course will provide graduate students with a detailed overview of the history of Britain in the "long" nineteenth century. It will focus on such issues as the impact of the Industrial Revolution, the formation of a recognizably modern class society, the growth of working-class political consciousness, and the politics of class and gender. Prereq: Permission of instructor.

HIS 627 THE BRITISH EMPIRE, 1763-1914. (3)
This course provides graduate students with a detailed overview of several broad themes pertaining to the history of the British empire, 1763-1914: the first imperial crisis, slavery and the slave trade, race as a category of imperial knowledge/power, women's emancipation and the problem of empire, the post-colonial challenge to the "imperial mindset," and the intensification of imperial awareness within Britain itself, c. 1880-1914. Prereq: Permission of the instructor.

HIS 628 COLLOQUIUM ON MODERN EUROPEAN HISTORY. (3)
This course will provide an overview of the major themes and events that have shaped Modern European History from the late 18th century to the present. We will analyze the various ways in which particular historical topics have been interpreted (and reinterpreted) over time, as well as historian's different methodologies, underlying assumptions, and use of evidence. The major goal of the course, however, is to introduce graduate students to significant works and historical debates in Modern European 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)
Intensive survey of the major themes and debates in Latin American History from 1850 to the present. Includes political, economic, social and cultural topics. 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 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. (Same as AAS 654.)

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 657 RACE RELATIONS IN THE UNITED STATES. (3)
This seminar focuses on the African American experience in the United States from Reconstruction to the present. Using primary documents and secondary readings, this course will examine the construction of race relations and the individuals, organizations, events, and issues significant to the shaping of the black experience. (Same as AAS 657.)

HIS 673 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 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.

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 705 COLLOQUIUM IN PRE-MODERN EUROPEAN HISTORY. (3)
Graduate research seminar for students in pre-modern European history. Students will write a research paper of 20-30 pages using primary sources in the original languages. Class time will primarily involve discussion of works in progress, including works by the students and pre-modern European faculty members, as well as discussion of the mechanics of researching and writing history.

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 total 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 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

HJS Hebrew and Judaic Studies

HJS 101 ELEMENTARY HEBREW. (4)
Coverage of Hebrew grammar designed to prepare students to use Hebrew for their particular needs and programs.

HJS 102 ELEMENTARY HEBREW. (4)
Continuation of HJS 101. Prereq: HJS 101 or consent of instructor.

HJS 201 INTERMEDIATE HEBREW. (3)
Hebrew grammar and introduction to the reading of specimens of Hebrew prose. Prereq: HJS 102 or consent of instructor.

HJS 202 INTERMEDIATE HEBREW. (3)
Readings in selected Hebrew authors. Prereq: HJS 201 or consent of instructor.

HJS 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.

HJS 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.

HJS 425 TOPICS IN JUDAIC STUDIES (SUBTITLE REQUIRED). (3)
Variable in content, this course focuses on important texts and issues in Jewish history, religion, literature, and philosophy. May be repeated to a maximum of six credits under different subtitles.

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 MANAGEMENT AND TOURISM. (3)
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 208 INTRODUCTION TO FOOD AND BEVERAGE. (3)
An introductory review of food and beverage terminology, menu development and service for the various segments of the hospitality and tourism industries. Food and beverage demonstrations will be included. A fee to cover materials and activities may be assessed from students. Prereq: For Hospitality Management and Tourism majors only.

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 270 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 320 HOSPITALITY AND TOURISM MARKETING. (3)
This course concentrates on the principles of marketing as they are applied to the hospitality industry. Problems and characteristics specific to the industry will be examined. Additionally this course will be a starting point for the development of a marketing feasibility study and comprehensive plan and strategy for marketing a hospitality operation. Prereq: MKT 300. For Hospitality Management and Tourism majors only.

HMT 330 MEETINGS AND CONVENTION MANAGEMENT. (3)
This course highlights the importance, growth, and economic impacts associated with convention/trade shows to hotels, restaurants, visitors and convention centers, museums, airlines and local governments. Prereq: HMT 120, HMT 210, HMT 270, MKT 300. For Hospitality Management and Tourism majors only.

HMT 345 INFORMATION TECHNOLOGY IN THE HOSPITALITY INDUSTRY. (3)
This course discusses the strategic impact of information technology on the hospitality industry, describes basic functions found in IT applications in the hospitality industry, and devotes time to learning industry-specific applications as well as the Internet. Prereq: CS 101, HMT 120. For Hospitality Management and Tourism majors only.

HMT 350 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.

HMT 359 HOSPITALITY AND TOURISM SPECIAL TOPICS (SUBTITLE REQUIRED) (1-3)
New issues or the in-depth study of issues relevant to hospitality and/or tourism will be offered through this course. Credit hours will vary. May be repeated to a maximum of six credit hours under different subtitles. Prereq: Consent of instructor.

HMT 395 HOSPITALITY AND TOURISM INDEPENDENT STUDY. (1-3)
Independent intensive work on specific topics in hospitality management or tourism. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

HMT 460 ADVANCED SEMINAR IN LODGING AND TOURISM. (3)
This course is a review and application of the principles of hospitality (specifically lodging) and tourism learned in pre-requisite courses. Theory and principles will be applied to decision-making in the hospitality and tourism industry while emphasizing features and characteristics of the industry. Current issues of relevance pertaining to the industry will be discussed to highlight their importance to the industry. Prereq: HMT 120, HMT 210, HMT 270, MKT 300, MGT 301. For Hospitality Management and Tourism majors only.

HMT 470 HOSPITALITY AND TOURISM LAW AND ETHICS. (3)
Students are introduced to the principles of law and their application in the hospitality industry. The focus of the course is on the rights and obligations of hotel, restaurant and travel business managers and professionals in their dealings with customers and other business. Prereq: HMT 120, HMT 210, HMT 270. For Hospitality Management and Tourism majors only.

HMT 480 TRENDS ANALYSIS FOR THE HOSPITALITY INDUSTRY. (3)
The course is designed to acquaint the student with the major trends occurring in the hospitality industry and to develop analytical skills required to interpret them. Throughout the course, the student should be able to identify trends; their timing; the causal effects they have on organizations; the actual probability of their occurrence; and impact they will have on the organization. Prereq: HMT 120, HMT 208, HMT 210, HMT 270, HMT 290. For Hospitality Management and Tourism majors only.

HMT 488 ADVANCED FOOD SERVICE MANAGEMENT SEMINAR. (3)
An integrative and applied course that allows students evaluate strategic planning, decision making and implementation for food service organizations. Prereq: HMT 120, HMT 208, HMT 210, MGT 301, MKT 300.

HMT 499 HOSPITALITY AND TOURISM SENIOR FIELD EXPERIENCE. (3)
Planned managerial work experience of at least 400 hours in a hospitality or tourism 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: 400 hours of verifiable work experience in the hospitality or tourism industry in the last two years. HMT 120, 208, 210, 270 with a grade of C or above.

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 111 WORLD FOOD ISSUES I: SEEDS AND HARVESTS. (3)
In this foundational course you will start from the human past, explore the role of the Agricultural Revolution 10,000 years ago, and address the impacts of those historical influences on current world food issues. Prereq: Admission to the Honors Program.

#HON 115 WORLD FOOD ISSUES II: YOUR DAILY BREAD. (3)
In this course, you will learn about basic human nutrition, critically consider the basis of your own food choices, and evaluate how individual food choices are made in the context of cultural relationships. Prereq: HON 111.

#HON 121 HISTORY OF EMERGING TECHNOLOGIES IMPACT ON SOCIETY: A TIME TRAVEL. (3)
The objective of this course is to examine the short and long term impacts of emerging technologies on the society at large. We will have, in a sense, a time travel to explore how some of the major inventions such as steam engine, compass, and roman aqueducts influenced the society during their times as well as centuries later. We will discuss the technological expectations of a society and the overall mind set prior and after a given technology was introduced. Finally, we will have a speculative study of nanotechnology to explore its potential impact on science, engineering, and the society. Prereq: Membership in the Nanotechnology Track of the Honors Program.

#HON 125 THE SCIENCE & ART OF SMALL: INTRODUCTION TO NANOTECHNOLOGY. (3)
Nanotechnology is a highly interdisciplinary emerging field involving scientists from physics, chemistry, biology, engineering, information technology, metrology, and other fields. This course will define the terminology, promises, and challenges of nanotechnology by exploring the development of the National Nanotechnology Initiative (NNI) and related enterprises. Prereq: Membership in the Nanotechnology Track of the Honors Program (HON 121) or consent of instructor.

#HON 131 SPACE, PLACE, AND CULTURE: AN INTRODUCTION. (3)
A multidisciplinary introduction to the concepts of space and place in culture. Through readings in social and critical theory, as well as analyses of literary texts, film, music, architecture, urban design, and other forms of cultural expression, students explore how places develop meaning for those who inhabit them. Special attention is given to the issue of belonging, the geographies of gender and race, the problem of nationalism in the era of globalization, the fate of the city, and the spatial politics of resistance. Prereq: Membership in the Space, Place, and Culture track of the Honors Program.

#HON 135 SPACE, PLACE, AND CULTURE: TOPICAL SEMINAR II (SUBTITLE REQUIRED). (3)
This course provides an in-depth multidisciplinary study of a specialized topic within the broader area of space, place, and culture. Course topics, which change from year to year, explore cultures of the Middle East, Western Europe, and the Americas by asking how cultural identity is grounded in and shaped by human encounters with geographic place. Prereq: HON 131 and membership in the Space, Place, and Culture track of the Honors Program.

#HON 141 THE SELF AND OTHERS. (3)
This course is designed to give students a multidisciplinary perspective on the social sciences. Specifically, it seeks to introduce students to representative disciplines, guiding themes and salient theories, and paradigmatic social science thinkers and researchers within the broad domain of the social sciences. This interdisciplinary Honors course will provide an intellectual base from which to begin the study of the social sciences. The topics cover the self and others, and they are examined from various Social Science disciplines including Anthropology, Communications, Education, Family Studies, Geography, Political Science, Psychology, Social Work, Sociology, and Statistics. Prereq: Membership in the Social Science track of the Honors Program.

#HON 145 THE SOCIAL CONSTRUCTION OF HUMAN IDENTITY. (3)
This course is designed to give students a multidisciplinary perspective on the social sciences. Specifically, it seeks to introduce students to representative disciplines, guiding themes and salient theories, and paradigmatic social science thinkers and researchers within the broad domain of the social sciences. This interdisciplinary Honors course will continue to provide an intellectual base from which to begin the study of the social sciences. The topics cover the social construction of human identity, and they are examined from various Social Science disciplines such as Anthropology, Communications, Education, Family Studies, Geography, Political Science, Psychology, Social Work, and Sociology. Prereq: HON 141 and membership in the Social Science track of 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 211 WORLD FOOD ISSUES III: LIVING WITH LIMITS. (3)
In this course, you will evaluate the availability of resources to sustain human societies in the future, and consider the prospects of changing food expectations in order to achieve sustainability. Prereq: HON 115.

#HON 221 SOCIAL IMPLICATIONS OF EMERGING TECHNOLOGY. (3)
This course explores the social implications of technology and the production of scientific knowledge in educational, legal, ethical, cultural, and industrial contexts. Prereq: HON 121 (previously HON 101B), HON 125.

#HON 231 SPACE, PLACE, AND CULTURE: TOPICAL SEMINAR II (SUBTITLE REQUIRED). (3)
This course provides an in-depth multidisciplinary study of a specialized topic within the broader area of space, place, and culture. Course topics, which change from year to year, explore cultures of the Middle East, Western Europe, and the Americas by asking how cultural identity is grounded in and shaped by human encounters with geographic place. Prereq: HON 131, HON 135 and membership in the Space, Place, and Culture track of the Honors Program.

#HON 241 TOPICAL SEMINAR IN SOCIAL SCIENCES (SUBTITLE REQUIRED). (3)
This course is designed to provide an in-depth multidisciplinary study of a specialized topic within the social sciences. Topics will vary from year to year, providing students with a diversity of material in the social sciences. The topics are examined from various Social Science disciplines including Anthropology, Communications, Education, Family Studies, Geography, Political Science, Psychology, Social Work, and Sociology. Prereq: HON 141, HON 145 and membership in the Social Science track of the Honors Program.

#HON 242 A SCIENTIFIC APPROACH TO UNCERTAINTY. (3)
This course is designed to give students a multidisciplinary perspective on the interaction of the science and art of statistics in the world around us. Particular attention will be focused on how this interaction has influenced the notion of quantitative argument in the social sciences. Although the course will emphasize ideas of mathematical computations, both will be encountered and explored in depth. Case studies and current social science controversies will be presented and discussed. Methodological arguments and techniques from sampling, experimental design, inference, and regression will be illustrated. Prereq: HON 141, HON 145, and membership in the Social Science track of the Honors Program.

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.

HP Historic Preservation

HP 501 SELECTED TOPICS IN HISTORIC PRESERVATION (SUBTITLE REQUIRED). (3)
Seminars for investigations of selected topics in historic preservation. May be repeated to a maximum of nine credits under different subtitles. Prereq: ARC 324 or consent of instructor.

HP 601 INTRODUCTION TO HISTORIC PRESERVATION. (3)
ARC 601 is an introduction to the field of historic preservation, focusing on the policies and practice of preservation in the United States. It covers preservation legislation, public and private preservation organizations and the organization of preservation practice at local, state and National levels. It emphasizes preservation as a publicly supported endeavor, and presents information about the workings of standard preservation program areas. The National Register of Historic Places, a program marking a threshold for preservation decisions in the United States, receives special attention in this course. Students in the course will experience the process of evaluating the eligibility of a property for listing in the National Register of Historic Places as a class project.

HP 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.

HP 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.

HP 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: HP 610 or consent of instructor.

HP 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.

HP 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.

HP 614 BUILDINGS AND SITES II. (3)
A continuation of HP 612 with emphasis upon advanced interpretive methods, computer applications and technologies. Prereq: HP 612.

HP 616 PRESERVATION DESIGN STUDIO. (3-6)
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, six hours per week. Prereq: Enrollment in program or consent of instructor.

HP 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.

HP 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 HP 602 or consent of instructor.

HP 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.

HP 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.

HP 723 VERNACULAR ARCHITECTURE AND CULTURAL LANDSCAPES. (3)
This course will review Kentucky's vernacular architectural heritage 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.

HP 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: HP 613 or consent of instructor.

HP 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.

HP 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. (Same as ANT 726.)

HP 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, HP 610, 611, or consent of instructor.

#HP 748 MASTER'S PROJECT RESEARCH. (0)
Half-time to full-time work on Master's Project. May be repeated a maximum of six times. Prereq: All course work toward the degree must be completed.

HP 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.

HP 798 MASTER'S PROJECT I. (3)
The Master's Project or Thesis is designed to serve as the capstone of the student's experience in the program as well as an opportunity for students to investigate in-depth a preservation design project or a scholarly essay of substantial length on a topic chosen in consultation with the director and supervised by an appropriate committee chair and committee. Prereq: Admission to the graduate program, and completion of 24 hours of course work.

HP 799 MASTER'S PROJECT II. (3)
This is a sequel to ARC 798. The course focuses the student, under the direction of a committee chair and committee chosen by the director in consultation with the student, on completing the design project or scholarly essay as developed in HP 798. Prereq: 39 hours of course work or consent of instructor.

HS Health Sciences

#HS 500 INTEGRATIVE CARE FOR HEALTH SCIENCES. (1-3)
Integrative care involves using the best possible treatments from both complementary/alternative and allopathic medicine, based on the patient's individual needs and condition. The selection of health care providers should be based on good science and this course will introduce students to complementary and alternative health care providers and the practices and beliefs of these practices as well as the scientific evidence in support of these practices. The course integrates successes from both worlds and describe the safest, least invasive, most cost-effective approach while incorporating a holistic understanding of the individual. May be repeated to a maximum of 3 credits (1 credit didactic and up to two credits experiential/research). (Same as AT 500, CLS 500, CNU 500, CD 500, PA 500, PT 686.)

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 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 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.

HSM Health Services Management

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: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as CLM 351.)

***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: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as CLM 353.)

***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. Prereq: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as CLM 354.)

***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: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as CLM 355.)

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: Professional program status (which includes an earned Associate Degree in a health care discipline and one year of post-degree work in a health care setting) or consent of instructor. (Same as CLM 452.)

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 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.

HSM 602 ORGANIZATIONAL CHANGE AND STRATEGIC PLANNING. (3)
This course is designed to focus on the future needs of the health care organization as contrasted to day-to-day operational management. Strategies for the design and implementation of organizational change including techniques of quality and process improvement will be addressed. The strategic planning components of needs assessment, demands analysis, generation of alternative, priority setting and evaluation form the basis of the course. 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: HA 601 and HA 621.

HSM 603 LEGAL ASPECTS OF HEALTH ADMINISTRATION. (2)
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.

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.

HSM 624 INFORMATION SYSTEMS IN HEALTH CARE. (3)
This course will focus on the life cycle approach to information systems development. Phases of this approach include systems analysis, design, implementation, maintenance and evaluation. This approach has a technological, financial, and human factors component. The decision making and planning role of administration as well as the need on how to maximize the utilization of current systems is stressed. Topics include the information needs of the strategic planning process, administrative function and clinical care. The course will involve site visits. Prereq: HA 602 and 642.

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.

HSM 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.

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.

†HSM 711 PRACTICUM IN HEALTH ADMINISTRATION.

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.

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.

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.

IBS Integrated Biomedical Sciences

IBS 601 BIOMOLECULES AND METABOLISM. (3)
An introductory graduate-level biochemistry course designed to provide a basic knowledge of molecular and biochemical principles necessary for advanced graduate study. Protein structure and function, enzyme catalysis, the generation and storage of metabolic energy, amino acid, nucleotide, and lipid metabolism and biological membranes and transport will be covered. Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents. (Same as BCH 607.)

IBS 602 BIOMOLECULES AND MOLECULAR BIOLOGY. (3)
An introductory graduate-level biochemistry course focused on the cellular mechanisms that underlie the regulated expression of genes, including transcription and translation, as well as basic mechanisms of DNA replication/repair and recombination. Genetic engineering and other experimental approaches critical to molecular biology research will be reviewed. Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents. (Same as BCH 608.)

IBS 603 CELL BIOLOGY. (3)
An introduction to cell biology and signaling focused on cell types and architecture, membrane structure, cytoskeletons, mitochondria, cellular mechanisms of development, cell division, cell cycle, apoptosis and prokaryotic cell biology and modulation by bacterial pathogens. Prereq: CHE 105, 107, 230 and 232; BIO 150, 152; or equivalents.

IBS 604 CELL SIGNALING. (3)
An introductory course on cell biology and signaling focused on inter-and intracellular communication, from the generation of signaling molecules to cellular responses, including transcriptional regulation. Examination of cellular and molecular techniques important to understanding key advances in cell signaling will be included. Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents.

IBS 605 EXPERIMENTAL GENETICS. (3)
An introductory molecular genetics course designed to expose first-year graduate students to contemporary concepts and methods in genetics and genomic analysis. Model systems and classic papers will be presented as paradigms for important genetic principles. Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents. (Same as MI 604.)

IBS 606 INTEGRATED BIOMEDICAL SCIENCES. (4)
Consideration of the function of the mammalian organism from a perspective ranging from the cellular/ sub-cellular to the organ system and whole organ designed to allow students in the IBS curriculum to develop a truly integrative appreciation of biologic function. Prereq: IBS 601, 603 and 605.

IBS 607 SEMINAR IN INTEGRATED BIOMEDICAL SCIENCES. (0)
Weekly seminar devoted to the presentation and discussion of classic and new research. May be repeated to a maximum of four times; two semesters are required as part of the IBS curriculum. Prereq: Admission to IBS curriculum.

IBS 609 RESEARCH IN INTEGRATED BIOMEDICAL SCIENCES. (1)
Individualized laboratory and research experience under the supervision of a faculty member. May be repeated to a maximum of two credit hours. Two semesters required as part of IBS curriculum. Prereq: Admission to IBS curriculum and consent of instructor.

ID School of Interior Design

ID 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.

ID 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.

ID 171 INTERIOR DESIGN PROBLEM SOLVING FUNDAMENTALS. (5)
An introduction to Interior Design fundamentals and problem solving, exploring the built environment and human factors through research, drawing, and visual perception with emphasis on two- and three-dimensional design and the making of objects and interior space. Prereq: School of Interior Design majors only.

ID 172 INTERIOR DESIGN GRAPHICS AND THEORY: DESIGNER AS PROBLEM SOLVER. (5)
A continuation of Interior Design Problem Solving Fundamentals integrating three-dimensional design and human factors based on research, experimentation, programming, and emphasizing professional graphic communication skills. Prereq: ID 171.

ID 234 RESEARCH, BEHAVIOR AND DESIGN THEORY. (3)
A exploration of the relationships between the built environment and people. Topics include human factor issues that relate to the design of interior space, such as personality, preference, proxemics, privacy, culture, symbolism, perception, anthropometrics, universal design and the application of behavioral research to the design process. Concur: ID 274 or consent of instructor.

ID 243 DESIGN THEORY IN THE MODERN ERA. (3)
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, and field trips. Prereq: ID 142 or consent of instructor.

ID 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: ID 151.

ID 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: ID 151 or equivalent and ID 253.

ID 262 INTERIOR BUILDING SYSTEMS. (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: Admission into the ID program and concurrent with ID 274.

ID 263 INTRODUCTION TO DIGITAL MEDIA. (3)
An introduction to various digital media used as a tool within the design professions. Lecture, studio, readings, problem solving, research, field trips. Concur: ID 274.

ID 264 COLOR THEORY. (3)
Study of color theory and its application to the built environment. Aesthetic, psychological, behavioral, social, preferential, and cultural properties of color application are emphasized. A companion studio experience will include color analysis and application. Prereq: Concurrent enrollment in ID 274 or consent of instructor.

ID 272 INTERIOR DESIGN STUDIO I: DESIGNER AS ARTIST. (6)
In-depth application of research to the problem solving process as it relates to defining interior space, creating poetics, and considering human response to the built environment. Model building and drawing skills required. Prereq: Admission to upper division studio and concurrent enrollment in ID 262.

ID 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.

ID 274 INTERIOR DESIGN STUDIO II: DESIGNER AS HUMANIST. (5)
Exploration of shelter. Emphasis on macro and micro issues that influence human factors in design solutions. Examination of shelter precedents and theory for hypothesis testing as a basis of problem solving. Model building, drawing and digital media required. Prereq: Concurrent enrollment in ID 264 and ID 234.

ID 326 INTERIOR DESIGN EXPERIENTIAL PREPARATION. (1)
Preparation for interior design internship or a study abroad experience. Must be taken the semester prior to the internship or study abroad travel experience. Prereq: Successful completion of one ID 370 Vertical Studio. Concurrent enrollment in the second or third ID 370 Vertical Studio.

ID 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: ID 244, ID 254, ID 264 and approval from the Sophomore Portfolio Review. Concur: ID 365.

ID 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: ID 355, ID 365; concur: ID 346.

ID 359 SPECIAL TOPIC IN INTERIOR DESIGN (SUBTITLE REQUIRED). (1-3)
Exploration of specific topics in the profession of interior design. May be offered as a studio or lecture. May be repeated to a maximum of six credits. Prereq: Junior standing or consent of instructor prior to registration.

ID 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: MAT 121; concur: ID 355.

ID 366 LIGHTING DESIGN AND THEORY. (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: ID 274 or consent of instructor.

ID 370 VERTICAL STUDIO. (5)
Continuation of Interior Design Studio sequence with particular focus on design projects at varying levels of complexity. Design problems will correspond to real world design opportunities in differing areas of interior design specialization (i.e., corporate, hospitality, retail, residential, etc.) Sustainable design issues will be explored. Course shall be repeated for a total of 15 hours. Prereq: ID 274 and concurrent enrollment in ID 365 and ID 366 during first enrollment in the ID 370 Vertical Studio sequence.

ID 395 INDEPENDENT STUDY IN INTERIOR DESIGN. (1-3)
Problems involving independent study/library study conforming to the student's special interest under the direction of an appropriate faculty. May be repeated to a maximum of six credits. Prereq: Consent of instructor and contractual agreement.

ID 427 INTERIOR DESIGN OUTREACH EXPERIENCE: INTERNSHIP. (9-12)
A supervised full-time work experience with a professional interior design studio in a metropolitan area preferably outside Lexington. Specific work assignment to be defined by faculty/employer/student contract with a minimum of 450 working hours required during summer term (nine credits) or 600 working hours required during an academic semester (twelve credits). Prereq: ID 326 and successful completion of two ID 370 studios.

ID 428 INTERIOR DESIGN OUTREACH EXPERIENCE: TRAVEL SEMINAR. (9-12)
A study abroad program that investigates design in a foreign culture. Studio experience in combination with on-site lectures and discussions provide opportunity for exploring and solving design problems considering contextual factors and design theories in relation to the locale and precedent. Nine credits earned during summer semester. Twelve credits earned during fall semester. Prereq: ID 326 and successful completion of two vertical studios (ID 370) and faculty consent.

ID 429 INTERIOR DESIGN PORTFOLIO PREPARATION. (2)
A comprehensive review of media and processes leading to the preparation of a professional portfolio. Concur: ID 470.

ID 460 COMPREHENSIVE RESEARCH AND PROGRAMMING. (3)
Detailed research and programming for individual comprehensive studio project. Includes documentation of design issues, research, case studies, and programming, as well as graphic presentation. Prereq: Senior standing and consent of instructor.

ID 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.

ID 470 INTERIOR DESIGN ADVANCED PROBLEM SOLVING: DESIGNER AS CREATOR AND PRAGMATIST. (5)
Studio problems in interior design related to institutional facilities and/or specialized populations, such as education, healthcare and the elderly. Includes custom design, specifications, models and working drawings. Studio experiences, analyses, discussions, readings and field trips. Prereq: ID 427 or ID 428 and three semesters of ID 370.

ID 471 COMPREHENSIVE INTERIOR DESIGN STUDIO. (6)
Comprehensive and integrative solution to a selected design problem in the community. Prereq: ID 460.

ID 480 INTERIOR DESIGN STUDY TOUR. (1-3)
A domestic or foreign study tour to include investigation of interests related to interior design. Professional visits are planned according to particular itineraries. Application and payment dates are determined each semester by the instructor. May be repeated one time if tour destinations are different. Prereq: Priority is given to majors and upperclassmen majors.

ID 490 INTERNSHIP. (3, 6 OR 9)
Supervised experience with a cooperative design or industry establishment. May be repeated to a maximum of nine credits. Prereq: Senior standing and approval of department. Applications must be submitted the prior semester according to a designated schedule established by the School.

ID 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: ID 356.

ID 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: ID 557.

ID 559 SPECIAL TOPIC IN INTERIOR DESIGN (SUBTITLE REQUIRED). (1-3)
Advanced exploration of a specific topic in the profession of interior design. May be offered as a studio and lecture. May be repeated to a maximum of six credits. Prereq: Senior standing or consent of instructor prior to registration.

ID 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.

ID 595 INDEPENDENT STUDY IN INTERIOR DESIGN. (1-3)
Problems involving independent studio and/or library study conforming to the student's special interest under the direction of an appropriate faculty member. May be repeated to a maximum of six credits. Prereq: Senior standing or consent of instructor and contractual agreement.

IEC Interdisciplinary Early Childhood Education

***IEC 120 INTRODUCTION TO EARLY CHILDHOOD EDUCATION. (3)**
An introduction to the history of early childhood education and an overview of current laws and best practices. Discussions will include issues impacting families and current research in early childhood education.

#IEC 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. Prereq: PSY 223 (for FAM 254) or FAM 255. (Same as FAM 256.)

***IEC 260 CURRICULUM PLANNING IN INTERDISCIPLINARY 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: IEC 120, FAM 255, and IEC/FAM 256.

***IEC 411 STUDENT TEACHING IN INTERDISCIPLINARY EARLY CHILDHOOD EDUCATION. (12)**
Course designed to give students experience with supervised teaching at the preprimary 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.

***IEC 507 ASSESSMENT OF YOUNG CHILDREN. (3)**
An introduction and application of assessment and measurement 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. Prereq: FAM 255, admission to Teacher Education Program or enrollment as required/elective course for IEC graduate students. Co-Requisite: To be taken with IEC 508, 509 and 510.

***IEC 508 ADVANCED CURRICULUM PLANNING IN INTERDISCIPLINARY EARLY CHILDHOOD EDUCATION. (3)**
Study of the child's development of reasoning, concept formation, and perception of reality. 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, English, arts and humanities, health education and physical education within various curriculum models. Prereq: Six hours of child development and admission to the Teacher Education or enrollment as required/elective course for IEC graduate students. Coreq: IEC 507, 508 and 510.

***IEC 509 INTERVENTION PLANNING FOR CHILDREN WITH SPECIAL NEEDS. (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 assessment and promoting attainment of cognitive, language, social, self-help, and motor skills. Prereq: EDS 375 or EDS 203 and admission to the Teacher Education Program or enrollment as required/elective course for IEC graduate students. Coreq: IEC 507, 508 and 510.

#IEC 510 PRACTICUM IN INTERDISCIPLINARY EARLY CHILDHOOD EDUCATION. (3)
This course is the field based component of the Early Childhood block (IEC 507, 508 and 509) and is taught concurrently with these courses. This course provides an opportunity for students to demonstrate application of readings and content from the Early Childhood block courses. Prereq: Admission to Teacher Education Program or enrollment as required/elective course for IEC graduate students. Co-requisite: IEC 507, 508, and 509.

#IEC 512 LANGUAGE AND LITERACY FOR YOUNG CHILDREN. (3)
An overview of early language and merging literacy skills in young children. Will prepare future early childhood service provides to evaluate and plan developmentally appropriate environments to promote oral and written language and literacy. Prereq: Admission to TEP or enrollment as required/elective course for IEC graduate students.

***IEC 522 CHILDREN AND FAMILIES. (3)**
The purpose of this course is to provide students with information related to working with young children with and without disabilities and their families. This course will focus both on presenting new information and providing opportunities for students to practice skills necessary for working with families. (Same as EDS 522.)

#IEC 546 TRANSDISCIPLINARY SERVICES FOR YOUNG CHILDREN. (3)
This course will focus on the philosophical issues related to teaching young children with multiple disabilities. Topics related to planning for the population of children, participants in the areas of communication, physical and motor development, health, vitality and sensory input will be presented. Strategies presented for planning will include transdisciplinary assessment persons centered planning and activity based instruction. Prereq: EDS 375 or EDS 600. (Same as EDS 546 and RC 546.)

***IEC 552 ADMINISTRATION AND SUPERVISION IN INTERDISCIPLINARY 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: IEC 260 or consent of instructor.

#IEC 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. (Same as FAM 557.)

***IEC 620 INSTRUCTIONAL PROGRAMMING AND ASSESSMENT IN INTERDISCIPLINARY EARLY CHILDHOOD 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 EDS 600 and IEC 509 or equivalent or permission of instructor.

***IEC 621 ISSUES IN EARLY CHILDHOOD SPECIAL EDUCATION. (3)**
Students will review, discuss and participate in issues in general and inclusive discussion and learning experiences related to the preparation of special education teachers. Discussion will include issues in general and inclusive special preschool programs, infant intervention programs, interdisciplinary child evaluation, instructional methods, and materials; and local, state and federal initiatives related to early childhood special education. Prereq: EDS 375 or EDS 600 and IEC 509 or equivalent or permission of instructor.

***IEC 623 ADVANCED PRACTICUM: INTERDISCIPLINARY EARLY CHILDHOOD EDUCATION. (3-9)**
This course will provide supervised field experience in preparation of teachers or supervisors in interdisciplinary early childhood education. While enrolled in this course, students will be required to apply for the Teacher Education Program. May be repeated to a maximum of nine credit hours. Prereq: Admission to Master's program or permission of instructor.

***IEC 710 CURRENT TRENDS IN INTERDISCIPLINARY EARLY CHILDHOOD EDUCATION. (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.

INF Informatics

INF 401G INFORMATICS FUNDAMENTALS. (3)
An introduction to the fundamentals of informatics for students in a broad array of disciplines. Fundamentals of computer science, including programming, operating systems, database management, and networking will be covered. Not accepted as credit towards a degree in computer science. Prereq: Junior standing.

INF 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. Prereq: BIO 315 or BIO 304 or BCH 401 or BCH 501 or BCH 502 or BIO 510 or consent of instructor. (Same as BIO 520.)

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. Prereq: ISC pre-majors only or consent of instructor.

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 pre-major status; 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 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: JOU 101, TEL 101, or ISC 161. (Same as JOU/TEL 319.)

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; cannot be taken concurrently with ISC 451.

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; cannot be taken concurrently with ISC 461.

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. 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 audience, 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. Prereq: Concurrent or previous enrollment in ISC 311 and ISC 321; cannot be taken concurrently with ISC 351.

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: Concurrent or previous enrollment in ISC 311 and ISC 321; cannot be taken concurrently with ISC 361.

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 COMMUNICATION CAMPAIGNS. (3)**
An advanced course which enables students to unify strategic and tactical abilities developed in their research, creative, account management, 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. Prereq: Completion of Major Path or consent of instructor.

ISC 497 SPECIAL TOPICS IN ISC (SUBTITLE REQUIRED). (3)
This course will focus on selected topics of industry practice associated with the integrated fields of strategic communication. Title assigned each time the course is offered. May be repeated with different subtitles to a maximum of six credits. Prereq: Variable, given when topic is identified.

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.

ISP International Studies Program

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.

ITA Italian

#ITA 011 ITALIAN FOR READING. (3)
Designed to meet the needs of upper division and graduate students who are preparing for the graduate reading examination or who need reading knowledge of Italian in their minor.

ITA 101 ELEMENTARY ITALIAN. (3)
A study of the grammar and composition of Italian.

ITA 102 ELEMENTARY ITALIAN. (3)
A continuation of ITA 101. Prereq: ITA 101.

ITA 201 INTERMEDIATE ITALIAN. (3)
Review of grammatical principles and readings of selected Italian works. Prereq: ITA 102.

ITA 202 INTERMEDIATE ITALIAN. (3)
A continuation of ITA 201. Prereq: ITA 201.

ITA 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.

ITA 295 ITALIAN CONVERSATION AND COMPOSITION. (3)
Italian conversation and composition. Prereq: ITA 202 or equivalent.

ITA 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.

ITA 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: ITA 295 or ITA 296.

ITA 443G SURVEY OF ITALIAN LITERATURE I. (3)
A survey of Italian literature from its beginnings to the 17th century. Prereq: ITA 202.

ITA 563 STUDIES IN DANTE. (3)
Either the *Vita Nuova* and the *Divina Commedia*, *Inferno* or the *Divina Commedia*, *Purgatorio* and *Paradiso*. Prereq: ITA 443G.

ITA 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: ITA 543 or 544 or consent of instructor.

ITA 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.

JAT Journalism, Advertising, and Telecommunications

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 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.

JOU Journalism

JOU 101 INTRODUCTION TO JOURNALISM. (3)
This course surveys the history and social theories of journalism and introduces students to contemporary journalistic practice. Students will learn about the function and operation of print, electronic and on-line news media. Issues and concepts to be covered include the relationship of government to media; press freedom and controls; media ethics, and the impact of global communications. The course also covers the relationship of journalism to advertising, public relations and telecommunications, particularly with regard to new technologies. Prereq: JOU pre-majors only or consent of instructor.

JOU 204 WRITING FOR THE MASS MEDIA. (3)
An introduction to the concepts and techniques of media writing. This course offers hands-on instruction in information gathering, organization, and writing for print, broadcast and on-line media. Lecture, one hour; laboratory, four hours per week. Prereq: JOU pre-major status; JOU 101 or consent of instructor. (Same as CLD 204.)

JOU 250 ETYMOLOGY. (3)
A study of words and their fundamental values with reference to development of a writing vocabulary. (Same as ENG 201.)

***JOU 301 NEWS REPORTING.** (3)
A course designed to develop skills in information gathering, news judgment, organization and writing. Students will learn to cover breaking news and write features. Lecture, two hours; laboratory, two hours per week. Prereq: JOU/CLD 204 or equivalent. (Same as CLD 301.)

JOU 302 RADIO AND TV NEWS REPORTING. (3)
An introduction to principles of broadcast writing and reporting. Students will complete assignments in class and at WUKY-FM, where they will prepare segments for newscasts under the supervision of the station's news director. Students also will learn to shoot and edit videotape and to prepare TV news reports. Lecture, two hours; laboratory, two hours per week. Prereq: JOU 204.

JOU 303 NEWS EDITING. (3)
Instruction and practice in copy desk operation and the duties and ethics of copy editors. Topics include techniques for editing stories, handling wire copy, writing headlines and news judgment. Emphasis on electronic editing. Lecture, one hour; laboratory, four hours per week. Prereq: JOU 204.

JOU 304 BROADCAST NEWS DECISION MAKING. (3)
This class is designed to sharpen students' news judgment and teach them the skills they will need to become assignment editors and producers of radio and television newscasts. Students will study the content and selection of news stories, using audio materials from such sources as National Public Radio, and visual materials from CNN Newsource. Lecture, two hours; laboratory, two hours per week. Prereq: JOU 302.

***JOU 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: JOU 101, TEL 101, or ISC 161. (Same as ISC/TEL 319.)

JOU 330 WEB PUBLISHING AND DESIGN. (3)
This course is designed to teach students to code and display information effectively on the Internet. Students will be introduced to basic techniques and strategies for publishing, designing and managing a web site for a newspaper, magazine, television station, advertising agency or public relations firm. Lecture, two hours; laboratory, two hours per week.

JOU 387 PHOTOJOURNALISM I. (3)
A hands-on introduction to the use of cameras and laboratory equipment in contemporary news photography. Selected readings on photographic methods and the ethics of photojournalism. Lecture, two hours; laboratory, two hours per week.

JOU 403 TV NEWSCAST PRODUCING. (3)
This class is designed to train students to become television newscast producers. Students will prepare TV newscasts with consideration of news story placement as it relates to audience, viewing trends, and journalistic judgment. Students will learn critical thinking skills in producing as it relates to newscast and story promotion, reacting to major news events and their coverage, and talent and time management. Students will be required to write news stories in different formats for different formats for different newscasts and address ethical and legal concerns of news stories.

JOU 404 ADVANCED TV NEWS: JAT NEWS. (3)
Students in this class produce a half-hour, TV newscast shown on a cable channel to 60,000 homes in the Lexington area. Students will hone their writing skills and their proficiency in shooting and editing videotape, serving as producers, writers, videographers, reporters and anchors. May be repeated for up to six hours credit, with permission of instructor. Lecture, one hour per week; laboratory, four hours per week. Prereq: JOU 302.

JOU 409 MAGAZINE ARTICLE WRITING. (3)
An advanced writing course designed to teach students to generate, report and write feature stories for magazines and to market free-lance articles. Lecture, two hours; laboratory, two hours per week. Prereq: JOU 301.

JOU 410 PUBLICATIONS PRODUCTION. (3)
Study of theory and practice in the techniques of effective communication through print. Primary emphasis will be on magazines, but other publications will be considered. Instruction in the processes of defining the purpose of, designing and producing a publication. These include: planning, design, article grading and editing, picture selection, page layout, headline and title writing. Lecture, two hours; laboratory, two hours per week. Prereq: JOU 301 and 303.

JOU 415 DESIGN AND LAYOUT: (SUBTITLE REQUIRED). (1)
This course will familiarize students with computer programs used in publication design. Students develop their skills through hands-on exercises and projects. May be repeated to a maximum of three credits under different subtitles. Prereq: Will be determined by topic of course.

JOU 430 MEDIA MANAGEMENT AND ENTREPRENEURSHIP. (3)
An introduction to news media management focusing on start-up, design and operation of newspapers and magazines. This course takes an intensive look at the editorial content, advertising, business and management side of journalism. Lecture, two hours per week; laboratory, two hours per week.

JOU 455 MASS MEDIA AND DIVERSITY: (SUBTITLE REQUIRED). (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. May be repeated to a total of nine hours under different subtitles.

JOU 460 JOURNALISM IN SECONDARY EDUCATION. (3)
A course designed to familiarize students with a variety of legal and ethical issues facing student journalists and media advisers in secondary schools. Prereq: JOU 301 or JOU 302.

***JOU 485 COMMUNITY JOURNALISM. (3)**
A study of all aspects of small town and suburban newspapers, including editorial, advertising, circulation and management. Lecture, two hours; laboratory, two hours per week. Prereq: JOU/CLD 301. (Same as CLD 485.)

JOU 487 PHOTOJOURNALISM II. (3)
An in-depth study of the many facets of photojournalism from the photo editor's perspective. Students will shoot assignments and will also probe the legal and ethical aspects of news photography. Lecture, one hour; laboratory, four hours per week. Prereq: JOU 387.

JOU 497 SPECIAL TOPICS IN JOURNALISM: (SUBTITLE REQUIRED). (1-3)
Course will focus on selected topics drawn from journalism and related fields. Title assigned each time course is offered. May be repeated with different subtitles to a maximum of six credits.

JOU 499 ADVANCED WRITING FOR THE MASS MEDIA: (SUBTITLE REQUIRED). (3)
A course designed to provide journalism majors advanced training in reporting and writing articles on current events, public issues, personalities, culture and entertainment for the print and electronic media. Areas of emphasis will vary each semester. These include reporting on business, the arts, government and sports. May be repeated to a total of nine credits with different subtitles. Lecture, two hours; laboratory, two hours per week. Prereq: JOU 301 or JOU 302.

JOU 531 MEDIA LAW AND ETHICS. (3)
A study of the legal and ethical issues facing the mass media. The course will focus on the rights, constraints and responsibilities under the U.S. Constitution, federal and state statutes, administrative law, common law and voluntary codes of ethics. Specific topics include libel, privacy, contempt, copyright, broadcast regulation, the court systems, commercial speech, prior restraint, access, the civil and criminal judicial processes and obscenity.

JOU 532 ETHICS OF JOURNALISM AND MASS COMMUNICATION. (3)
An examination of ethics in journalism and mass communication focusing on the social, political and economic context of ethical issues. Students will reason through issues of value that arise in the practice of journalism.

JOU 535 HISTORY OF JOURNALISM. (3)
A study of the development of American journalism, with emphasis on the evolution of newspapers and electronic news media. Examination of principles and social theory underlying the practice of journalism.

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 283 JAPANESE FILM. (3)
Study of Japanese films as an expression of Japanese culture. Viewing of films outside of class required. (Same as ENG 283.)

JPN 301 ADVANCED JAPANESE I. (3)
This course is primarily a course in contemporary Japanese culture, but serves as a third year language course. The "texts" will consist of contemporary written materials (books, magazines, newspapers) and visual materials (tv programs, movies) and will exercise the four skills (reading, writing, listening, speaking) studied in the first four semesters of the language. By building on the skills learned in the initial semesters, this course will continue and strengthen the oral and aural, written and reading skills in Japanese, for students who have studied the equivalent of two years of Japanese language. Further, this course will emphasize the speaking and listening skills. It is paired with JPN 302, a course emphasizing reading and writing skills. Thus, students who complete this course will be able to communicate at a rather sophisticated level of Japanese on a variety of contemporary topics within Japanese society. Prereq: JPN 202 or permission of instructor.

JPN 302 ADVANCED JAPANESE II. (3)
This course is primarily a course in contemporary Japanese culture, but serves as third year language course. The "texts" will consist of contemporary written materials (books, magazines, newspapers) and visual materials (tv programs, movies) and will exercise the four skills (reading, writing, listening, speaking) studied in the first four semesters of the language. By building on the skills learned in the initial semesters, this course will continue and strengthen the oral and aural, written and reading skills in Japanese, for students who have studied the equivalent of two years of Japanese language. Further, this course will emphasize the reading and writing skills. It is paired with JPN 301, a course emphasizing speaking and listening skills. Thus, students who complete this course will be able to communicate at a rather sophisticated level of Japanese on a variety of contemporary topics within Japanese society, and will be comfortable within Japanese print media. Prereq: JPN 301.

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. (Same as ANT 321.)

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 400G TOPICS IN JAPAN STUDIES (SUBTITLE REQUIRED). (3)
Variable in content, this course focuses on important texts and issues in Japanese history, religion, literature, and philosophy. May be repeated to a maximum of six credits under different subtitles. To be taught in English.

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.

JPN 420G PRE-MODERN LITERARY AND VISUAL ARTS OF JAPAN. (3)
This course will introduce representative literary and visual arts of Japan, from antiquity until the mid-nineteenth century. This serves as an introduction to intellectual and societal undercurrents foundational to understanding Japanese society.

JPN 421G CONTEMPORARY LITERARY AND VISUAL ARTS OF JAPAN. (3)
This course will introduce the literary and visual arts of the last 150 years (since the Meiji period) of Japan. This serves as an introduction to intellectual questions that have enlivened Japanese society in the last century and a half, key to understanding contemporary Japanese culture.

JPN 451G SOCIAL MOVEMENTS IN MODERN JAPAN. (3)
This course will explore selected movements within Japan that have arisen in the last one hundred and fifty years. This course will ask questions about the specific nature of these movements, the context of these movements within Japan, and within the context of other movements around the world, whether contemporary in time or theme.

JPN 461G JAPANESE COLONIALISM AND ITS LEGACIES. (3)
This course will explore the making and unmaking of Japanese colonialism and its postwar legacies via a number of media. Geopolitically, the course will be organized in terms of the changing boundaries, and their representations, of the Japanese empire. We will also incorporate the following related perspectives in order to examine some of the basic problems of Japanese colonialism which contemporary Japan has not completely left behind.

JPN 491G JAPANESE LANDSCAPES. (3)
A study of the landscapes of Japan as vivid portrayal of Japanese culture and their value system, including review and analysis of major primary and secondary components of the Japanese landscape. Prereq: JPN 334 or GEO 334 or consent of instructor. (Same as GEO 491G.)

JPN 551 JAPANESE MULTINATIONAL CORPORATIONS. (3)
A study of the giant Japanese multinational corporations in the world economy and their impact on development and environment of selected countries. Topics include: geographical organization of multinational corporate system; their locational decisions; affect of multinationals policies on the environment; and local economy. Prereq: Consent of instructor. (Same as GEO 551.)

KHP Kinesiology and Health Promotion

KINESIOLOGY

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 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 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 EDUCATIONAL GYMNASTICS. (1)
The primary goal of the course is to equip the student with the skills necessary to effectively teach gymnastics and tumbling skills in the schools. Students will learn safety procedures, skill sequencing, and progressions that are recommended for students in pre-school through middle school. Students will learn to analyze skills and prepare appropriate lesson plans. Laboratory, six hours per week for one-half semester or three laboratory hours per week per semester. Prereq: Demonstrated competence and PHED, KINE majors only.

KHP 157 TRACK AND FIELD. (1)
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, three hours per week.

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. Prereq: KINE/HEPR/KHPR majors only.

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.

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 210 INTRODUCTION TO FITNESS: (SUBTITLE REQUIRED). (2)
Designed to familiarize the professional physical education student with the theory, techniques, and practices of physical fitness and conditioning. Understanding of the basic principles and an attainment of above average personal 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. Prereq: PHED, KINE majors only.

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 250 TEAM SPORTS: (SUBTITLE REQUIRED). (2)
This course is designed to familiarize the professional physical education student with the skills, practices, techniques, rules, and strategies of the sports of: soccer, volleyball, and team handball. The primary goal of the course is to equip the student with the skills necessary to effectively teach these three sports in both the upper elementary and secondary schools. Development of at least an intermediate skill level is expected of the students. Laboratory: Six hours per week for one semester. Prereq: KINE or PHED major.

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 260 INDIVIDUAL SPORTS: (SUBTITLE REQUIRED). (2)
This course is designed to familiarize the professional physical education student with the skills, practices, techniques, rules, and strategies of the sports of: golf, tennis, and badminton. The primary goal of the course is to equip the student with the skills necessary to effectively teach these three sports in both the upper elementary, middle, and secondary schools. Development of at least an intermediate skill level is expected of the students. Laboratory: six hours per week for one semester. Prereq: KINE or HEPR major.

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. Prereq: KINE/HEPR/KHPR majors or permission of the instructor.

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.

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 319 SPORTS OFFICIATING. (1)
This course will provide students with introductory knowledge, interpretations skills, and mechanical techniques of officiating. Prereq: KHP major or permission of instructor.

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 KHP Teacher Education Program.

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: Admission to KHP Teacher Education Program.

KHP 361 FIELD EXPERIENCES. (1)
Field experiences with elementary school age children, P-12. Prereq: Admission to the KHP Teacher Education Program.

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.

KHP 391 JAZZ DANCE I. (2)
Theory and practice of jazz dance from early 20th century to present. Lecture, one hour; laboratory, two hours.

KHP 392 JAZZ DANCE II. (2)
Intermediate jazz dance emphasizing contemporary techniques and styles. 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 STUDY IN KINESIOLOGY AND HEALTH PROMOTION. (3)
May be repeated to a maximum of 12 credits. Prereq: Major and 3.0 standing in area or consent of instructor.

KHP 396 DANCE PEDAGOGY FOR MIDDLE AND HIGH SCHOOL. (3)
This is a comprehensive study of teaching methods and materials for teachers of middle and high school students. Prereq: KHP 390 and/or KHP 393.

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 209, PGY 206 or equivalent. Junior, senior or graduate standing.

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 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 644 RESEARCH TECHNIQUES APPLIED TO KINESIOLOGY AND HEALTH PROMOTION. (3)
A critique of research procedures for purposes of developing more efficient research designs applicable to problems in kinesiology and health promotion. 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 AND FITNESS MARKETING. (3)**
An introduction to the broad area of sport and fitness marketing to include a focus on marketing management as it applies to sport, the general nature of the sport and fitness consumer, pricing strategies and promotions, licensing, and the role of research in sport marketing.

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 KINESIOLOGY AND HEALTH PROMOTION. (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 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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.

KHP 782 INDEPENDENT RESEARCH IN KINESIOLOGY AND HEALTH PROMOTION. (3)
Systematic investigation of a problem selected from the areas of kinesiology and health promotion. May be repeated to a maximum of nine credits.

SPORT MANAGEMENT

KHP 570 PLANNING AND MANAGEMENT OF FACILITIES FOR SPORT. (3)
An introduction to the planning 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 KHP major 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 577 PRACTICUM IN KINESIOLOGY AND HEALTH PROMOTION. (3-6)
Extensive practical work experiences with qualified practitioners and KHP faculty. Prereq: KINE, HEPR, KHPR majors only.

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)
An overview of the broad field of sport management with an emphasis on (1) the historical, political, sociological and economic parameters that influence sport; and (2) the issues related to sport and business in society and their application to sport organizations. Prereq: Sport Management graduate student or permission of instructor.

HEALTH PROMOTION

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 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 674 FOUNDATIONS OF HEALTH PROMOTION. (3)
This course is designed to provide students with the foundations of health promotion and education including history, philosophy, and ethics in the field. Prereq: Health-related background and/or course work. Consent of the instructor.

KHP 675 HEALTH ASSESSMENTS. (3)
This course presents concepts and skills related to assessing health status at the individual and community level in a wellness environment. Emphasis is placed on, but not limited to, physical and psychological components of health. Prereq: Completion of/or in concurrent enrollment in KHP 674 or equivalent. Consent of the instructor.

KHP 677 PLANNING HEALTH PROMOTION PROGRAMS. (3)
This course addresses principles of planning, designing, implementing, and evaluating health promotion and education programs. Prereq: KHP 674 or equivalent/ Consent of the instructor.

EXERCISE SCIENCE

#KHP 350 STRENGTH AND CONDITIONING FOR SPORTS. (3)
The course addresses the fundamental principles of Exercise Science specifically as they relate to the conditioning of athletes. The course will also review concepts essential for successful completion of the National Strength and Conditioning Association's CSCS exam. Prereq: ANA 209, PGY 206, KHP 120.

#KHP 450 INTRODUCTION TO EXERCISE TESTING AND PRESCRIPTION. (3)
The course addresses fundamental principles of Exercise Science specifically as they relate to the testing and exercise prescription of apparently healthy individuals and individuals with controlled disease. The class will review concepts essential for successful completion of the American College of Sports Medicine Certified Personal Trainer and Health Fitness Instructor exams. Prereq: ANA 209, PGY 206.

KHP 600 EXERCISE STRESS TESTING AND PRESCRIPTION. (3)
Knowledge required for the administration of an exercise stress test with implications for writing an exercise prescription. Content covers healthy individuals as well as those with various health problems such as heart disease, hypertension, mental illness and diabetes. Course implements the Guidelines of the American College of Sportsmedicine in preparing a specialist in exercise stress testing. Lecture, two hours; laboratory, two hours per week. Prereq: PGY 206, KHP 420G, consent of instructor.

KHP 610 MOTOR CONTROL I: MUSCLES, STRENGTH AND MOVEMENT. (3)
This course will teach the relationship between muscle forces and movement control, understanding of neuromuscular and musculoskeletal interactions. Prereq: Anatomy, Physiology

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 617 GAIT ANALYSIS. (3)
This course is a graduate level experience into the analysis of human gait. Walking, running, and pathological gait will be studied. Prereq: KHP 615 or similar course.

KHP 618 WORK HARDENING AND ERGONOMICS. (3)
A study of the basic areas of ergonomics including: anthropometric principles, repetitive motion disorders, low back pain, design of manual handling tasks, and job evaluation tools. The class will also discuss important government documents such as the NOISH Lifting equation and the Americans with Disabilities Act. Prereq: 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 640 LAB METHODS IN EXERCISE SCIENCE. (3)
Introduces students to measurement techniques used in exercise science. Emphasis is placed on calibration of instruments and on concepts of accuracy, validity and reliability. Prereq: Consent of instructor.

KHP 650 MOTOR CONTROL II: REFLEXES, COGNITION AND MOVEMENT. (3)
This second course in the motor control sequence introduces recent theories on how cord and brain function to aid in movement control. Prereq: Anatomy & Physiology, Motor Control I, or 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.

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. Graduate credit will be limited to Master's students enrolled in the Historic Preservation graduate program and the awarding of graduate credit in each case requires the approval of the Director of Graduate Studies in Historic Preservation.

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, junior/senior, or graduate student, CS 101, FOR 200 or GEO 415, or permission of instructor. (Same as NRC 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 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 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/SOC 555/NRC 555 and either STA 291 or STA 570. (Same as NRC 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".

LAS Latin American Studies

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 361 LATIN AMERICAN LITERATURE IN TRANSLATION (SUBTITLE REQUIRED). (3)
This course examines particular authors, periods, regions, cultural events, or movements from Latin America. Special attention will be paid to links between literature and culture, politics and society through reading, discussion, and writing assignments to be conducted in English. Course may be repeated under different titles to a maximum of six credits. (Same as SPA 361.)

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.

LAW Law

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. (4)
Intentional torts and defenses, negligence, causation, duties of occupants of land and manufacturers and vendors of chattels, contributory negligence, strict liability, deceit, defamation, malicious prosecution, interference with advantageous relations.

LAW 807 PROPERTY. (4)
Basic course in property; possession, gifts, bona fide purchasers of personalty. Estates, uses, easements, and rights incident to ownership.

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 813 CAPITAL PUNISHMENT. (3)
This course provides an examination of history, purpose and constitutionality of capital punishment. The course will also discuss death penalty eligibility/offenses and will provide an international perspective.

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 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 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 829 CORPORATE TRANSACTIONS IN HEALTH CARE.

LAW 830 HEALTH LAW I. (3)
This course examines the regulation of health care access, cost and quality. It will cover public and private market rules controlling access to health care, cost containment rules, and regulations regarding the quality of health care.

#LAW 832 MEDICAL LIABILITY. (3)
This course examines the liability issues that arise from the provision of medical care. The course studies the physician/patient relationship, when it begins and how it can be terminated. It examines the extent of the duties owed by providers to patients, including requirements relating to confidentiality, informed consent and records disclosure. The course also provides a detailed treatment of the common law of provider liability, focusing on medical malpractice. The course also examines the question of legislative reform of medical liability.

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 838 LAW AND RELIGION. (3)
The relationship of law to religion with emphasis on the establishment and free exercise clauses of the First Amendment. Prereq: LAW 822.

LAW 842 SPORTS LAW. (3)
Surveys regulatory and contractual aspects of this multi-million dollar industry. Includes issues related to intercollegiate athletics; professional recruitment and contracting; labor and anti-trust issues; liability issues and other related topics.

#LAW 845 JURISPRUDENCE. (3)
This course presents a survey of the various schools of legal philosophical thought, with an emphasis on exploring how these intellectual "value systems" necessarily inform judges' decisions, and how they might therefore influence one's choice of legal argument in a given case. The course will include readings from formalism, legal positivism, process theory, legal realism, law and economics, critical legal studies, feminist legal theory, and critical race theory, among others.

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. (2)
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 864 REAL ESTATE TRANSACTIONS. (3)
This course covers numerous issues related to real estate conveyancing, including contractual issues, title assurance, and financing the transactions. Prereq: Property.

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 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 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 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. (2-3)
This course focuses on the basics of payment transactions using check and other negotiable instruments. In the longer version of this course, coverage will also include the regulatory structure governing modern electronic payment systems. Prereq: Basic Uniform Commercial Code.

LAW 882 SECURED TRANSACTIONS. (3)
This course focuses on secured credit transactions and will include an examination of contemporary bank lending practices.

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 888 CONSTRUCTION LAW. (2-3)
This course covers particular legal issues relating to construction designs, procurement, contract interpretation, performance subcontracts, bonds and insurance, and conflict resolution approaches.

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 913 ADVANCED LEGAL RESEARCH. (2)
This two credit course is designed to assist third-year law students improve their legal research skills by introducing them to a number of research tools not covered in first-year legal research instruction. Besides exposure to legal research material, students will apply research strategies to in-class and out-of-class assignments.
Topics covered include: review of basics; secondary authority; international, foreign and transnational law; statutory and legislative history research; administrative law; tax research; securities law; environmental and criminal law; banking and labor law; family and employment law; and looseleaf, trial practice and ALR materials. These topics will be examined using traditional legal research methodology, as well as CD-ROM, INTERNET and on-line databases. Prereq: Open only to third year students.

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 916 CHILDREN AND THE LAW. (2-3)
When offered for two credit hours: allocation of rights between the state and parents, management/control of minor's property, child protective services (abuse, dependency, and neglect), status offenses, termination of parental rights, foster care, and adoption. When offered for three credit hours: allocation of rights between the state and parents, management/control of minor's property, child protective services (abuse, dependency, and neglect), status offenses, termination of parental rights, foster care, adoption, medical decision-making, education rights, and juvenile justice (transfer hearings, and sanctions).

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 921 ELECTION LAW. (3)
This course looks comprehensively at the law governing the political process and democratic self-government. Topics covered include legislative redistricting, campaign financing laws, the regulation of political parties, the Voting Rights Act, and 'direct democracy' initiatives (such as binding public referendums). The course also addresses the alternative electoral structures being explored by many U.S. cities, such as proportionate representation, cumulative voting and transferable vote systems. Students interested in law, government and democratic theory are encouraged to enroll.

LAW 923 INTERNATIONAL ENVIRONMENTAL LAW. (2-3)
This course will cover sources and forms of international environmental law developing principles and international responses to global environmental problems.

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 INTELLECTUAL PROPERTY. (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 936 INTELLECTUAL PROPERTY TRANSACTIONS. (2 OR 3)
Intellectual Property Transactions deals with legal problems in the commercialization of intellectual property. It covers, among other things, license, confidentiality agreements, and intellectual property financing. Prereq: LAW 935 or permission of the instructor.

LAW 937 INTERNATIONAL TAX. (3)
This course examines the U.S. federal income tax implications of international transactions, covering both inbound and outbound transactions. Prereq: LAW 860.

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 957 DEPARTMENT OF PUBLIC ADVOCACY INNOCENCE PROJECT EXTERNSHIP. (2-3)
Students will work under the supervision of field instructors and mentors on investigating claims of innocence by inmates. The course includes a classroom component. May be repeated to a maximum of 4 credit hours. Prereq: Completion of 2nd year of law school.

LAW 959 LEGAL CLINIC. (2-3)
This is a graded two or three hours practice-oriented course that provides third year students with a unique opportunity to represent low income elderly individuals on a variety of legal matters. Under the Kentucky Supreme Court's limited practice rule, and with the supervision of the clinical director, students will represent clients in negotiations with federal and state agencies, in administrative hearings or in court procedures. Students will also interview clients, draft legal documents, file pleadings, and conduct discovery.

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.

LIN Linguistics

LIN 210 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. (Same as ENG 210.)

LIN 211 INTRODUCTION TO LINGUISTICS I. (3)
This course is an introduction to the scientific study of human language, with an emphasis on the fundamental principles of linguistic theory, and applications of these principles in the investigation of grammatical structure, language change, language universals and typology, writing systems. The course will also focus on the application of linguistic study to real-world problems, e.g. language and technology. Credit will not be given to students who already have credit for ENG 414G. (Same as ENG 211.)

LIN 212 INTRODUCTION TO LINGUISTICS II. (3)
This course is the second semester of a two-semester sequence introducing the study of Linguistics, the scientific study of human language as a system. This course focuses on the social aspects of linguistic study: Semantics, pragmatics, conversational interaction, language variation and register, dialects, linguistic aspects of sign languages, second language acquisition, and the acquisition of language by children. Prereq: ENG/LIN 211. (Same as ENG 212.)

LIN 310 AMERICAN ENGLISH. (3)
The study of the varieties of modern American English: regional, social, and ethnic varieties, gender differences in communication, creoles and pidgins, stylistic variation. History and methods of American dialect study. (Same as ENG 310.)

LIN 317 LANGUAGE AND SOCIETY (SUBTITLE REQUIRED). (3)
This course will introduce students to various topics concerning the interaction between language use and social and cultural phenomena, including topics of language and cultural meaning, social segmentation and linguistic variation, bi- and multi-lingual communities, and the ethnography of communication. Course may be repeated under different subtitles to a maximum of six credits.

LIN 318 SEMANTICS AND PRAGMATICS. (3)
This course focuses on how meaning is conveyed by the world's languages, introducing the primary approaches to the study of semantics and pragmatics of the 20th century. We discuss the semantics of words and then shift our study to investigate the way meaning is conveyed in larger units such as sentences and then conversations. The influence of context - social, physical, and linguistic - is also examined as it relates to meaning.

LIN 319 HISTORICAL LINGUISTICS. (3)
Students in this course will study a variety of topics related to the topic of language change: the reconstruction of linguistic systems; language classification; comparative linguistics; the temporal, spatial, and social context of language change. Prereq: ENG/LIN 211, or ENG 414G, or equivalent. (Same as ANT 319.)

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 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 the equivalent; or consent of instructor. (Same as ENG 512.)

LIN 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/ENG 513.)

LIN 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/ENG 514.)

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 520 SANSKRIT I. (3)
An introduction to the Sanskrit language. Includes a historical survey of the language; detailed study of the devanagari writing system and of Sanskrit phonology and grammar; a recitation component; and the reading of selected Sanskrit texts. Prereq: Completion of the fourth semester of a foreign language.

LIN 521 SANSKRIT II. (3)
A continuation of LIN 520. Includes intensive study of the relationship of Sanskrit to other early Indic languages (especially Vedic and Pali); discussion of the Indo-European ancestry of these languages; and the reading of selected texts in these languages. Prereq: LIN 520.

LIN 612 STRUCTURE AND STYLISTICS OF FRENCH. (3)
A study of the history and structure of French with an emphasis on contemporary features. (Same as ENG/FR 612.)

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).

LIS Library and Information Science

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 514 LITERATURE AND RELATED MEDIA FOR YOUNG ADULTS. (3)
A study of literature and related materials for use with young people in grades 6-12. Emphasis is placed on the special characteristics and needs of young people and the evaluation of materials for this age group.

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 605 INFORMATION POLICY AND TECHNOLOGY REGULATION. (3)
Examination of the three models of regulation by which society govern communication and information, and the problems and opportunities brought about by technological changes to media. Prereq: LIS 600.

***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. Prereq: LIS 601, LIS 602 or consent of instructor.

***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: Eighteen hours of graduate study in LIS or consent 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 or LIS 613 or consent of instructor.

LIS 613 INFORMATION RESOURCES AND SERVICES FOR CHILDREN. (3)
A study of effective programming for children and young adults. Emphasis is placed on oral presentations. Literature-based activities and community outreach. Prereq: LIS 510 or consent of instructor.

LIS 615 PROSEMINAR IN COMMUNICATION AND INFORMATION SYSTEMS. (3)
This course is an introductory graduate-level survey of theory and research on human communication mediated by communication and information technologies. This course is designed to cover the areas not typically addressed in traditional courses of mass or interpersonal communication, including theory and research on the use of computers and electronic communication over a variety of communication and information systems. Prereq: Graduate standing or consent of instructor. (Same as CJT 615.)

***LIS 622 SOCIAL SCIENCE INFORMATION. (3)**
Examination of important issues and developments relating to creation, packaging, dissemination and use of social science information by various segments of society. Emphasis on understanding information needs of those who use social science information and information systems, source and services available to satisfy those needs. Prereq: LIS 601 or consent of instructor.

***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 601 or consent of instructor.

***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 601 and LIS 602 or consent of instructor.

LIS 625 INSTRUCTIONAL SERVICES. (3)
Examines instructional services that libraries and other information-related organizations offer their clients to provide them with the knowledge and skills they need to effectively use information resources. Attention is given to the nature of instructional services, the instructional needs of clients, information literacy, methods of instruction, teaching and learning styles, instructional design and the evaluation of students and instruction. Prereq: LIS 601 or consent of instructor.

***LIS 630 ONLINE INFORMATION RETRIEVAL. (3)**
This course examines online information retrieval processes and services. It emphasizes searching commercially available online retrieval systems and databases and focuses on two major components of electronic searching strategies: the knowledge about system structure of electronic databases and the various strategies, models and approaches to online searching. The course contents cover the pre-search interview, query analysis, database selection, search strategy development, online protocol, and evaluation of search results. Current status of and future trends in the online industry are also discussed. Prereq or concur: LIS 601, LIS 602 or consent of instructor.

***LIS 636 FOUNDATIONS OF INFORMATION TECHNOLOGY. (3)**
A study of the computing fundamentals necessary for the understanding and use of information technology. Focus is on examining computer systems in concept and practice, which is essential to information professionals. Topics include how computers represent, process, store and retrieve information; how operating systems control these processes, interpret commands, present the user interface, and run applications; how databases are designed and created; how general understanding of programming processes and productivity software skills is important in a variety of professional contexts. Productivity applications include the Office suite, Internet applications and web publishing, and database management systems.

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. Prereq: Consent of instructor. (Same as CJT 637.)

LIS 638 INTERNET TECHNOLOGIES AND INFORMATION SERVICES. (3)
A course examining the structure, development and evolution of the Internet; network protocols and client/server architecture issues; Web page design, authoring, and evaluation; the use of the Internet as an information storage and retrieval system; recent advances in HTML and scripting languages; and Internet related social issues such as censorship and copyright. Prereq: LIS 636 or consent of instructor. (Same as CJT 638.)

#LIS 639 INTRODUCTION TO MEDICAL INFORMATICS. (3)
This course is designed to introduce the interdisciplinary field of medical informatics to health information professionals. Medical Informatics is a developing field that essentially seeks to apply information and computing technologies to improve all aspects of healthcare, including patient care, research, and education. During the semester we will explore a number of topics central to understanding the field, including: the nature of biomedical information, the electronic medical record, the role of information and computing technologies to support clinical decision making, healthcare and informatics standards, information retrieval, system analysis and technology assessment, and essential issues of information technology in medical education and medical ethics. By the end of this Web-based course, students are expected to be able to understand broad aspects of the field and can use this as a foundation for further education, training, and work in health information professions. (Same as CJT 639.)

LIS 640 HEALTH SCIENCES LIBRARIES. (3)
A survey of health sciences libraries and information agencies, including coverage of topics related to: the healthcare community and their information needs, information resources in the health sciences, controlled medical terminologies and classification systems, search and retrieval of various information resources, issues in the management of collections and access in health libraries, and current trends and issues. Prereq: LIS 601 and LIS 602 or consent of instructor. (Same as CJT 640.)

***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: LIS 601 and LIS 602 or 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 602 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 676) for certification as school media librarian.

***LIS 645 PUBLIC LIBRARIES. (3)**
Examines historical development of the public library and its roles in society. Topics considered include the environment of public libraries; organization and management; information needs of client groups; information resources and services provided to clients; and trends developments in public libraries. Prereq: LIS 601 and LIS 602 or consent of instructor.

***LIS 646 ACADEMIC LIBRARIES. (3)**
Examines historical development of academic libraries and their roles in higher education. Topics considered include the environment of academic libraries, organization and management needs of client groups, information resources and services provided clients; and issues, trends, and developments in academic libraries. Prereq: LIS 601 and LIS 602 or consent of instructor.

LIS 647 CURRENT TRENDS IN SCHOOL MEDIA CENTERS. (3)
An intensive study of trends in school media centers with emphasis on research, technology, and the role of the school media specialist in the school curriculum.

***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 602 or consent of instructor.

LIS 653 PRESERVATION MANAGEMENT. (3)
Considers the many facets of paper, non-print, and digital preservation with the aim of providing the knowledge and awareness necessary to be able to incorporate preservation principles, concepts, and practices into all aspects of library and information center management. Includes hand-on experience.

***LIS 655 ORGANIZATION OF KNOWLEDGE I. (3)**
Theories and practice of bibliographic description and subject analysis. Covers the organization of both print and electronic information, including use of Anglo-American Cataloging Rules, Dewey Decimal Classification, Library of Congress Classification and Library of Congress Subject Headings. Prereq: LIS 602 or consent of instructor.

***LIS 656 ORGANIZATION OF KNOWLEDGE II. (3)**
In-depth coverage of the theories and practice of bibliographic description and subject analysis. Covers the organization of both print and electronic information and authority control. Emphasis is on problems in practice, special case studies, current issues and future trends of description, subject analysis and online authority control. Prereq: LIS 655. 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.

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 or consent of instructor. (Same as CJT 668.)

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. (Same as CJT 690.)

LIS 695 INDEPENDENT STUDY IN LIBRARY AND INFORMATION SCIENCE. (3)
Opportunities for directed study in subjects or problems of interest to a student. Observation and research required, and a written report describing the work accomplished. 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 18 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 19 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 111 INTRODUCTION TO CONTEMPORARY MATHEMATICS. (3)
An introduction to concepts and applications of mathematics, with examples drawn from such areas as voting methods, apportionment, consumer finance, graph theory, tilings, polyhedra, number theory, and game theory. 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, 201 and 202. This course does not serve as a prerequisite for any calculus course. Credit not available on the basis of special examination. Prereq: Two years of high school algebra and a Math ACTE score of 19 or above, or MA 108R, or math placement test.

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 ACT of 26 or above, or math SAT of 600 or above, or MA 109 and MA 112, or MA 110, or consent of department. Note: Math placement test recommended.

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 or MA 132.

***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 ACT score of 26 or above, or math SAT of 600 or above, or MA 109, or appropriate math placement score, or consent of department. Note: Math placement test recommended. Students who have received credit for MA 113 cannot receive credit for MA 123.

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 SUPPLEMENTARY MATHEMATICS WORKSHOP I: (SUBTITLE REQUIRED). (1-2)
Laboratory offered (only) as an adjunct to certain mathematics lecture courses. Offered only on a pass/fail basis. Coreq: Set by instructor.

MA 194 SUPPLEMENTARY MATHEMATICS WORKSHOP II: (SUBTITLE REQUIRED). (1-2)
Laboratory offered (only) as an adjunct to certain mathematics lecture courses. Offered only on a pass/fail basis. Coreq: Set by instructor.

MA 201 MATHEMATICS FOR ELEMENTARY TEACHERS. (3)
Sets, numbers and operations, problem solving and number theory. Recommended only for majors in elementary and middle school education. Prereq: MA 109, 111.

MA 202 MATHEMATICS FOR ELEMENTARY TEACHERS. (3)
Algebraic reasoning, introduction to statistics and probability, geometry, and measurement. 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 241 GEOMETRY FOR MIDDLE SCHOOL TEACHERS. (3)
A course in plane and solid geometry designed to give middle school mathematics teachers the knowledge needed to teach a beginning geometry course. Cannot be counted toward the mathematics minor or major. Prereq: One semester of calculus.

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 interpolation. Least squares approximation. Numerical integration. Roots of nonlinear equations. Ordinary differential equations. Laboratory exercises using software packages available at computer center. Prereq: MA 114 and 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 APPLICABLE ALGEBRA. (3)**
Topics include: Euclid's algorithm, unique factorization moduli arithmetic, Fermat's and Euler's theorems, Chinese remainder theorem, RSA public key encryption, Pollard rho factoring, pseudo primes, error correcting codes, Hamming codes, polynomial rings and quotient rings, field extensions, finite fields and BCH codes. Prereq: MA 322 or MA 213. (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 and 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 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. (3)
The fundamental goal is to cover those mathematical theories essential to the study of quantum mechanics (physics and mathematics students) and the qualitative and quantitative study of partial differential equations, especially the partial differential equations of mathematical physics (engineering graduate students). The course encompasses the following topics: uniform convergence, Picard's existence proof, Power series techniques, regular singular point theory, Bessel's equation, Legendre, Hermite and Chebychev polynomials, Orthogonal Functions, completeness, convergence in the mean, Sturm-Liouville theory, eigenvalues, eigenfunction expansions, Sturm comparison and oscillation theorems. Separation of variable techniques for the heat, wave, and Laplace's equation. Prereq: One of MA 432G, MA 471G or equivalent, or consent of instructor.

MA 483G INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS. (3)
MA 483G is essentially an introductory course in partial differential equations designed to prepare undergraduate mathematics majors for serious work in partial differential equations and to provide Ph.D. candidates in engineering and science with an introduction to partial differential equations which will serve as a foundation for their advanced numerical and qualitative work (e.g., in computational fluid dynamics.) The course encompasses the following topics: first order linear equations, characteristics, Laplace's equation, wave equation and heat equation, boundary value problems, Fourier series, Green's identities and Green's functions, general eigenvalue problems. Prereq: One of MA 432G, MA 471G, MA 481G, or equivalent, or consent of instructor.

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/ME 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 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 LINEAR AND COMBINATORIAL OPTIMIZATION. (3)
Mathematical and computational aspects of linear programming and combinatorial optimization. Linear optimization is introduced by presenting solution techniques (primal and dual simplex) and studying geometric properties and duality for linear systems of inequalities. Asics of combinatorial optimization, including trees, paths, flows, matchings, and matroids, and the corresponding algorithms are presented. 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 527 APPLIED MATHEMATICS IN THE NATURAL SCIENCES I. (3)
Construction, analysis and interpretation of mathematical models applied to problems in the natural sciences. Physical problems whose solutions involve special topics in applied mathematics are formulated, various solution techniques are introduced, and the mathematical results are interpreted. Fourier analysis, dimensional analysis and scaling rules, regular and singular perturbation theory, random processes and diffusion are samples of selected topics studied in the applications. Intended for students in applied mathematics, science and engineering. Prereq: MA 432G or three hours in an equivalent junior/senior level mathematics course or consent of the instructor. (Same as EM/ME 527.)

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 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 575 PRINCIPLES OF ANALYSIS. (3)
Real and complex numbers, sequences and series, continuity, differentiation, integration, and uniform convergence. Prereq: MA 471G or equivalent 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 614 ENUMERATIVE COMBINATORICS. (3)
An introduction to the basic notions and techniques in enumerative combinatorics. The material has applications to polytopal theory, hyperplane arrangements, computational commutative algebra, representation theory and symrnetric functions. Topics include generating functions, the principle of inclusion and exclusion, bijections, recurrence relations, partially ordered sets, the Mobius function and Mobius algebra, the Lagrange inversion formula, the exponential formula and tree enumeration. Prereq: A graduate course in linear algebra or consent of instructor.

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.

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 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; a symptotic 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 Cech 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 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 575 or consent of instructor.

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 676 ANALYSIS I. (3)
Sequences and series of real and complex numbers, sequences of functions. Riemann-Stieltjes integration, Lebesque measure and integration. Prereq: MA 575 or consent of instructor.

MA 677 ANALYSIS II. (3)
Continuation of MA 676. Absolutely continuous functions on the real line, Lebesque spaces, beginning theory of Banach spaces including the Hahn-Banach, closed graph, and open mapping theorems. Prereq: MA 676 or 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 677 or consent of instructor.

MA 714 TOPICS IN DISCRETE MATHEMATICS (SUBTITLE REQUIRED). (3)
Review of recent research in discrete mathematics. May be repeated to a maximum of nine credits. Prereq: Consent of the instructor.

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 of 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

MAT Merchandising, Apparel and Textiles

MAT 114 INTRODUCTION TO MERCHANDISING. (3)
An introduction to merchandising with emphasis on apparel and textiles. Examination of industry structures which facilitate the development, manufacturing, marketing and merchandising of goods and services in the domestic and international marketplace.

MAT 120 TEXTILES FOR CONSUMERS. (3)
A study of textiles with emphasis on consumer applications. Properties of fibers, yarns, fabric structures, colors, and finishes related to end use. Survey of legislation and of maintenance requirements.

MAT 122 TEXTILES LAB. (1)
Laboratory analysis of the relationship between the properties and performance characteristics of fibers, yarns, fabric structures and finishes. Laboratory: two hours per week. Prereq: MAT 120 or may be taken concurrently.

MAT 232 APPAREL PRODUCTION STUDIO. (3)
Principles of apparel production for men, women and children. Development of basic construction skills. Studio, six hours. Prereq: MAT 120.

***MAT 237 AESTHETIC EXPERIENCE IN RETAIL. (3)**
An introduction to design and aesthetic principles as they are applied to promotional procedures of retail and wholesale organizations including methods of visual merchandising, special event promotion and public relations. Prereq: MAT 120 or consent of instructor.

MAT 247 DRESS AND CULTURE. (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.

†MAT 312 MERCHANDISING PROMOTION.

MAT 315 MERCHANDISE PLANNING AND CONTROL. (3)
Study and application of planning and control strategies and processes essential to profitability in merchandising. Analysis of company and industry merchandising and operating results. Prereq: MAT 114, ECO 201, ECO 202, ACC 201 and MKT 300. ACC 201 and MKT 300 may be taken concurrently.

MAT 340 PROFESSIONAL PRACTICE. (1)
An examination of employment opportunities and internship availability in merchandising, apparel and textiles. Survey and application of current procedures, methods and tools used in preparing to secure employment including: resumes, interviews, qualifications assessment, strategy development, electronic job searches. Prereq: MAT 114, MAT 120, MAT 237, MAT 315 and at least 60 hours of earned credit.

MAT 350 PROBLEM SOLVING IN MERCHANDISING. (3)
Study and application of research and creative problem solving in merchandising, apparel and textiles. Problem identification and evaluation of proposed solutions. Prereq: MAT 114, MAT 120, MAT 237, MAT 247, STA 200, MKT 300.

MAT 359 SPECIAL TOPIC IN MERCHANDISING, APPAREL AND TEXTILES (SUBTITLE REQUIRED). (1-3)
Exploration of topics in the field of merchandising, apparel and textiles. May be repeated to a maximum of six credits. Prereq: Junior standing or consent of instructor prior to registration.

MAT 395 INDEPENDENT STUDY IN MERCHANDISING, APPAREL 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.

***MAT 414 MERCHANDISING STRATEGY ANALYSIS. (3)**
The analysis of environmental, individual, and psychological factors of consumer consumption and their impact on apparel retailer strategic planning. Prereq: ACC 201, MAT 315, MAT 350, and MKT 320.

†MAT 420 CONSUMER DEMAND IN MERCHANDISING.

MAT 425 ECONOMICS OF MERCHANDISE SOURCING. (3)
Examination of global sourcing strategies in retail merchandising. Includes assessment of political, social, economic and cultural influences critical to the sourcing process. Prereq: MAT 114, MAT 350; ECO 201, ECO 202; MKT 300, MKT 320.

MAT 470 INTERNATIONAL MERCHANDISING. (3)
A study of the internationalization of retail merchandising and factors that influence the process in the global marketplace. Prereq: MAT 315, MAT 350, MKT 320.

MAT 480 MERCHANDISING, APPAREL AND TEXTILES STUDY TOUR. (1-3)
A domestic or foreign study tour to include investigation of interests related to merchandising, apparel and textiles. 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.

MAT 490 INTERNSHIP. (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.

MAT 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: MAT 120, MAT 237.

MAT 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: MAT 120 plus six hours in European history, Western culture, or art history.

MAT 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.

MAT 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: MAT 247 for majors only. Non-majors: three hours in sociology or anthropology and three hours in psychology.

MAT 559 SPECIAL TOPIC IN MERCHANDISING, APPAREL AND TEXTILES. (SUBTITLE REQUIRED). (1-3)
Advanced in-depth study of merchandising, apparel and textiles. May be repeated to a maximum of six credits. Prereq: Senior standing or consent of instructor prior to registration.

#MAT 570 ELECTRONIC RETAILING (E-TAILING). (3)
An educational foundation in e-tail development as a medium for food, apparel, and textile distribution and sales. Prereq: MAT 114, 120, 237, 247, STA 200, MKT 300.

MAT 595 INDEPENDENT STUDY IN MERCHANDISING, APPAREL 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.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.)

MBA Master of Business Administration

#MBA 600 RAPID IMMERSION IN ACCOUNTING. (3)
An immersive four-week introduction to the use of key financial and managerial accounting statements in analyzing business problems. Open only to students in the daytime MBA track.

#MBA 601 RAPID IMMERSION IN DECISION MAKING. (3)
An immersive four-week introduction to the use of key financial and managerial accounting statements in analyzing business problems. Open only to students in the daytime MBA track.

#MBA 602 RAPID IMMERSION IN LEADERSHIP. (2)
An immersive, largely experiential four-week course designed to help build students team work, communication and leadership skills. Open only to students in the daytime MBA track.

#MBA 603 MARKETS – STRUCTURE AND DYNAMICS. (1)
An immersive one-week course that explore how markets work. Open only to students in the daytime MBA track. Prereq: MBA 600, MBA 601 and MBA 602.

#MBA 604 BUSINESS PROCESSES AND FUNCTIONS. (3)
An immersive multidisciplinary course that introduces students to key business functions and processes. Open only to students in the daytime MBA track. Prereq: MBA 600, MBA 601, MBA 602.

#MBA 605 ORGANIZATIONAL STRUCTURES AND STRATEGIES. (1)
An immersive course that explores firm structures, internal allocation decisions and outsourcing decisions from a variety of social science perspectives. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602 and 603.

#MBA 606 BUSINESS SIMULATION. (1)
An experiential-based course that places students in teams that complete in a complex business simulation. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602 and 603.

#MBA 610 NEW PRODUCT DEVELOPMENT. (9)
An extensive, multidisciplinary examination of the new product or new service development process from ideation to product or service delivery. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605 and 606.

#MBA 611 SUPPLY CHAIN MANAGEMENT. (9)
An extensive, multidisciplinary examination of the supply chain management from planning and sourcing to manufacturing and relationship management. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606 and 610.

#MBA 612 MERGERS AND ACQUISITIONS. (5)
An extensive, multidisciplinary examination of the mergers and acquisitions process from the role of mergers in firm strategy to target identification, acquisition, and absorption issues. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610 and 611.

#MBA 620 RISK MANAGEMENT. (2)
An examination of financial decision-making about the management of risk by corporations, recognizing the relationship between risk management and the overall goals of the firm. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 621 NEW VENTURE FINANCE. (1)
The advantages and disadvantages of the sources of new venture capital are studied from the entrepreneur's and the provider's viewpoints. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 622 INTERNATIONAL FINANCIAL MANAGEMENT. (2)
Overview of financial management at the international level. Topics include the structure of international trade and foreign direct investment, foreign exchange markets, and managing currency risk. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 623 INTERNATIONAL MARKETING. (2)
An examination of the factors that shape international marketing decisions, including entry strategies, marketing mix decisions and product policies. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 624 ENTREPRENEURIAL MARKETING. (2)
An examination of how to market creatively on limited resources. Hands on experience in how to develop a marketing plan for a small firm. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 625 SALES MANAGEMENT. (1)
An examination of managerial approaches to the planning, implementation and control of personal contact programs. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 626 E-COMMERCE. (2)
A thorough examination of the major issues associated with the development of e-commerce solutions and applications. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 627 KNOWLEDGE MANAGEMENT. (1)
Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 628 TECHNOLOGY MANAGEMENT. (2)
An examination of the management of technology, especially the critical role of technology as a strategic resource to enable management to achieve firm objectives. Topics include the technology life-cycle, technology forecasting, and emerging technologies. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 630 ADVANCED SKILL ENHANCEMENT. (1)
Students complete five short modules to enhance their interpersonal, implementation or analytic skills. Topics vary by year. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

#MBA 640 CULMINATION WEEK. (1)
A comprehensive assessment of students' professional development and progress during the program. Open only to students in the daytime MBA track. Prereq: MBA 600, 601, 602, 603, 604, 605, 606, 610, 611 and 612.

MC Medical Center

MC 500 INTRODUCTION TO SERVICE-LEARNING. (3)
This interdisciplinary course is designed to introduce students to the theories, concepts, and practices of Service-Learning. Service-Learning is a form of experiential education which engages the students in enhancing the common good through the application of classroom learning to service. Prereq: Upper division status. (Same as EXP 500.)

MCL Modern and Classical Languages

#MCL 270 INTRODUCTION TO FOLKLORE AND MYTHOLOGY. (3)
Introduction to the major genres and theoretical approaches to folkloristics.

#MCL 510 WORLD LANGUAGE METHODS P-8. (3)
This course serves pre- and in-service teachers with the theoretical background and instructional strategies surrounding the five areas of second language acquisition for P-8 learners as defined by the National Standards for Language Learning and information to address the Standards of Foreign Language Learning and Kentucky Teacher Standards.

#MCL 601 WORLD LANGUAGE TEACHING INTERNSHIP P-12. (12)
Three-credit hour Seminar taught in conjunction with a 14-week P-12 teaching Internship. Students will be interning in local schools and meeting once a week to discuss various aspects of their teaching needs and progress as well as issues encountered during their teaching experience. Prereq: EDP 500/600, EDC 610, EDS 600, MCL 510, and MCL 610.

#MCL 610 WORLD LANGUAGE METHODS 9-12. (3)
This course serves pre- and in-service teachers with the theoretical background and instructional strategies surrounding the five areas of second language acquisition for 9-12 learners as defined by the National Standards for Language Learning and information to address the Standards of Foreign Language Learning and Kentucky Teacher Standards.

#MCL 650 TOPICS IN INTERCULTURAL TEACHING: (SUBTITLE REQUIRED). (3)
Seminar on teaching intercultural topics from the perspective of world languages and cultures. The course will provide based in depth analysis of one area of intercultural teaching. Topics may include how to teach arts and humanities courses and/or units using folk and fairy tale traditions, multicultural and world cinema, comparative art and architecture, or musical and theatrical traditions. Focus will be on methods of teaching in primary and secondary schools. Taught in English. May be repeated to a maximum of six credits. Prereq: Enrollment in the Master's in Teaching World Languages program, a world languages program, or permission of the instructor.

MD Medicine (M.D. Program)

MD 810 PHYSICIANS, PATIENTS, AND SOCIETY I. (4)
In small groups, students and their assigned preceptors will study written clinical scenarios. Students will investigate, contemplate, comprehend, and discuss biological, clinical, psychological, economic, social, legal, and ethical issues concerning the problem-based histories. Prereq: Admission to Medical School (first year). (Same as BSC 810.)

MD 811 INTRODUCTION TO THE MEDICAL PROFESSION I. (7)
This course combines small-group meetings, lectures, and practical experience in providing students with the basic skills necessary to successfully engage in clinical rotations. First year medical students participate in four modules: observation period, interviewing and communication, clinical decision making, and physical examination. Prereq: Admission to Medical School (first year).

MD 812 HUMAN STRUCTURE/CELL AND TISSUE BIOLOGY. (4)
The organization of cells, tissues and organs is presented in lectures and in the laboratory through the study of in vivo materials, histological sections and electron microscopic illustrations with focus on the correlation of structure and function. Small group discussions on select topics supplement full classroom work. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year). (Same as ANA 812.)

MD 813 HEALTHY HUMAN. (2)
The course uses problem-based learning, lectures, and small group discussions to introduce students to the concepts of health and human development. Lecture, four hours per week. Prereq: Admission to Medical School (first year).

MD 814 HUMAN STRUCTURE/GROSS ANATOMY. (6)
The course consists of lecture, small group, laboratory, and palpation exercises that provide a basic understanding of anatomical principles, organization and development. Anatomical structures are introduced as a basis for future functional correlates and principles are taught via laboratory discussions, prosections, disections, films and skeletal materials. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year). (Same as ANA 814.)

MD 816 CELLULAR STRUCTURE AND FUNCTION/GENETICS. (3)
The course combines small group meetings, lecture, clinical correlations, problem-based learning, and problem-solving sessions in providing an understanding of the relationship of human genetics to human health and disease. Close integration with biochemistry topics provides a better picture of how biochemistry, genetics and molecular biology contribute to normal human development and medicine. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year). (Same as MI 816.)

MD 817 NEUROSCIENCES. (6)
The course is an integrated presentation of relevant topics in human neuroanatomy and neurophysiology as well as introductory correlations with neurology and psychiatry. Teaching methodology includes lecture, small group discussion, laboratory and self-study units. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year).

MD 818 HUMAN FUNCTION. (8)
This course provides in-depth instruction on the physiological mechanisms of body function from the single cell to the organism level. The course is team taught by medical scientists and clinicians. Teaching methodologies include didactic and Socratic lectures, small group discussions, demonstrations and live model and computer simulated laboratories. Lecture, 20 hours per week. Prereq: For MD 818/PGY818: Admission to medical school (first year). For OBI 814: Admission to the Dental School and OBI 812. (Same as OBI 814/PGY 818.)

MD 819 CELLULAR STRUCTURE AND FUNCTION/BIOCHEMISTRY. (7)
The course combines lecture, small group activities, clinical correlations, problem-based learning, and problem-solving sessions in providing an understanding of the relationship of biochemical principles to human health and disease. Close integration with genetics topics provides a better picture of how biochemistry, molecular biology and genetics contribute to normal human development and medicine. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year). (Same as BCH 819.)

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 821 INTRODUCTION TO THE MEDICAL PROFESSION II. (7)
This course is an intermediate clinical medicine course combining small-group tutorials, lectures, and practical experience. Second year medical students participate in three components: interviewing and communication skills, radiology and laboratory skills, and physical examination and diagnosis. Prereq: MD 811.

MD 822 IMMUNITY, INFECTION, AND DISEASE. (9)
The course provides basic concepts of immunology and of bacterial, viral, fungal and protozoal biology. It focuses on mechanisms of human immunity, immunologically mediated disease, and pathogenesis in infectious disease. The material covered includes relevant pathology associated with both immunologic and infectious diseases, and a brief summary of infectious diseases from an organ system perspective. Lecture, 20 hours per week. Prereq: Admission to second year of medical curriculum. (Same as MI 822.)

MD 823 MECHANISMS OF DISEASE AND TREATMENT/PATHOLOGY. (9)
This is a course in basic mechanisms of disease causation and specific diseases of the organ systems. It introduces fundamental disease processes and the pathophysiology of major diseases affecting each of the organ systems. It stresses how disease alters normal structure and function and is closely integrated with PAT 824. Various teaching methodologies utilized include lectures, small group discussions, workshops, case studies, and computer-assisted instruction. Lecture, 20 hours per week. Prereq: Admission to second year of medical curriculum. (Same as PAT 823.)

MD 824 MECHANISMS OF DISEASE AND TREATMENT/PHARMACOLOGY. (7)
This course introduces the principal actions of substances which are used as drugs for treatment of diseases and suffering in humans. It will cover the general principles of drug action, how drugs alter the function of normal and pathologic tissues and organisms and how they influence the disease process. Drugs used in the treatment of disease processes will be integrated with discussion of those diseases in PAT 823. Lecture, 20 hours per week. Prereq: Admission to second year of medical curriculum. (Same as PHA 824.)

MD 826 MECHANISMS OF DISEASE AND TREATMENT/PSYCHIATRY. (2)
This is an introduction to psychopathology and the psychiatric nomenclature for second year medical students. It occurs during the spring and fits within the context of the larger pathology segment of MD 826. Integration with the pharmacology sequence that runs before and after is in place. Prereq: Promotion to the second year of medical school. (Same as PSC 826.)

MD 830 WOMEN'S MATERNAL AND CHILD HEALTH/PEDIATRICS. (6)
This course will provide an opportunity for the students to see the cycle of birth and neonatal care and to observe the mother/infant relationship through labor and delivery, the newborn nursery, and the follow-up examination. Inpatient pediatrics will be a component of this rotation. Laboratory, 40 hours per week. Prereq: Admission to third year of medical curriculum.

***MD 832 CHILD NEUROLOGY INDEPTH. (4)**
The course will diagnose the common, acute, and emergency problems of disease of the central nervous system. Prereq: Completion of 3rd year of medical school. (Same as NEU 851.)

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 834 PRIMARY CARE/FAMILY PRACTICE. (4)
This course introduces third year medical students to primary care family practice in rural and urban settings. Students participate in patient-centered teaching during which they work with primary care Family Physicians seeing ambulatory patients in their offices. Students are allowed to interview, examine, and formulate treatment plans for patient problems under the direct supervision of their faculty preceptors. Prereq: Admission to third year of medical curriculum.

MD 835 PRIMARY CARE/INTERNAL MEDICINE. (4)
This clinical course introduces third year medical students to primary care internal medicine practice in rural or urban settings. Students participate in patient-centered teaching during which time they work with primary care internists in their clinics. Students interview, examine, and formulate treatment plans for patient problems under the direct supervision of their faculty preceptors. Laboratory, 40 hours per week. Prereq: Admission to third year of medical curriculum.

MD 836 MEDICAL SURGICAL CARE/MEDICINE. (8)
This course is an introduction to the concepts of internal medicine. It is designed around the principles of Problem Based Learning to help students solve complex medical problems. The course will use didactic exercises, computer simulated problems and clinical material and experiences to integrate basic sciences into the practice of medicine. Laboratory, 40 hours per week. Prereq: Admission to third year of medical curriculum.

MD 837 MEDICAL SURGICAL CARE/SURGERY. (8)
This course is an introduction to the concepts in surgery. It is designed around the principles of Problem Based Learning to help students solve complex surgical problems. The course will use didactic exercises, computer simulated problems and clinical material and experiences to integrate basic sciences into the practice of medicine and surgery. Laboratory, 40 hours per week. Prereq: Admission to third year of medical curriculum.

MD 838 WOMEN'S MATERNAL AND CHILD HEALTH/OBG. (6)
The clerkship will provide an opportunity for students to see the cycle of birth and neonatal care and to observe the mother/infant relationship through the outpatient clinic, labor and delivery, the newborn nursery, and the follow-up examination. Laboratory, 40 hours per week. Prereq: Admission to third year of medical curriculum.

MD 839 PRIMARY CARE/PEDIATRICS. (4)
This clinical course introduces third year medical students to primary care pediatric practice in rural or urban settings. Students participate in patient-centered teaching during which time they work with primary care pediatricians in their clinics. Students interview, examine, and formulate treatment plans for patient problems under the direct supervision of their faculty preceptors. Laboratory, 40 hours per week. Prereq: Admission to third year of medical curriculum.

MD 840 DEAN'S COLLOQUIUM. (1)
A two week experience which serves as a summation of the medical school experience and a transition to the role as practitioner. It will be taught using multiple educational formats. Lecture, 20-30 hours per week. Prereq: Admission to fourth year of medical curriculum.

MD 842 ADVANCED CLINICAL PHARMACOLOGY AND ANESTHESIOLOGY. (6)
This course uses lectures, interactive small groups, and firsthand experience to introduce anesthesiology as it relates to pharmacology and physiology. The course also teaches pharmacology and therapeutics utilizing clinical cases. Students develop their own personal formularies during the course. Laboratory, 40 hours per week. Prereq: Admission to fourth year of medical curriculum. (Same as PHA 842.)

MD 843 EMERGENCY MEDICINE. (4)
This course will provide the students with an introduction to the field of Emergency Medicine, Emergency Medical Services (EMS), and the approach to the acutely ill or injured patient. The students will complete an ACLS class during this rotation. Laboratory, 40 hours per week. Prereq: Admission to fourth year of medical curriculum. (Same as ER 843.)

ME Mechanical Engineering

***ME 101 INTRODUCTION TO MECHANICAL ENGINEERING. (3)**
The course introduces the engineering profession and the skills and expectations required for success. Engineering applications of calculus are also presented. Prereq or concur: MA 113.

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 205 COMPUTER AIDED ENGINEERING GRAPHICS. (3)
Combines freehand sketching techniques, both orthographic and pictorial, and the use of a solid modeling program to describe and define mechanical objects using current industrial standards. An introduction to basic dimensioning and tolerancing techniques is included.

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 introductory course in measurement and instrumentation emphasizing measurement errors, elementary statistics, uncertainty analysis, sensors, time and frequency response of instrumentation components, signal conditioning circuitry, and digital data acquisition. Applications include the measurement of strain, pressure, temperature, flow, force, torque, and vibration. Lecture, two hours; laboratory, three hours. Prereq: ME 101, ME 330, EE 305 and engineering standing. Prereq or Co-req: ME 340.

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.

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 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 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. Prereq: Registration in the College of Engineering and engineering standing.

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. Prereq: Engineering standing and concur: ME 344.

#ME 411 ME CAPSTONE DESIGN I. (3)
The first semester of the capstone design sequence in mechanical engineering. Topics include: product design, manufacturing, considerations of economics, safety, and communication. Students will work in small groups and emphasis will be on original work. Students will develop a project plan concerned with the design of a complex system of current interest to mechanical engineers. Lecture, 2 hours per week; laboratory, 3 hours per week. Prereq: ME 340 and engineering standing; concur or prereq: ME 310.

***ME 412 ME CAPSTONE DESIGN II. (3)**
Second semester of the capstone design sequence in mechanical engineering. Students will complete 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. Topics include engineering ethics, design and communication. Lecture, 1 hour; lab 4 hours per week. Prereq: ME 411 and engineering standing. Course is to be taken semester immediately following ME 411.

***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: Engineering standing and ME 340 and ME 310.

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 and ME 205; or graduate standing.

ME 503 LEAN MANUFACTURING PRINCIPLES AND PRACTICES. (3)
Introduction of the fundamental concepts for production improvement utilizing lean manufacturing principles and practices. This course will consist of lectures, manufacturing simulation laboratory, plant tours, design projects, and assigned problems drawn from industry. Prereq: Engineering standing or consent of instructor. (Same as MFS 503.)

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 302, EM 313, and engineering standing; or graduate standing with instructor consent. (Same as MFS 505.)

ME 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 EM/MSE 506.)

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 VIBRO-ACOUSTIC DESIGN IN MECHANICAL SYSTEMS. (3)
Application of basic acoustics and vibrations to engineering problems in vibro-acoustic design. The objective is to acquaint the student with the tools used in industry for noise and vibration control and to make the student aware of the major applications of such tools in the automotive, aerospace, and consumer product industries. Prereq: ME 310, ME 340.

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 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. (Same as EM 513.)

ME 527 APPLIED MATHEMATICS IN THE NATURAL SCIENCES I. (3)
Construction, analysis and interpretation of mathematical models applied to problems in the natural sciences. Physical problems whose solutions involve special topics in applied mathematics are formulated, various solution techniques are introduced, and the mathematical results are interpreted. Fourier analysis, dimensional analysis and scaling rules, regular and singular perturbation theory, random processes and diffusion are samples of selected topics studied in the applications. Intended for students in applied mathematics, science and engineering. Prereq: MA 432G or three hours in an equivalent junior/senior level mathematics course or consent of the instructor. (Same as EM/MA 527.)

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 532 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. (Same as EM 531.)

#ME 548 AERODYNAMICS OF TURBOMACHINERY. (3)
Aerodynamic analysis and design of turbomachines (pumps, compressors and turbines). Blade element performance (deflection and losses), and models for performance prediction are present. Special topics - rotating stall and surge, and aeromechanical considerations. Prereq: ME 321 and ME 330.

#ME 549 POWER GENERATION. (3)
Modern powerplants for electric power generation and cogeneration. Thermodynamic analysis of different concepts of powerplants. Design studies of specific powerplants. Prereq: ME 321 and ME 330.

ME 554 CHEMICAL AND PHYSICAL PROCESSING OF POLYMER SYSTEMS. (3)
Theory and practice as related to the chemical and physical processing of polymer systems. Polymer rheology, heat transfer in polymer flows, polymer engineering properties. Polymer processing operations and materials selection; flow instabilities. Prereq: CME 330, CME 425 or ME 325; or consent of instructor. (Same as CME/MFS/MSE 554.)

***ME 556 INTRODUCTION TO COMPOSITE MATERIALS. (3)**
Applications, materials selection and design of 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. Prereq: MSE 201, 301, CHE 236, and Engineering Standing, or consent of instructor. (Same as CME/MSE 556.)

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 321, ME 330, ME 325 and engineering standing; or graduate standing.

ME 580 HEATING, VENTILATING AND AIR CONDITIONING. (3)
A course emphasizing the use of thermodynamics, fluid mechanics, and heat transfer principles in thermal environmental design. Building energy requirements will be computed and thermal comfort criteria will be studied. Prereq: BAE 427 or ME 321 or consent of instructor. (Same as BAE 580.)

ME 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 585.)

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 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 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 601/ ME 641, or EM/ME 651 or consent of instructor.

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 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 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/ME 513.

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 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 531; prereq or concur: ME 631.

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 641 FOUNDATIONS OF SOLID MECHANICS. (3)
A brief review of vectors and an in-depth discussion of tensors and tensor calculus. Stress, deformation and strain. Continuum balance principles of mass, momentum and energy, the equations of motion and the energy equation. Entropy, the principles of material frame indifference and material symmetry. Various constitutive models, including elasticity (linear and/or non-linear), plasticity and viscoelasticity. Thermoelasticity, hyperelasticity, hypoelasticity, and electroelasticity may also be addressed. Prereq: EM 531 or ME 532 or consent of instructor.

ME 644 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.

ME 645 ADVANCED CONTROL SYSTEM ANALYSIS. (3)
Conceptual development and study of complex systems; their synthesis and design; analysis and optimization of system parameters. Input-output relationships; formulation of mathematical models, parameters and constraints on physical systems. Prereq: ME 440 or instructor consent.

ME 647 SYSTEM OPTIMIZATION I. (3)
Introduction to linear and nonlinear optimization and their use in engineering design. Emphasis on numerical approaches and use of optimization methods for engineering systems (e.g. biological, mechanical, structural). Prereq: CS 221; one mathematics course beyond MA 214 or equivalent. (Same as BAE 647.)

ME 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.

ME 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.

ME 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.

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 691 CFD I - INCOMPRESSIBLE FLOWS. (3)
This course will cover a control-volume CFD approach for the conservation of momentum, heat and mass transfer. The emphasis will be on the discretization of the transport equations in general coordinates and its application in both structured and unstructured grid arrangements. Modern numerical schemes and pressure solution algorithms will also be covered. An introduction of turbulence modeling will be provided. At the end of the lecture, the students not only are able to understand the basics of commercial software but also will be able to write a general coordinate code for fluid flow, heat and mass transfer applications. Prereq: ME 531.

#ME 692 CFD II - COMPRESSIBLE FLOWS. (3)
This second course shall focus on the solution of the compressible Navier-Stokes equations. The Van-Leer's and Roe's approaches will be discussed to derive the discretization equations. Modern shock capturing schemes, such as FCT, TVD and ENO will be introduced. The solution techniques such as ADI, DDADI and line-relaxation will be used to solve the system of equations. Multi-grid acceleration techniques will be introduced to speed up the rate of convergence. Finally, the parallelization of CFD codes using shared and distributed computers will be discussed. Prereq: ME 531 and ME 691.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 616 BIOLOGY AND THERAPY OF CANCER. (3)
Biology of cancer will be discussed at the molecular, cellular and organismic level. Emphasis will be placed on cellular signaling, apostosis and cell cycle unique to cancer cells, which affects tumor cell behavior and its interactions with the host immune system. The biology of hematopoitic cells will also be included. Clinicians active in treatment and research of various types of cancer will be invited to participate in the lectures. Prereq: BCH 501, 502, BIO 685. (Same as MI/PHA 616.)

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 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 873 MEDICAL SPECIALTIES AND GENERAL MEDICINE CLINICS
MED 874 STUDENT HEALTH SERVICE
MED 875 MEDS-PEDS AMBULATORY ELECTIVE
MED 876 HEMATOLOGY-ONCOLOGY, UK
MED 879 GENERAL MEDICAL CONSULTING SERVICE
MED 890 INTERNAL MEDICINE OFF-SITE

MFS Manufacturing Systems Engineering

MFS 503 LEAN MANUFACTURING PRINCIPLES AND PRACTICES. (3)
Introduction of the fundamental concepts for production improvement utilizing lean manufacturing principles and practices. This course will consist of lectures, manufacturing simulation laboratory, plant tours, design projects, and assigned problems drawn from industry. Prereq: Engineering standing or consent of instructor. (Same as ME 503.)

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 302, EM 313, and engineering standing; or graduate standing with instructor consent. (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 525 ORGANIZATIONAL LEARNING FOR LEAN MANUFACTURING. (3)
Learning organizations are skilled at creating, acquiring, and transferring knowledge, and at modifying their behavior to reflect the new knowledge and insights. In this context, this course will discuss leadership styles, adult learning principles, communication, organizational behaviors, and a structure for learning. Prereq: MFS 503 or consent of instructor.

MFS 526 OPERATIONS MANAGEMENT IN LEAN MANUFACTURING. (3)
Principles and practices of lean manufacturing operations management. The focus is on manufacturing as a sociotechnical system and how to limit variability through various methods of control of basic processes. Emphasis is on managing an effective and efficient technical system. Prereq: MFS 503 or consent of instructor.

MFS 554 CHEMICAL AND PHYSICAL PROCESSING OF POLYMER SYSTEMS. (3)
Theory and practice as related to the chemical and physical processing of polymer systems. Polymer rheology, heat transfer in polymer flows, polymer engineering properties. Polymer processing operations and materials selection; flow instabilities. Prereq: CME 330, CME 425 or ME 325; or consent of instructor. (Same as CME/ME/MSE 554.)

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, engineering standing. (Same as MNG 563.)

MFS 581 QUALITY CONTROL. (3)
The purposes and goals of quality control, economics of quality control, quality engineering, statistics and probability in quality control and the functions of a quality control/assurance program in a manufacturing setting. Prereq: STA 381, Engineering standing, MSE 301 or consent of instructor.

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 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: Enrollment in Manufacturing Systems Engineering Program. (Same as MGT 611.)

MFS 612 DESIGN OF LEAN MANUFACTURING SYSTEMS. (3)
Technical design of manufacturing systems in accordance with lean manufacturing principles. Topics include models for characterization and analysis of factory flow dynamics, production flow analysis, work cell design, and design of pull-based production control systems. Prereq: MFS 503 Lean Manufacturing Principles and Practices.

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 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.

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 390 SPECIAL TOPICS IN MANAGEMENT (SUBTITLE REQUIRED). (3)
Readings, projects, lecture and/or discussion to illuminate current topics of special interest or concern in management. 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 three times under the MGT 390 number. Prereq: 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 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 610 GLOBAL 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.

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: Enrollment in Manufacturing Systems Engineering Program. (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 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 641 LEGAL ISSUES IN THE ACCOUNTING PROFESSION. (3)
A study of various legal issues in the accounting profession. Among the topics covered are accountant's liability, commercial transactions, business organizations, property concepts and other issues in the legal environment that will be encountered in accounting practice. Prereq: Admission to MSACC program or consent of DGS.

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 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 208 or BIO 308 or consent of instructor. (Same as BIO 494G.)

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 BCH/BIO/PLS/PPA 601.)

MI 604 EXPERIMENTAL GENETICS. (3)
An introductory molecular genetics course designed to expose first-year graduate students to contemporary concepts and methods in genetics and genomic analysis. Model systems and classic papers will be presented as paradigms for important genetic principles. Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents. (Same as IBS 605.)

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 304) and a course in nucleic acids and elementary molecular biology (e.g. BCH 502) or consent of instructor. (Same as BCH/BIO 615.)

MI 616 BIOLOGY AND THERAPY OF CANCER. (3)
Biology of cancer will be discussed at the molecular, cellular and organismic level. Emphasis will be placed on cellular signaling, apostosis and cell cycle unique to cancer cells, which affects tumor cell behavior and its interactions with the host immune system. The biology of hematopoitic cells will also be included. Clinicians active in treatment and research of various types of cancer will be invited to participate in the lectures. Prereq: BCH 502, 502, BIO 685. (Same as MED/PHA 616.)

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. (3)
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. (3)
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: (to reflect appropriate IBS course). (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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 816 CELLULAR STRUCTURE AND FUNCTION/GENETICS. (4)
The course combines small group meetings, lecture, clinical correlations, problem-based learning, and problem-solving sessions in providing an understanding of the relationship of human genetics to human health and disease. Close integration with biochemistry topics provides a better picture of how biochemistry, genetics and molecular biology contribute to normal human development and medicine. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year). (Same as MD 816.)

MI 822 IMMUNITY, INFECTION, AND DISEASE. (9)
The course provides basic concepts of immunology and of bacterial, viral, fungal and protozoal biology. It focuses on mechanisms of human immunity, immunologically mediated disease, and pathogenesis in infectious disease. The material covered includes relevant pathology associated with both immunologic and infectious diseases, and a brief summary of infectious diseases from an organ system perspective. Lecture, 20 hours per week. Prereq: Admission to second year of medical curriculum. (Same as MD 822.)

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 828 IMMUNITY, INFECTION AND DISEASE FOR THE STUDENT DENTIST. (11)
The course provides basic concepts of immunology and bacterial, viral, fungal and protozoal biology. It focuses on mechanisms of human immunity, immunologically mediated disease, and pathogenesis in infectious disease. The material covered includes relevant pathology associated with both immunologic and infectious diseases, and a summary of infectious diseases from a clinical perspective. Lecture: 20 hours per week. Prereq: Admission to the second year of dental curriculum or permission of course director. (Same as OBI 828.)

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 330 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 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 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 415 INTERNET MARKETING. (3)
The purpose of the course is to introduce the business functions of the Internet including E-mail, Discussion Groups, and the World Wide Web (WWW) to the students. This rapidly evolving technology is changing every facet of how companies market their products and how they do business. The Internet is also opening up the global market to companies of all sizes. The importance of integrating this technology into the strategic marketing process will be emphasized in this course. Prereq: MKT 300 and Marketing Majors only.

MKT 425 FRANCHISING. (3)
The purpose of the course is to provide an understanding of franchising and the various business components that affect its success. Franchising issues are considered from a strategic marketing perspective. Issues such as branding, promotion, distribution, financing, and service delivery are considered as they pertain to franchising. Prereq: MKT 300 and Marketing Majors Only.

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 445 SPORTS MARKETING. (3)
The purpose of the course is to develop an understanding of strategic marketing concepts and activities as they apply to the context of sports. Marketing concepts and activities related to the marketing mix, consumer/fan behavior, and business organization-sport organization relationships will be examined. Prereq: MKT 300 and Marketing majors only.

MKT 450 MARKETING STRATEGY AND PLANNING. (3)
As the capstone course for marketing majors, this class examines 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 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 771 SEMINAR IN BUSINESS ADMINISTRATION. (3)
Each semester some topic currently discussed in scholarly journals in business administration will be studied intensively. May be repeated to a maximum of nine credits. Prereq: Consent of instructor.

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. (1)
Orientation to the mining engineering profession; introduction to key mining engineering activities and functions; mining methods and equipment; health and safety subsystems.

MNG 211 MINE SURVEYING. (2)
Surveying as applied to mining engineering, including the use and care of surveying instruments, measurement of horizontal and vertical distances, angles and direction, collection of ground and underground data for the design and layout of surface and underground mineral workings; and some aspects of the precise determination of position and direction for survey control. Prereq: MNG 101 and MA 113.

MNG 264 MINING METHODS. (3)
A study of the principal underground and surface mining methods practiced in coal and hard rock mines; method classification; support and equipment requirements; general mine planning; sequence of development, cycle of operations, and method application and variation. Prereq: MNG 101.

MNG 291 MINERAL RESERVE MODELING. (2)
Basic CAD drawing skills including drawing tools, basic dimensioning, coordinate systems, and crosshatching; concepts and approaches for estimation of spatial distribution of rock and mineral properties from sample data. The course emphasizes hands-on experience with mine design software for reserve estimation. Lecture, one hour; laboratory, two hours per week. Prereq: MNG 264.

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; CHE 105.

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 331 EXPLOSIVES AND BLASTING. (2)
Drilling and drill performance, types and properties of commercial explosives, initiation and priming, explosives selection, blast design, explosives applications, environmental effects, and safety and regulatory compliance. Prereq: MNG 264, CHE 105, PHY 231.

MNG 332 MINE PLANT MACHINERY. (3)
Theory and practice of mine haulage, hoisting, and drainage and pumping. Application of engineering principles to the analysis and selection of materials handling mediums for the minerals industry. Prereq: MNG 264, PHY 231; concur: EM 221.

MNG 335 INTRODUCTION TO MINE SYSTEMS ANALYSIS. (3)
Descriptive statistics; random variables & probability distributions; point estimation; hypothesis testing; linear regression; time and motion study; introduction to geostatistics. Prereq: MA 114, MNG 264.

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: ME 330 and engineering standing.

MNG 371 PROFESSIONAL DEVELOPMENT OF MINING ENGINEERS. (3)
Development of professional skills important to the practice of mining engineering. Topics include written and oral communication skills, understanding ethical responsibility and appropriate ethical conduct, real world problem formulation and solution skills, exercise of abilities important to lifelong learning, knowledge of contemporary issues important to mining engineering. Concur: COM 199; prereq: engineering standing.

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, engineering standing.

MNG 431 MINES SYSTEMS ENGINEERING AND VALUATION. (4)
Characterization and analysis of mine production systems, including economic considerations. Topics include basic production systems concepts, work sampling, standard time models, scheduling, PERT/CPM, engineering economics, mine valuation. Prereq: MNG 332, MNG 335, engineering standing.

MNG 463 SURFACE MINE DESIGN AND ENVIRONMENTAL ISSUES. (3)
Pit layout and design of excess spoil disposal areas including stability of the slopes. Design of sediment control systems to satisfy surface mine regulations. Use of design standards for various reclamation alternatives. Prereq: MNG 264, Engineering Standing.

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 305 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, MNG 303, GLY 230, and engineering standing.

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, engineering standing. (Same as MFS 563.)

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, engineering standing.

MNG 580 MINERAL PROCESSING PLANT DESIGN. (3)
Design of mineral processing plants including the associated unit operations; flowsheet development, unit selection, sizing and number, water/mass flow balancing. Prereq: MNG 301, 302; engineering standing.

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 291 and engineering standing.

MNG 592 MINE DESIGN PROJECT II. (3)
Students will undertake a major design project such as the overall design of a mining system, including design of major components of the system and economic evaluation. Students will write reports documenting this design, which will also be presented orally before a group of peers and invited experts. Lecture, two hours; laboratory, two hours per week. Prereq: MNG 341, MNG 551, MNG 591 and engineering standing.

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. Prereq: MNG 511.

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 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 flowsheeting 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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.

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 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 202 MATERIALS SCIENCE LABORATORY. (1)
To teach students the basic materials characterization laboratory techniques and demonstrate the difference in properties between different types of materials. Prereq: Concurrent enrollment in MSE 201.

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 301 MATERIALS SCIENCE II. (3)
Introduction to processing of ceramic, polymer and composite materials; relating the structure and bonding in these materials to their properties; considerations in choosing appropriate materials for engineering applications. Prereq: MSE 201, or consent of instructor.

MSE 351 MATERIAL 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 200 and MSE 201.

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 401G METAL AND ALLOYS. (3)**
Crystal structures, phase diagrams, diffusion, nucleation and growth, deformation, recovery, recrystallization and grain growth are discussed to understand the structure-property relations in metals and alloys. Prereq: MSE 201, 301 and Engineering Standing.

***MSE 402G ELECTRONIC MATERIALS AND PROCESSING. (3)**
This course will examine electron behavior in a variety of materials and the processing methods used for integrated device production. Additional topics will include thin film growth, diffusion, oxidation, electronic device principals, defect control, and a survey of current challenges to the semiconductor industry. Prereq: MSE 201, MSE 301 or related engineering/science senior/graduate level courses with instructor permission.

***MSE 403G CERAMIC ENGINEERING AND PROCESSING. (3)**
Microstructure of crystalline ceramics and glasses, and role of thermodynamics and kinetics in its formation. Effect of microstructure on mechanical and physical properties. Prereq: MSE 201, MSE 301 or consent of instructor, Engineering standing.

MSE 404G POLYMERIC MATERIALS. (3)
Synthesis, structure, and processing of polymers, useful geometric forms, mechanical and thermal properties, crystallinity, polymer blends, evaluation of polymers for specific applications (aerospace, automotive, biomedical), laboratory activities for each of the above. Prereq: Engineering standing. CHE 230 or CHE 236. MSE 301 or consent of instructor. (Same as CME 404G.)

#MSE 407 MATERIALS LABORATORY I. (3)
Various laboratory experiments that demonstrate behavior of polymers, metals, ceramics, and electronic materials. Includes instruction and practice in use of numerous instruments and equipment, typical of the materials engineering discipline. Data reduction, analysis, and interpretation is covered, as well as correct writing of reports. Prereq: MA 114, PHY 231, PHY 232, CHE 107, CHE 115, EM 221, MSE 201, MSE 301, MSE 351.

#MSE 408 MATERIALS LABORATORY II. (3)
Various laboratory experiments that illustrate crystal structure, behavior of multi-component systems, and failure modes. Provides hands-on experience with some more advanced characterization methods of polymers, metals, and ceramics. Includes data reduction, analysis, and interpretation, as well as correct writing of reports. Prereq: MA 114, PHY 231, PHY 232, CHE 107, CHE 115, EM 221, MSE 201, MSE 301, MSE 351.

MSE 436 MATERIAL 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 and Engineering standing.

***MSE 462 PHYSICAL METALLURGY OF FERROUS MATERIALS. (4)**
Relating the properties of ferrous materials to their microstructures; Fe-C alloys, plastic deformation, recovery, recrystallization and grain growth, phase transformations, heat treatments, hardening and hardenability, tempering, thermomechanical treatments are discussed from the point of view of physical metallurgy principles. Prereq: MSE 401G or consent of instructor, and Engineering Standing.

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/ME 506.)

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 538 METALS PROCESSING. (3)**
Solidification of molten alloys; fundamentals of metal working; application of metal working theories to forging, rolling, extrusion, drawing and sheet forming. Prereq: Engineering standing.

MSE 554 CHEMICAL AND PHYSICAL PROCESSING OF POLYMER SYSTEMS. (3)
Theory and practice as related to the chemical and physical processing of polymer systems. Polymer rheology, heat transfer in polymer flows, polymer engineering properties. Polymer processing operations and materials selection; flow instabilities. Prereq: CME 330, CME 425 or ME 325; or consent of instructor. (Same as CME/ME/MFS 554.)

***MSE 556 INTRODUCTION TO COMPOSITE MATERIALS. (3)**
Applications, materials selection and design of 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. Prereq: MSE 201, 301, CHE 236, and Engineering Standing, or consent of instructor. (Same as CME/ME 556.)

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 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, EE 360 or MSE 402G, or consent of instructor. (Same as EE 569.)

***MSE 585 MATERIALS CHARACTERIZATION TECHNIQUES. (3)**
This course will present the fundamentals of x-ray and electron beam interactions with solid-state materials. Both elastic and inelastic interactions will be treated, with emphasis on elastic diffraction effects. Prereq: MSE 301 and Engineering standing, or graduate status or consent of instructor.

MSE 599 TOPICS IN MATERIALS SCIENCE AND ENGINEERING (SUBTITLE REQUIRED). (1-4)
A detailed investigation of a topic of current significance in engineering and materials science such as: biomedical synthetics, electronic properties of materials, advances in metal working, history of materials technology, quantitative metallography. Theory of disclinations, scanning electron microscopy. 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 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 620 COMPUTATIONAL MATERIALS SCIENCE ENGINEERING. (3)
The effective use of existing computer software in the area of materials science engineering. Use of computers to model processes and examine and predict materials properties at the macroscopic and atomistic level. Prereq: Graduate standing in physical sciences and engineering, strong background in material properties and structure similar to the material covered in MSE 401G, MSE 403G, and MSE 404G, and some programming experience in C or FORTRAN; or consent of instructor.

MSE 622 PHYSICS OF POLYMERS. (3)
An in-depth look at the physical and mathematical descriptions of polymer behavior. Comparison of diverse approaches to modeling the same behavior. Study of isolated polymer chain and how it relates to polymers in rigid, rubbery, melt, and solution states. Prereq: Graduate standing and undergraduate degree in the physical sciences or engineering that includes advanced calculus, differential equations, and matrix algebra. (Same as CME 622.)

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 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 663 OPTOELECTRONIC DEVICES. (3)**
Theory and applications of photodetectors, solar cells, semiconductor lasers, light emitting diodes and display devices, nanocrystalline structures and organic semiconductors applications in optoelectronic devices. Prereq: EE 360 or MSE 402G, consent of instructor and/or graduate standing. (Same as EE 663.)

MSE 664 MULTIDISCIPLINARY SENSORS LABORATORY. (3)
A multidisciplinary laboratory course with laboratory experiences in areas related to sensors and sensing architectures, typically including chemistry, chemical and materials engineering, and electrical engineering. Lecture, 1 hour; laboratory, 2 hours. Prereq: One year of college chemistry, calculus and physics. GS 660 or by consent of instructor. (Same as CHE/CME/EE 664.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 110 DOUBLE REED MAKING LAB. (1)
This lab is designed for double reed players to learn how to make and adjust the reeds used to play the oboe and bassoon. May be repeated to a maximum of eight semesters. Prereq: Concurrent registration in MUP oboe or bassoon, or with consent of the instructor.

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.

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 197 MOVEMENT FOR SINGERS. (1)
A course to teach movement and coordination of the body for singers. Course will also introduce different styles of movement required for singers in opera and musical theatre. May be repeated to a maximum of 8 times. Prereq: Consent of instructor.

#MUC 198 OPERA PRODUCTION PRACTICUM. (1)
The study and practice of production techniques through rehearsal and performance participation. May be repeated to a maximum of 4 credit hours (1 credit hour per semester). 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.

Undergraduate Courses Numbered 100-499 (1-3)	Graduate Courses Numbered 500 and above (1-4)
PIANO	
MUP 101, 201, 301, 401,	501, 601, 701
VOICE	
MUP 102, 202, 302, 402,	502, 602, 702
ORGAN	
MUP 103, 203, 303, 403,	503, 603, 703
VIOLIN	
MUP 104, 204, 304, 404,	504, 604, 704
VIOLA	
MUP 105, 205, 305, 405,	505, 605, 705
CELLO	
MUP 106, 206, 306, 406,	506, 606, 706
STRING BASS	
MUP 107, 207, 307, 407,	507, 607
FLUTE	
MUP 108, 208, 308, 408,	508, 608, 708
OBOE	
MUP 109, 209, 309, 409,	509, 609, 709
CLARINET	
MUP 110, 210, 310, 410,	510, 610, 710
BASSOON	
MUP 111, 211, 311, 411,	511, 611, 711
TRUMPET	
MUP 112, 212, 312, 412,	512, 612, 712
FRENCH HORN	
MUP 113, 213, 313, 413,	513, 613, 713
TROMBONE	
MUP 114, 214, 314, 414,	514, 614, 714
EUPHONIUM	
MUP 115, 215, 315, 415,	515, 615
TUBA	
MUP 116, 216, 316, 416,	516, 616, 716
SAXOPHONE (ALTO)	
MUP 117, 217, 317, 417,	517, 617, 717
PERCUSSION	
MUP 118, 218, 318, 418,	518, 618, 718
HARP*	
MUP 119, 219, 319, 419,	519, 619
HARPSICHORD	
MUP 120, 220, 320, 420,	520, 620
ENGLISH HORN	
MUP 321,	521
HISTORICAL INSTRUMENTS*	
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

MUS 001 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 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 I. (3)
Survey of the history of music from the Medieval through the Baroque period (approximately 800 - 1750). Required of all music majors. Prereq: For music majors, sophomore standing; non-music 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. (3)
Development of personal philosophy of music education. Elements of singing posture, breathing, diction and choral tone. Demonstration of effective choral warm-ups. Beginning conducting and rehearsal keyboard skills. Prereq: MUS 172, 173, or consent of instructor.

MUS 263 INSTRUMENTAL MUSIC METHODS AND MATERIALS SEMINAR I. (3)
Historical and philosophical foundations of music education. Comprehensive study of teaching methods and materials for instrumental music in the elementary and early middle schools. Secondary instrument performance and group teaching. Observations in the public schools with emphasis on the elementary and middle school levels. Prereq: MUS 172 and 173 or consent of instructor.

MUS 264 VOCAL MUSIC METHODS AND MATERIALS SEMINAR II. (3)
Comprehensive study of teaching methods and materials for choral music in the middle school and high school. Study of the changing voice and supervised experimental teaching in middle school. Audition procedures, placement of voices, sight-reading methods and evaluation of repertoire. Beginning to intermediate choral conducting, keyboarding skills. Prereq: MUS 262.

MUS 265 INSTRUMENTAL MUSIC METHODS AND MATERIALS SEMINAR II. (3)
A study of the organization and administration of the school instrumental music program. Repertoire for secondary school bands and orchestras. Study of teaching methods, styles, and music literature for the high school jazz band. Continuation of observations and visitations. Continuation of secondary instrument performance and group teaching. 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. (Same as AAS 300.)

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.

MUS 302 HISTORY OF MUSIC II. (3)
A survey of the history of European music during the Classic and Romantic periods of the 18th and 19th centuries. Required of all music majors. Prereq: For music majors, MUS 203 and junior standing; non-music majors, consent of instructor.

MUS 303 HISTORY OF MUSIC III. (3)
A survey of the history of music from the Twentieth century including vernacular and cultivated musical expression of the United States. Required of all music majors. Prereq: Music majors - junior standing; non-music 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. (3)
A continuation of 262 and 264. Study of performance practice and rehearsal techniques for the choral music of each historical period. Conducting/study of the literature for the high school chorus. A study of the organization and administration of the school choral program. Prereq: MUS 262, 264.

MUS 363 INSTRUMENTAL MUSIC METHODS AND MATERIALS SEMINAR III. (3)
A continuation of MUS 263 and 265. Beginning to intermediate instrumental conducting. An introduction to teaching high school marching band; fundamentals, administrative procedures, drill writing, music selection and rehearsal. Continuation of secondary instrument performance and group teaching. Continued observation in the public schools with emphasis on high school bands and orchestras. Prereq: MUS 265.

MUS 365 INSTRUMENTAL MUSIC METHODS AND MATERIALS SEMINAR IV. (3)
Advanced conducting; emphasis on advanced rehearsal techniques with use of instructional materials and advanced music for the high school ensemble. Continuation of secondary instrument performance and group teaching. Continued observation in the public schools with options for teacher-aide assignment. Prereq: MUS 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 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 500 MUSIC OF THE MIDDLE AGES. (3)
The development of Western music through the 14th century. Prereq: MUS 203 or consent of instructor.

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 survey of cultivated and vernacular musical styles in America from Colonial times to the present. 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 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 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 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 I. (3)
An intensive study of the history and literature of opera from its origins around 1600 through the early Romantic period. 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 627 OPERA LITERATURE II. (3)
An intensive study of the history and literature of opera from the early Romantic period through the present. Prereq: Graduate standing in music 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 ANALYSIS OF TONAL MUSIC I. (3)
An introduction to and exploration of analytical techniques and issues relevant to music before 1900, addressing as well the performance implications of analytical decisions insofar as possible. Various musical dimensions will be studied including motivic structure, meter/rhythm, harmonic syntax, formal processes and text/music relationships. Prereq: MUS 578 or equivalent.

MUS 671 ANALYSIS OF TONAL MUSIC II. (3)
Introduction to the theories of Heinrich Schenker, their application to the analysis of tonal music and to performance. Intensive analytical work and selected readings. Prereq: MUS 578 or equivalent.

MUS 672 ANALYSIS OF MUSIC SINCE 1900 I. (3)
An introduction to and exploration of analytical techniques and issues relevant to the literature since 1900, addressing as well the performance implications of analytical decisions insofar as possible. Various musical dimensions will be studied including motivic structure, meter/rhythm, harmonic syntax, formal processes and text/music relationships. 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 675 INTERNSHIP IN THEORY PEDAGOGY. (1)
An internship providing pedagogical experience in undergraduate music theory (written and aural). Internship is conducted under the supervision of a faculty member who is teaching an undergraduate music theory course (MUS 170, 171, 172, 173, 270, 271, 272, or 273). May be repeated to a maximum of four credits.

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 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 694 INTERNSHIP IN SACRED MUSIC. (1)
An internship to provide students in the Master of Music in Sacred Music program with a practical field experience in a sacred setting. The internship is identified and conducted under the supervision of a UK School of Music faculty supervisor and on-site coordinator. Students must file a Learning Contract with the School of Music DGS. May be repeated to a maximum of three credits. Prereq: Completion of 12 hours in the M.M. in Sacred Music program or by 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 AND RENAISSANCE NOTATION. (3)
The study and transcription of the notation of medieval and Renaissance polyphony, and of the various keyboard and lute tablatures of the 16th and 17th centuries. 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 703 PROSEMINAR IN MUSICOLOGICAL METHODS. (3)
An introductory exploration into the methodologies currently utilized in the field of musicology. Prereq: Consent of instructor.

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 750 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 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.

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 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 CHILD NEUROLOGY INDEPTH.

NEU 852 RESEARCH IN NEUROLOGY

NEU 853 NEUROLOGY CONSULTATION

NEU 854 CLINICAL NEUROPHYSIOLOGY (EEG, EMG, AND EVOKED POTENTIALS)

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 201 INTRODUCTION TO THE DIETETICS PROFESSION. (1)
An introduction to careers in dietetics. This course examines specialties in dietetics practice, the process toward certification as a registered dietitian and the code of ethics and standards of practice of the American dietetics Association.

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. Prereq: Limited to NFS, Family and Consumer Science (FSC) department majors and with permission of instructor.

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. Prereq: BIO 152; CHE 105 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 241 FOOD SERVICE SANITATION. (1)
This course covers the principles of food microbiology, important food borne diseases, standards that are enforced by regulatory agencies, and applied measures for the prevention of food borne diseases and other microbiological problems. It leads to certification from the National Restaurant Association.

NFS 301 DIETETICS PRACTICE. (2)
An overview of the dietetic profession including education requirements, career roles and responsibilities. Basic skills needed by the dietitian are reviewed with emphasis on communication, media, nutritional care, medical terminology, medical nutrition therapy, and food service management. Prereq: NFS 201.

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 and PGY 206 may be taken concurrently or consent of instructor.

NFS 312 NUTRITION AND WELLNESS IN THE LIFE CYCLE. (3)
A study of the physiological changes occurring in the life cycle with associated nutrient needs. The course focuses on nutrient needs in in-utero to geriatrics, health promotion, agency and worksite accommodations for community health, prevention education, personal care program development and community interventions. Prereq: NFS 212.

NFS 314 DIETETICS: COUNSELING AND COMMUNICATION. (3)
Development of competency in collection and interpretation of food/diet related data. Strategies and techniques for promoting change in nutrition behaviors will be included. Lecture, one hour; laboratory, four hours per week. Prereq: NFS 212 and Dietetics major only.

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. (4)
An introduction to the production and service of food in quantity, to include the application of production techniques and controls, menu planning and service. Lecture, two hours; laboratory, 4.5 hours per week. Prereq: NFS 204 or HMT 208, and NFS 241.

NFS 346 HUMAN RESOURCES MANAGEMENT FOR THE FOOD AND HOSPITALITY INDUSTRIES. (3)
Exposes the student to all aspects of human resources management in the hospitality and health care industry context. Topics covered include planning, selection, placement, training, disciplining employees, labor relations and compensation. Prereq: Hospitality and Tourism major or Dietetics major.

NFS 403 COMMUNITY NUTRITION AND WELLNESS. (3)
Study of nutrition education programs on a community level. Experience is provided for presenting nutrition in health clinics, health camps, schools, state institutions, family resource centers, and corporate wellness programs. Attention is paid to special populations, including pregnant women, children, adults, the elderly, and persons with disabilities. Prereq: NFS 312.

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 480 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. May be repeated to a maximum of six credits. Prereq: Consent of instructor and senior status in the Dietetics Didactic Program.

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. (4)
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 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 603 ADVANCED COMMUNITY PROGRAM DEVELOPMENT. (3)
The course focuses on concepts and theories of program development, use of planned goals and objectives such as Healthy Communities-goals and objectives, use of data from national monitoring, survey and surveillance programs, and community assessment to guide decision making for program development. Program marketing, staffing formulas, and grant writing and grant management, cost analysis and cost effectiveness reporting, and formative and summative evaluation of community programs complete the study. Prereq: Admission to graduate program.

NFS 607 FOOD RELATED BEHAVIORS. (3)
This team-taught course will provide background in topics and methods in food related behaviors to students in Nutritional Sciences and other interested students. The course will follow a problem-based learning approach, and will consist of 3 out of 4 modules in any given year. The four modules will be Social and Cultural Perspectives on Food, Psychological Perspectives on Food and Food Behaviors, Challenges to Community Food Security, and International Issues in Nutrition. (Same as ANT 607, NS 607, BSC 607.)

NFS 610 MARKETING IN HOSPITALITY AND DIETETICS. (3)
This course overviews the discipline of marketing as it relates to the hospitality and dietetics professions. Special emphasis will be placed on the analysis of the marketing environment, marketing strategies and the diversity of marketing practices used by the hospitality industry and dietetics profession. This course will provide opportunities for students to develop appropriate marketing approaches in today's increasingly competitive and complex global marketplace. Prereq: MKT 300 or HMT 320 or equivalent course.

NFS 620 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. (Same as NS 620.)

NFS 630 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. (Same as NS 630.)

NFS 640 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. (Same as NS 640.)

***NFS 646 ADVANCED INFORMATION TECHNOLOGY IN THE HOSPITALITY INDUSTRY. (3)**
This course will engage students in the latest technology used by the hospitality industry and the dietetics profession for advancement of human, material and financial resources. Strategies and applications using technology to gain competitive advantage will be investigated. Students should be able to examine the problems of technology in the hospitality and dietetics industries and to provide solutions. Students will have the opportunity to do the class completely on-line or a combination of traditional classroom and on-line teaching. Prereq: Admission to the graduate program.

NFS 648 MANAGEMENT OF HOSPITALITY AND DIETETICS ORGANIZATIONS. (3)
This course will engage students with the theories and their application in the area of leadership and management of people, resources, finances, information and internal and external customers as they relate to dietetics, food service and hospitality professions. Prereq: Admission to graduate program, NFS 346 or equivalent course.

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 690 ADVANCED WORK IN DIETETICS. (3)
Evaluation of administrative practices in dietetics. This course will examine topics related to managing dietetics services including medical nutrition therapy protocols, dietetics outcomes research, parenteral and enteral support, clinical pathways, JCAHO requirements, state and institutional policy controls, reimbursement for dietetics services, in-patient and out-patient quality management, and hospital outreach programs. Prereq: Admission to graduate program. Lecture only course.

NFS 694 STRATEGIC PLANNING IN HOSPITALITY, LODGING AND TOURISM. (3)
This course is designed to shape students' understanding of strategic planning as it relates to hospitality, lodging, and tourism. The concepts utilized to accomplish this objective represent several discipline areas such as: organizational theory, strategic management, and the function of management. Prereq: Admission to graduate program.

NFS 704 CURRENT TOPICS IN NUTRITIONAL SCIENCES. (1)
This course is designed to develop the student's independent thinking and critical analysis related to various nutritional sciences issues. These skills will be developed through reading assignments and group discussion related to current topics in nutrition. Prereq: Consent of instructor. (Same as CNU/NS 704.)

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. (Same as NS 748.)

NFS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)
May be repeated to a maximum of 12 hours. (Same as NS 768.)

NFS 770 SEMINAR IN HOSPITALITY AND DIETETICS ADMINISTRATION. (1)
Investigation of recent research in Hospitality and Dietetics Administration. May be repeated to a maximum of three credits.

NFS 772 CURRENT TOPICS IN HOSPITALITY AND DIETETICS ADMINISTRATION. (2)
Faculty from different disciplines will provide in-depth coverage of selected topics in Hospitality and Dietetics Administration.

NFS 781 ADVANCED TRENDS ANALYSIS IN HOSPITALITY AND TOURISM. (3)
The student will investigate the major trends occurring in the hospitality, lodging, and tourism industry and develop analytical skills required to interpret them. Throughout the course, the student should be able to identify trends; their timing; the causal effects they have on organizations; the actual probability of their occurrence; and impact they will have on the organization. Prereq: Admission to graduate program.

NFS 782 SPECIAL PROBLEMS. (1-6)
Independent advanced work on a special problem in nutritional sciences. Prereq: Consent of graduate advisor. (Same as CNU/NS 782.)

NFS 784 SPECIAL PROBLEMS IN INSTITUTION MANAGEMENT. (3)
A current events approach to the financial and accounting decision-making process in dietetics and hospitality administration. The course will prepare advanced students in dietetics and hospitality administration to analyze and make sound financial decisions in settings relevant to the dietetics profession and the hospitality industry. Prereq: Admission to graduate program, ACC 201 or HMT 350 and FIN 300 or equivalent courses.

NFS 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. (Same as CNU/NS 790.)

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/AP4.

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/AP4.

NFS 810 THERAPEUTIC NUTRITION: PRACTICUM. (5)
Supervised practice in health care facilities. Course focuses on patient assessment, diet planning, care plan implementation, and nutritional evaluation. Laboratory, fifteen hours per week. Prereq: Admission to Coordinated Program/AP4; concur: enrollment in NFS 818, NFS 812.

NFS 812 FOOD SERVICE SYSTEMS: PRACTICUM. (5)
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 resources management, marketing, and training. Prereq: Admission to Coordinated Program/AP4.

NFS 814 ADVANCED FOOD SERVICE SYSTEMS PRACTICUM. (3)
In-depth application of food service management in a variety of food service operations. Provides variety of experience in operations, financial, and managerial aspects of food services. Experience based on performance requirements established by the American Dietetic Association for the entry-level generalist dietitian. Prereq: Admission to Coordinated Program/AP4.

NFS 816 ADVANCED THERAPEUTIC NUTRITION PRACTICUM. (3)
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 Dietetic Association for the entry-level generalist dietitian. Prereq: Admission to Coordinated Program/AP4.

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/AP4.

NRC Natural Resource Conservation and Management

NRC 301 NATURAL RESOURCE CONSERVATION AND MANAGEMENT. (3)
A beginning course in conservation and management of natural resources, with an emphasis on terrestrial resources. Structured inquiry will be used to illuminate major natural resource issues. Prereq: Sophomore standing in Natural Resource Conservation and Management, or consent of instructor.

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 330 NEPA COMPLIANCE. (3)
This course focuses on Federal agencies' compliance activities associated with the National Environment Policy Act. Implementing regulations issued by the Council on Environmental Quality and guidelines for NEPA compliance issued by various agencies comprise the foci for this course. Prereq: NRC 301 or consent of instructor.

NRC 380 ANALYSIS OF NATURAL RESOURCE SYSTEMS. (3)
An intermediate course that teaches the analysis of complex natural resource systems through case studies, with emphasis on the scientific basis of such systems, but including interactions with social factors. Prereq: NRC 301.

NRC 381 NATURAL RESOURCE POLICY ANALYSIS. (3)
Using an integrative systems approach, this course will generate a holistic framework of policy analysis related to natural resource conservation and management. Major integrative themes in this course will be economics, government, institutions, social, psychological, cultural and other human systems. Prereq: NRC 301 (no exceptions made).

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. (Same as BIO 420G.)

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 PLS 450G.)

NRC 455G WETLAND DELINEATION. (3)
Basic concepts of natural wetland ecosystems, their importance, functions, and major features used for their identification and classification. Application of basic hydrology, hydrophytic vegetation and hydric soil indicators for identification of jurisdictional wetlands utilizing documentation and analysis of field collected data. Three laboratory exercises and four short field trips required. Prereq: PLS 366 or consent of instructor. (Same as PLS 455G.)

NRC 456G CONSTRUCTED WETLANDS. (3)
Important aspects of the functions of natural and constructed wetlands as water purifiers. Principles and mechanisms of the purification process, design, construction, operation and management criteria for efficient usage. Case studies and design problems of constructed wetlands on mining, agricultural, industrial and municipal wastewater treatment applications. Two all day field trips are required. Prereq: PLS 366 or consent of instructor. (Same as PLS 456G.)

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 PLS 477G.)

NRC 545 RESOURCE AND ENVIRONMENTAL ECONOMICS. (3)
This course builds on the principles of economics to analyze the problems in achieving an efficient allocation of resources. It provides the theoretical concepts for evaluating environmental policies and the tools necessary in the application of benefit/cost analysis. Prereq: ECO 201. (Same as AEC 545.)

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, junior/senior, or graduate student, CS 101, FOR 200 or GEO 415, or permission of instructor. (Same as LA 855.)

NS Nutritional Sciences

NS 601 MACRONUTRIENT METABOLISM. (4)
Emphasis will be on macronutrient assimilation and utilization and will include lectures, discussions and student presentations related to energy balance and protein-lipid-carbohydrate metabolism and its relationship to health maintenance. This course integrates biochemistry, physiology and nutrition with regards to macronutrient metabolism. Prereq: NFS 311 and PGY 206 or equivalent or consent of instructor. (Same as CNU 601.)

NS 602 MICRONUTRIENT METABOLISM. (4)
Detailed study of the properties, metabolism, biochemical and physiological functions and interactions of vitamins and minerals, and their relationships to deficiency symptoms and toxicity. Prereq: BCH 401G or consent of instructor. (Same as ASC 602.)

NS 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: NS/CNU 601, BCH 401G and PGY 412G or consent of instructor. (Same as CNU 604.)

NS 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/PT 605.)

NS 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. (Same as CNU 606.)

NS 607 FOOD RELATED BEHAVIORS. (3)
This team-taught course will provide background in topics and methods in food related behaviors to students in Nutritional Sciences and other interested students. The course will follow a problem-based learning approach, and will consist of 3 out of 4 modules in any given year. The four modules will be Social and Cultural Perspectives on Food, Psychological Perspectives on Food and Food Behaviors, Challenges to Community Food Security, and International Issues in Nutrition. (Same as ANT 607, NFS 607, BSC 607.)

NS 608 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. (Same as CNU 608.)

NS 609 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 CNU 609.)

NS 620 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. (Same as NFS 620.)

NS 630 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. (Same as NFS 630.)

NS 640 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. (Same as NFS 640.)

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 701 NUTRITION AND CHRONIC DISEASES, (4)
Selected topics in nutritional sciences as related to health and chronic diseases, e.g., gastrointestinal disease, cancer, AIDS, diabetes, cardiovascular disease, obesity, including drug-nutrient interactions. Prereq or concur: NS/CNU 601, NS/ASC 602. (Same as CNU 701.)

NS 702 CLINICAL/WELLNESS NUTRITION PROBLEM-BASED CASE STUDIES. (1-3)
A problem-based learning approach to case studies is integrated with a traditional didactic approach to offer options in therapeutic nutrition, and/or health promotion. 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 class presentations including case studies regarding rotations through various medical or health services e.g. surgery, pediatrics, nutrition support and health promotion. Prereq: NS/CNU 601, NS/ASC 602, NS/CNU 701, NS/NFS 610 and graduate status or consent of instructor. (Same as CNU 702.)

NS 704 CURRENT TOPICS IN NUTRITIONAL SCIENCES. (1)
This course is designed to develop the student's independent thinking and critical analysis related to various nutritional sciences issues. These skills will be developed through reading assignments and group discussion related to current topics in nutrition. Prereq: Consent of instructor. (Same as CNU/NFS 704.)

NS 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. (Same as NFS 748.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

NS 768 RESIDENCE CREDIT FOR THE MASTER'S DEGREE. (1-6)
May be repeated to a maximum of 12 hours. (Same as NFS 768.)

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 782 SPECIAL PROBLEMS. (1-6)
Independent advanced work on a special problem in nutritional sciences. Prereq: Consent of graduate advisor. (Same as CNU/NFS 782.)

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. (Same as CNU/NFS 790.)

NUR Nursing

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 512 COMPLEMENTARY/ALTERNATIVE APPROACHES TO HEALTH CARE. (3)
Using a holistic approach to wellness, this course is an overview of alternative ways of conceptualizing health and illness. Non-traditional methods of managing illness and promoting health and well-being will be discussed. Practitioners of these methods will participate in discussions and involve students in experiencing some of these practices. Alternative methods that reflect use in a number of other cultures will be explored as complementary to the traditional western style of medicine which is used almost exclusively in this country. Prereq: Junior level. Consent of instructor for students outside the health professions.

NUR 514 ADVANCED HEALTH ASSESSMENT. (2)
This advanced health assessment course offers essential assessment and skill development opportunities for advanced practice nursing. It includes intensive work on the principles and techniques of performing a comprehensive health assessment in the context of developmental, physiological, psychological, and environmental parameters. Individual, family, and community assessment models are analyzed for use with diverse populations. Clinical emphasis will be placed on comprehensive health assessment of individual clients consistent with advanced nursing practice. Prereq: Enrollment in graduate program in Nursing, or the RN-BSN program and consent of instructor.

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 530 EXPLORING MEDICAL MISSIONS: A MULTIDISCIPLINARY PERSPECTIVE. (3)
This seminar is designed to provide information on: (1) historical perspectives of mission work; (2) health, political, economic, and cultural diversities of mission sites in selected countries; and (3) eligibility and funding criteria for selected sites. This course provides an opportunity to learn about short-term humanitarian medical missions (sponsored by independent non-governmental and multi-denominational religious organizations). Health care professionals who have participated in medical missions will share their experiences. Prereq: Available to graduate or senior level undergraduate students.

NUR 601 THEORETICAL BASIS FOR ADVANCED PRACTICE NURSING. (2)
Selected concepts and theories useful for guiding advanced practice nursing are examined. The concepts and theories are drawn from nursing science as well as from other disciplines. All are discussed within the context of the nature of nursing knowledge and the expanding scientific basis for advanced practice nursing. Prereq: Enrollment in graduate program in Nursing or consent of instructor.

NUR 602 RESEARCH METHODS IN ADVANCED PRACTICE NURSING. (3)
This course provides the knowledge and skills essential for using research to support clinical and organizational decision making. The strengths and limitations of various research designs and methods are reviewed for their utility in answering clinical questions, evaluating care delivery and patient outcomes, and making clinical decisions. Prereq: Graduate level statistics (pre- or corequisite). Enrollment in Graduate program in Nursing or consent of instructor.

NUR 603 CLINICAL REASONING IN ADVANCED PRACTICE NURSING. (3)
The intent of this course is for students to enhance their abilities to think logically, use clinical evidence and research findings in making clinical decisions. Concepts and principles from the biopsychosocial sciences, clinical epidemiology, informatics, and ethics will be used in developing ways for defining problems; managing the health care of individuals, groups, and populations; and measuring and monitoring the outcomes of care. Strategies for organizing, managing, and using clinical data in decision making will be addressed. Prereq: NUR 601 and NUR 602. Enrollment in graduate program in Nursing or consent of instructor.

NUR 604 LEADERSHIP IN ADVANCED PRACTICE NURSING. (3)
This course focuses on leadership and management of health care delivery by advanced practice nurses. Emphasis will be placed on leading change related to improving health outcomes, especially in relation to those areas targeted by national health care objectives. Students will critically analyze theory and research from nursing and related sciences to understand social, cultural, economic, and political issues in the health care environment. Legislative and regulatory requirements related to the practice of advanced nursing will be appraised, with an emphasis on understanding how to promote the health of the public within appropriate legal boundaries and within the context of interdisciplinary practice. Students will use selected frameworks for evaluating organizational and public policies affecting health. Prereq: NUR 603, enrollment in graduate program in Nursing or consent of instructor.

NUR 605 EVIDENCE-BASED NURSING PRACTICE. (3)
This course provides the opportunity to apply knowledge of the research process, research utilization and program evaluation models, or evidence-based practice to address a clinical program. Under the guidance of a faculty advisor, students are expected to work with clinical staff to identify and address a clinical problem. A written scholarly report reflecting the process and outcomes of the activity is the final product. Prereq: NUR 602, enrollment in graduate program in Nursing or consent of instructor. Co-req: NUR 708, NUR 714, NUR 724, NUR 727, or NUR 734 (depending on student's specialty area.)

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 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 627 ISSUES IN RURAL NURSING AND HEALTH CARE DELIVERY. (3)
This course will focus on the exploration of models for providing preventive, primary health care, acute care, and chronic health care services in rural areas, including nursing care delivery models. Model standards for implementing the national health objectives in rural communities will be the primary focus. Demographic characteristics and organization of the community will be considered in assessing appropriateness and effectiveness of models for improving access to service and reducing disparity among subpopulations. Prereq: Enrollment in graduate program in nursing or consent of instructor.

NUR 629 EPIDEMIOLOGICAL PRINCIPLES APPLIED TO HEALTH CARE AND NURSING PRACTICE. (3)
This course reviews the basic concepts and methods of epidemiology applied to population focused health care and nursing practice. Emphasis is placed on the use of epidemiologic reasoning in deriving inferences about the etiology of health outcomes from population data, and in guiding the design of health service programs. Prereq: STA 570 or equivalent.

NUR 631 APPLICATIONS OF ADVANCED HEALTH ASSESSMENT. (2)
This advanced health assessment course is the second of two courses that offers essential assessment and skill development opportunities for advanced practice nursing. It includes intensive work on the principles and techniques of performing a comprehensive health assessment in the context of developmental, physiological, psychological, and environmental parameters. Individual, family, and community assessment models are analyzed for use with diverse populations. Emphasis is to differentiate normal and abnormal health findings for diverse individuals, families, and communities. Prereq: NUR 630, enrollment in graduate program in Nursing or consent of instructor.

NUR 632 COMPREHENSIVE PATIENT MANAGEMENT I. (2)
This clinical course places an emphasis on the role of the advanced practice nurse as a member of the health care team across a variety of settings. The clinical experience focuses on comprehensive patient assessment, diagnosis and management of health problems for individuals and their families. Prereq: NUR 631, NUR 706 or NUR 726 or NUR 722 (depending on the student's specialty track).

NUR 633 COMPREHENSIVE PATIENT MANAGEMENT II. (2-4)
This clinical experience focuses on synthesis of theoretical, scientific, and clinical knowledge as well as practice-based skills in the diagnosis and management of existing and potential health problems based on appropriate standards of care. Emphasis will be placed on the collaborative and leadership roles of the advanced practice nurse in health care delivery. Prereq: NUR 707, 726 or 723.

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 653 PATHOPHYSIOLOGY. (3)
This course is designed to present an orientation to disease as disordered physiology. It is intended to enable the student to understand how and why the symptoms and signs of various physical and mental conditions appear. In approaching disease as disordered physiology, the mechanism(s) of production of the symptoms and signs of different disease syndromes are analyzed. Student's needs to understand the mechanism(s) underlying the disease and its clinical manifestations so that rational therapies can be devised. Thus, appropriate screening and diagnostic laboratory evaluative methods will also be included. Prereq: Undergraduate physiology and enrollment in the graduate program in Nursing or consent of instructor.

NUR 658 RISKY BEHAVIORS AND HEALTH. (3)
This course examines the epidemiological, psychological, and theoretical perspectives of risk taking behavior and its health consequences across the lifespan. Fundamental risk concepts about individual and group risk taking behaviors, and models and practices that reduce risky behaviors are discussed. Selected topics include stress, tobacco, drug, alcohol, and medication abuse, unplanned pregnancy, sexually transmitted diseases, eating disorders, occupational and sports activities, and violence. Prereq: Graduate standing.

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 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 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 704 ACUTE AND CHRONIC ILLNESS AND NURSING THERAPEUTICS I. (3)
This course deals with advanced practice nursing care for adults with acute and chronic illnesses and their families. Advanced practice nursing care requires understanding the conditions that may influence patient/family quality of health, or wellness, as well as the consequences of disease and its treatment. The concept of transitions is introduced as central to advanced nursing practice. The conditions that influence illness perception and patient/family responses to illnesses, adherence to therapeutic regimens, and lifestyle changes are examined. Nursing therapeutics are explored for their effectiveness in positively influencing patient/family outcomes. Prereq: NUR 602, NUR 630, enrollment in graduate program in Nursing or consent of instructor. Pre- or coreq: NUR 603, NUR 631, NUR 652, NUR 653.

NUR 705 ACUTE AND CHRONIC ILLNESS AND NURSING THERAPEUTICS II. (6)
This course deals with advanced practice nursing care for adults with acute and chronic illnesses and their families. Emphasis on understanding the conditions influencing patient/family quality of health and the consequences of disease and its treatment continues. Symptom interpretation and management are explored. Nursing therapeutics are examined for their effectiveness in managing symptoms and enhancing quality of health. The clinical experience provides opportunities to analyze selected roles in APN by working with other healthcare professionals. Under the guidance of a faculty advisor and preceptor, the student will assist patients and their families in promoting health across a spectrum of health care transitions. Prereq: NUR 704, enrollment in graduate program in Nursing or consent of instructor. Pre- or coreq: NUR 604.

NUR 706 ADVANCED PRACTICE NURSING CARE OF ACUTELY ILL ADULTS. (2)
This course focuses on the role of the acute care nurse practitioner in assessing, diagnosing, and managing acute episodes in the chronically ill adult. Emphasis is placed on the use of research and theories from biological, behavioral, and advanced practice nursing to facilitate the comprehensive care of chronically ill patients and their families. Prereq: NUR 725. Coreq: NUR 631 and NUR 652.

NUR 707 ADVANCED PRACTICE NURSING CARE OF CRITICALLY ILL ADULTS. (6)
The didactic portion of this course focuses on the assessment, differential diagnosis and management of critically ill adults. Emphasis is placed upon biological, behavioral and advanced nursing concepts and research in order to facilitate the management and evaluation of therapies for critically ill adults and their families. The clinical portion of this course focuses on the care of critically ill adults in high acuity environments. The emphasis is placed upon students becoming a collaborative member of the health care team and incorporating both medical and advanced nursing concepts in the care of critically ill adults and their families. Prereq: NUR 632, NUR 706.

NUR 708 MEASURING AND DOCUMENTING NURSING PRACTICE. (4)
This course provides the knowledge and skills essential for advanced practice nurses to evaluate patient care. A systematic approach to collecting information related to nursing practice provides nurses with opportunities to substantiate their contributions to advanced practice. Measuring, documenting, and reporting patient, family, and organizational outcomes will be addressed. Mechanisms for evaluating nursing practices with regard to available resources also are examined. Clinical experience provides opportunities to continue to work with adults with acute and chronic illnesses. In addition, students will focus on the use of practice evaluation methods to document patient/family outcomes within a specific agency. Prereq: NUR 705 or NUR 707 (depending on the student's specialty area). Coreq: NUR 605.

NUR 712 ADVANCED PARENT-CHILD SEMINAR. (3)
The student will focus on evaluation of relevant beliefs, concepts, and theories related to maximizing the health of the family from pre-conception through adolescence. Using evidence-based literature, the student will explore physiologic, pathophysiologic, cognitive, behavioral, and psychosocial concepts, theories, and issues for their relevance in providing innovative approaches to family health care. Attention will be directed toward economic, ethical, cultural, legal, political and geographic factors that influence health behavior and care delivery. Family and child developmental theories will be used as an integrating framework. Prereq: NUR 601, NUR 602, enrollment in the graduate program in Nursing or consent of instructor.

***NUR 713 ADVANCED NURSING CARE FOR FAMILIES, PRE-CONCEPTION THROUGH ADOLESCENCE I. (4-6)**
The students in this course will test concepts and theories relevant to families. Collaboration with the family and other health care disciplines related to clinical decision making is expected. Students will apply knowledge with a variety of populations. Prereq: NUR 712, enrollment in graduate program in Nursing or consent of instructor.

***NUR 714 ADVANCED NURSING CARE FOR FAMILIES, PRE-CONCEPTION THROUGH ADOLESCENCE II. (2-4)**
Knowledge of families, pre-conception through adolescence, leadership, and clinical skills are applied to provide advanced nursing care to a selected population. Emphasis is placed on maximizing health and resolving actual or potential health problems for the individual and the family. Analysis of system problems in health care delivery is conducted. Prereq: NUR 713, enrollment in graduate program in Nursing or consent of instructor. Pre- or coreq: NUR 604.

NUR 722 CLINICAL TOPICS IN ADVANCED PRACTICE PSYCHIATRIC MENTAL HEALTH NURSING. (3)
The focus of this course is on concepts, theories and research underlying advanced practice psychiatric nursing (APPN). The four functions of the APPN - psychotherapy, psychobiological interventions, clinical supervision, and consultation - within the context of ethical decision-making are emphasized. Epidemiology, definitions, and classification models for mental health and mental illness are explored as a base for clinical decision making in advanced psychiatric nursing practice. Psychological, social and cultural influences on coping responses of individuals and families across the lifespan, groups, and communities for people/populations at risk are explored. Intervention models including prevention and models incorporating psychiatric and physical co-morbidities are introduced. Pre or co-requisite: NUR 514, enrollment in graduate program in nursing or consent of instructor.

NUR 723 ADVANCED PRACTICE PSYCHIATRIC NURSING I. (6)
This course provides the opportunity for study of conceptual frameworks, theories, and research findings in clinical practice. The course focuses on the psychotherapy, psychobiological and supervision functions of the Advanced Practice Psychiatric nurse. Expansion of practice, the scope of primary prevention, biological and pharmacological theories, and psychotherapy model for interventions with clients, families, and the community are emphasized. Clinical experiences and sites will reflect multicultural concerns and emerging trends in the delivery of psychiatric care. During clinical experiences, comprehensive psychiatric assessments, diagnosis of common psychiatric illnesses, and co-occurring physical and substance abuse problems, and interventions will be practiced. Supervision as a function of the Advanced Practice Psychiatric Nurse is incorporated in clinical work. Prereq: NUR 722, enrollment in the graduate program in nursing or consent of instructor. Co-requisite: NUR 631.

NUR 724 ADVANCED PRACTICE PSYCHIATRIC NURSING II. (4)
This course builds on knowledge and skills acquired in NUR 723 (Practicum I) and provides the student with the opportunity to integrate and apply knowledge acquired in other course work. Theory of group therapy structure and process, practice models, and collaboration with mental health consumer/advocacy groups are introduced and emphasized to fit with emerging health care delivery systems. Mental health policy and practice implications are reviewed as well as the fiscal consequences of public policy on mental health service delivery. Diagnosis of common physical illnesses that mimic psychiatric illness and common psychiatric symptoms that occur in physical illness are studied. Ethical dilemmas in practice are studied. Prereq: NUR 723, NUR 652, enrollment in the graduate program or consent of the instructor. Co-requisite: NUR 605.

NUR 725 ADVANCED PRACTICE NURSING SEMINAR FOR NURSE PRACTITIONERS. (3)
This course provides an overview of advanced practice nursing. Select physical, pathophysiologic, social, mental health, and behavioral concepts will be discussed as a basis for clinical decision-making. Trends in health and nursing at national and state levels will be analyzed, as well as issues of professionalism. Emphasis will be on the role of the nurse practitioner as a collaborative member of the health care team, and on the nurse practitioner's contributions to health, wellness, and health promotion. Prereq: NUR 630 and NUR 653.

NUR 726 PRIMARY CARE ADVANCED PRACTICE NURSING SEMINAR. (1-3)
This course focuses on the advanced practice nurse's management of common, acute health problems of individuals across the lifespan and determining the effect of the illness on families. Emphasis will be on differentiating a variety of signs and symptoms to formulate possible diagnoses. Students will demonstrate proficiency in assessing, diagnosing, managing, and evaluating common, acute health problems. Emphasis is on analysis of the role of the nurse practitioner as a collaborative member of the health care team. Prereq: NUR 725 or NUR 722. Pre- or co-requisites: NUR 652, 631, 603.

NUR 727 PRIMARY CARE ADVANCED PRACTICE NURSING SEMINAR. (2-5)
Seminar (2 credits): This course focuses on the advanced practice nurse's management in select common and stable chronic health problems of individuals across the lifespan. Emphasis will be placed on differentiating signs and symptoms to formulate possible diagnoses and determining the effect of the illness on the family. In addition, the nurse practitioner's role as a collaborative member of the health care team will be evaluated. Practicum (3 credits): Students will demonstrate proficiency in assessing, diagnosing, managing and evaluating selected chronic health problems based on appropriate standards of care. Prereq: NUR 632 and NUR 726 or NUR 722. Co-requisite: NUR 723 (psychiatric nurse practitioner students only).

NUR 732 ADVANCED PRACTICE IN PUBLIC HEALTH NURSING ASSESSMENT SPECIALTY SEMINAR. (3)
The community health nurse in advanced practice completes a three course sequence. Each course builds upon one of the three core functions of public health and nursing as identified by the Public Health Service of the U.S. This seminar addresses the first core function of assessment in advanced nursing practice in public health including the collecting, analyzing and dissemination of information about the health conditions, risks and resources in communities, or a population in targeted health care environments, such as home health or managed care. Advanced community level assessment concepts, models, theories and research findings are used. Assessing vulnerable and multicultural populations, using informatics in the assessment process, and distinguishing between decisions based on individual and aggregate data are emphasized. Prereq: NUR 653, enrollment in the graduate program in Nursing or consent of instructor. Pre- or coreq: NUR 629.

NUR 733 ADVANCED PRACTICE IN PUBLIC HEALTH NURSING PRACTICUM I: POLICY. (6)
This course addresses the second public health core function: the use of assessment data in the analysis and development of policy and program plans to meet the health, illness and health resource needs of communities. Students will evaluate the use of policy as an aggregate-level intervention strategy and determine the extent to which a nursing intervention classification can be used to categorize policy strategies. Policies will be evaluated in relation to current national and state health objectives for special populations. Students will evaluate the potential impact of policies affecting communities and populations in targeted health care environments such as home health or managed care. They will use evidence from the literature to develop and implement policy recommendations designed to improve health outcomes. Working with vulnerable and multicultural communities and using informatics in policy and planning are emphasized. Prereq: NUR 732, enrollment in the graduate program in Nursing or consent of the instructor.

NUR 734 ADVANCED PRACTICE IN PUBLIC HEALTH NURSING: PRACTICUM II: ASSURANCE. (4)
This course focuses on the third core public health function of monitoring health services to communities, collaborating with other health disciplines in the development and delivery of needed services, and using quality assurance activities to improve health, illness and health resources to communities. Students will learn the use of surveillance, evaluation, and performance improvement techniques in assuring cost-effective health services for communities and targeted health care environments such as home health or managed care. They will evaluate the use of nursing taxonomies for classification of aggregate level outcomes. Culturally competent care in vulnerable and multicultural communities and the use of informatics in assurance are emphasized. Prereq: NUR 733, enrollment in the graduate program in Nursing or consent of instructor.

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 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 750 CLINICAL MODELS FOR PROFESSIONAL AND ADVANCED NURSING CARE. (4)
Students will learn concepts underpinning clinical and business modeling. They will conduct integrated literature reviews around a particular clinical problem and develop evidence-based clinical models for practice using the best available research findings and best practices. Each will prepare a business plan for adoption of a clinical model by a nursing unit, clinical department, or clinical program that is fiscally and organizationally feasible. Students will incorporate concepts of teamwork and interdisciplinary collaboration into the plans, including evaluation and supervision. Prereq: NUR 604; enrollment in graduate program in nursing or consent of instructor.

NUR 751 RURAL HEALTH NURSING MANAGEMENT PRACTICUM. (3)
This course provides students with in-depth clinical experience in nursing management of an inpatient unit, a clinic, or a program. The focus is on use of clinical research in designing, implementing and evaluating an innovative model of care for a defined rural population. Students integrate knowledge of nursing research, leadership, management of personnel and financial management of clinical services in the application of their practice models. Prereq: NUR 704, 712, 722, 725, or 732; and NUR 740; or consent of instructor.

#NUR 752 CULTURALLY COMPETENT HEALTHCARE: CLIENT, CLINICIAN, AND ORGANIZATIONAL PERSPECTIVES. (3)
This interprofessional course will increase students' multicultural awareness, knowledge, and skill in the assessment and provision of healthcare. Models will be evaluated that aim to enhance the assessment and provision of culturally competent care, from the clinician to the organizational levels. Students will learn how to integrate evidence-based decision-making competencies to maximize attention to the needs of a diverse healthcare workforce. Prereq: Completion of applicable theory and research course (e.g., NUR 601 and 602); enrollment in graduate program or consent of instructor.

#NUR 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 DOCTORAL SEMINAR. (1-3)
A series of two-hour colloquia held every other week focusing on issues relative to the development of nursing science, the dissertation, and the role of the nurse scientist. The topics are selected by the students who are at various points of doctoral study in nursing. Included are topics on scientific integrity, the ethical conduct of research, and federal guidelines for inclusion of research subjects. The seminar is required for three semesters, one-credit hour each semester. Prereq: Enrollment in the doctoral program in nursing.

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)
The focus of this course is exploration of qualitative approaches to developing clinical nursing research. The relationship of data production and analysis strategies to underlying assumptions, theories, and research goals are considered. Applications of qualitative methods to research questions relevant to nursing science are explored. Prereq: NUR 790 or consent of instructor.

NUR 792 QUANTITATIVE METHODS IN NURSING RESEARCH. (3)
This course focuses on the application of quantitative research designs and methods for testing hypotheses in clinical nursing research. Students develop skills in critical evaluation of both intervention and nonintervention studies. Emphasis is placed on the identification and control of competing hypotheses in quantitative research. Prereq: NUR 791 or consent of instructor; STA 570.

NUR 793 MEASUREMENT OF NURSING PHENOMENA. (4)
This course focuses on measurement issues in conducting nursing research. Methods of instrument development and assessment of reliability and validity are discussed. The psychometric properties of instruments and measurement methods used in research are analyzed. Students conduct pilot psychometric research related to their dissertation topic. Prereq: NUR 790, 791, 792.

NUR 794 ANALYSIS, INTERPRETATION, AND PRESENTATION OF QUANTITATIVE DATA. (3)
This course provides opportunities for skill development in the application of a variety of analysis strategies to existing datasets. Students will identify hypotheses and/or research questions, test them using appropriate statistical methods, and interpret the results of their secondary analyses. Students also will gain experience in the presentation of findings via narrative, tabular, and oral formats. Prereq: STA 671 or equivalent, doctoral standing, and consent of instructor.

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 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 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 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 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 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 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 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 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 854 ADVANCED CONCEPTS IN PROFESSIONAL NURSING. (4)
This course provides experiences that will enable students to become acclimated to a self-directed learning environment and to develop skills pertinent to advanced concepts of professional nursing practice with diverse populations. These skills include: effective professional writing, the efficient use of computers to enhance nursing practice, the performance of effective patient teaching, and the judicious use of theory and literature to guide clinical decision-making. Prereq: Admission to College of Nursing RN-BSN or RN-MSN program.

NUR 860 FOUNDATIONS FOR PROFESSIONAL NURSING. (2)
Enable nursing students to develop skills for student success. Discover nursing as a discipline in historical and emerging contexts of today's health care delivery system. Prereq: Admission to professional standing in College of Nursing.

NUR 861 FAMILY HEALTH PROMOTION AND COMMUNICATION ACROSS THE LIFESPAN. (8)
This course introduces the baccalaureate student to the concepts of health and physical assessment, health promotion, and therapeutic communication skills as they are applied with diverse populations in a variety of clinical settings. In addition, students will develop critical thinking skills useful to the nurse in promoting health in individuals and families across the life span. Lecture, five hours; laboratory nine hours per week. Prereq: Admission to the College of Nursing, COM 199, NUR 852, Certified Nursing Assistant (CNA) Credentialing, First Aid Certification, and Basic Cardiac life Support Certification (BCLS), required immunizations, or consent of instructor.

NUR 862 PHARMACOLOGY. (3)
This is a general introductory course to drugs and drug therapy. Various drugs will be studied and categorized in the context of clinical pathological disorders or problems. The general approach will involve a study of the pathophysiology of specific disorders and the categories of drugs currently employed in the treatment of these problems. The students will learn mechanism of action, therapeutic effect, side effects, drug interactions, and toxicities of these drugs, and will be provided with examples of commonly used drugs (both old and new) in each of these categories. Prereq: NUR 861 or consent of instructor. Co-req: NUR 863, NUR 864.

NUR 863 PROFESSIONAL NURSING CARE ACROSS THE LIFESPAN. (8)
The course will provide didactic and clinical experiences that enable the student to provide beginning professional nursing care with individuals and families requiring interventions across the lifespan. Students will use the key concepts of nursing process, teaching-learning, and physical and psychosocial assessment in the care of people with basic alterations in ability to meet human needs. Content related to providing a safe care environment, such as administering and monitoring medications and aseptic technique will be addressed. Lecture, five hours; laboratory, nine hours per week. Prereq: NUR 861, BCLS Certification, required immunizations, or consent of instructor. Co-req: NUR 862, NUR 864.

NUR 864 PATHOPHYSIOLOGY. (3)
This course addresses pathophysiological concepts basic to nursing practice. Concepts essential for understanding major health problems which occur across the life span and that are encountered in multiple care settings are discussed. Emphasis is on understanding how and why various pathophysiologic signs and symptoms occur. Prereq: ANA 299, PGY 206, NUR 861, or consent of instructor. Co-req: NUR 862, NUR 863.

NUR 866 PATHOPHARMACOLOGY I. (3)
This course is the first of a two semester course sequence that addresses pathophysiological and pharmacologic concepts basic to nursing practice. Prereq: ANA 209, PGY 206, NUR 861.

NUR 869 INTRODUCTION TO NURSING CARE FOR SECOND DEGREE STUDENTS. (8)
This course introduces the baccalaureate student to the concepts of health and physical assessment, health promotion and therapeutic communication skills as they are applied with diverse populations in a variety of clinical settings. The course will provide didactic and clinical experiences that enable the students to provide beginning professional nursing care with individuals and families requiring interventions across the lifespan. Students will use the key concepts of nursing process, teaching-learning, and physical and psychosocial assessment in the care of people with basic alterations in ability to meet human needs. Content related to providing a safe care environment, such as administering and monitoring medications and aseptic technique will be addressed. In addition, students will develop critical thinking skills useful to the nurse in promoting health in individuals and families across the lifespan. Prereq: ANA 209, PGY 206, CHE 106, PSY 100 and baccalaureate degree in another field.

NUR 870 PATHOPHARMACOLOGY II. (3)
This course is the second of a two semester course sequence that addresses pathophysiological and pharmacologic concepts basic to nursing practice. Prereq: ANA 209, PGY 206, NUR 863, NUR 866.

NUR 871 FAMILY CENTERED CARE OF ADULTS WITH COMMON HEALTH PROBLEMS. (7)
This course will provide classroom and clinical experiences to enable the student to provide continuity of nursing care for adult populations with a variety of common health problems across settings. Lecture, three hours; clinic, 12 hours per week. Prereq: Junior year standing in nursing, NUR 862, NUR 863, NUR 864, BCLS Certification, required immunizations, or consent of instructor. Co-req: BIO 208, HSM 241.

NUR 872 CLINICAL REASONING: QUANTITATIVE, QUALITATIVE AND EPIDEMIOLOGICAL APPROACHES. (3)
Students develop the clinical reasoning skills needed to use quantitative, qualitative and epidemiological findings to solve clinical problems. Each of these three approaches is examined for its history, philosophy and relevance to health care. Legal and ethical issues inherent in each of the three approaches are discussed. Students learn to communicate findings from these clinical reasoning approaches to a variety of audiences. Partial fulfillment of the oral communication requirement in the University Studies Program. Prereq: STA 200 or equivalent, or consent of instructor.

NUR 873 NURSING CARE OF CHILDBEARING, CHILDREARING FAMILIES. (7)
This course is designed to provide classroom and clinical experiences to enable the student to provide continuity of nursing care for families during uncomplicated labor and delivery, postpartum and neonatal periods and when children and adolescents experience a variety of health problems. Lecture, three hours; laboratory, 12 hours per week. Prereq: NUR 871, BCLS Certification, required immunizations, or consent of instructor.

NUR 880 LEADERSHIP/MANAGEMENT IN NURSING CARE DELIVERY. (3)
This course is designed to advance the student's ability to use leadership and management theory in nursing practice within current and emerging organizational systems. The professional nurse's role in management of care will be examined. Responsibilities for resource management and management of legal and ethical dilemmas in various organizational systems also will be addressed. Prereq: HSM 241, NUR 873 or consent of instructor.

NUR 881 PSYCHIATRIC-MENTAL HEALTH NURSING. (5)
This course is designed to develop students' skill in the use of psychiatric/mental health concepts to provide nursing care to clients across the lifespan and in a variety of settings. Lecture, three hours; clinic, six hours per week. Prereq: NUR 872, NUR 873, BCLS Certification, required immunizations, or consent of instructor.

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 883 PUBLIC HEALTH NURSING. (5)
This course is designed to develop students' skills in applying health promotion and disease prevention frameworks and in using epidemiological and public health concepts to deliver nursing care with diverse populations in a variety of settings. Emphasis will be placed on the effect of changing health care delivery systems on nursing practice. Lecture, three hours; clinic, six hours per week. Prereq: NUR 872, NUR 873, HSM 241, BCLS Certification, required immunizations, or consent of instructor.

NUR 884 CAREER MANAGEMENT IN NURSING. (2)
The course provides students with the skills for ongoing professional development and success in nursing. Prereq: NUR 880, NUR 881, NUR 883 or consent of instructor. Co-req: NUR 885.

NUR 885 HIGH ACUITY NURSING. (5)
The course emphasizes critical thinking and data analysis skills in the nursing management of patients with complex health problems with and unpredictable outcomes. Students will collaborate with other health care professionals to plan, implement, and evaluate family-centered nursing care across the lifespan in high-acuity settings. Lecture, four hours; clinic, three hours per week. Prereq: NUR 881, NUR 883, BCLS Certification, required immunizations, or consent of instructor. Co-req: NUR 884.

NUR 886 SYNTHESIS OF CLINICAL KNOWLEDGE FOR NURSING PRACTICE. (6)
This course was designed to provide opportunity to develop independence and competence in applying principles of care management and leadership to nursing practice in a variety of clinical settings. Lecture, one hour; clinic, 15 hours per week. Graded pass/fail. Prereq: All other courses in the curriculum, BCLS Certification, required immunizations, or consent of instructor. Co-req: NUR 884, NUR 885.

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.

NUR 900 PROCESS OF NURSING LEADERSHIP. (3)
Students synthesize theoretical leadership concepts with personal and professional values and gain an appreciation for the changing sociocultural context in which clinical leadership is practiced. Issues of power, creativity, innovation, ethics and gender concerns are addressed. Self-reflection is used to develop interpersonal skills that enhance leadership. Lecture, two hours; laboratory, two hours per week. Prereq: Admission to the DNP program or Nursing Management specialty track in the MSN program.

***NUR 901 NURSING LEADERSHIP THROUGH EFFECTIVE USE OF SELF. (3)**
Building on skills developed in the Process of Leadership for Nurse Executives course, students focus on leading multiple constituencies. Within a clinical context, working with multiple disciplines and stakeholders, communication, negotiation, conflict management, public speaking, business etiquette, and media training are addressed. Lecture, two hours; laboratory, four hours per week. Prereq: NUR 900.

***NUR 902 NURSING LEADERSHIP IN HEALTH CARE SYSTEMS. (3)**
Students develop innovative approaches to complex issues in health care system. Creating shared visions, advocacy, strategic planning, and change management are addressed. Lecture, two hours; laboratory, four hours per week. Prereq: NUR 901.

NUR 903 APPLIED BIOSTATISTICS FOR OUTCOMES EVALUATION. (4)
This course provides opportunities for the application of a variety of quantitative analysis strategies in the evaluation of clinical outcomes. Statistical methods such as multiple regression, logistic regression, survival analysis, and cost-benefit analysis are discussed. Students apply these methods in the analysis of existing outcome data. Prereq: STA 570 or equivalent.

NUR 904 EPIDEMIOLOGY APPLIED TO THE DESIGN AND EVALUATION OF NURSING AND HEALTH SERVICES. (3)
This course provides nurse executives and clinical nurse leaders a conceptual orientation and the knowledge of techniques from epidemiology to design and evaluate nursing and health care delivery systems which are focused on populations. Emphasis will be placed on the application of select analytic methods and designs to answer questions related to the management of population based health care. Prereq: NUR 903.

***NUR 905 CLINICAL PROGRAM DEVELOPMENT AND IMPLEMENTATION. (3)**
This course provides students with the tools to conduct strategic analysis and planning for nursing and health care programs, and to develop and implement health care programs. Students evaluate the choice of program planning models and analyze the implications of implementation and change theory for program operationalization. Emphasis is on a broad strategic view of health care systems and on effective clinical program implementation within integrated care delivery systems. Prereq: NUR 904 or consent of instructor.

NUR 906 EVALUATION FOR IMPROVEMENT OF CLINICAL PRACTICE AND OUTCOMES. (3)
This course provides students with the tools to evaluate and improve health care programs and clinical outcomes. Students develop feasible and reliable program evaluation designs. Students analyze the nature of, and explanations for variations in clinical practice patterns and clinical outcomes. Emphasis is on the use of program evaluation for improvements in clinical outcomes, efficiency, resource allocation, and cost reduction. Prereq: NUR 905.

***NUR 907 FOUNDATIONS FOR POPULATION-FOCUSED INTERVENTIONS IN CLINICAL PRACTICE. (3)**
Students will review and analyze evidence related to a defined population health problem. Students will explore the philosophies, theories, research and evidence-based clinical practices in nursing and related fields that have been used to define and resolve the population health problems in which they are interested. Students will analyze competing strategies to resolve the defined population health problem and evaluate the cost effectiveness of these strategies. Readings and assignments will be focused on students' individually defined populations of interest thereby facilitating the development of a comprehensive knowledge of the theoretical and research foundations upon which existing clinical program models are based. Prereq: NUR 915. Co-requisite: NUR 903.

***NUR 908 CLINICAL PRACTICE MODEL DEVELOPMENT. (4)**
This course focuses on integrating theory and evidence to support clinical decision-making in nursing practice. The student selects a health care problem amenable to nursing intervention and explores this problem from a variety of perspectives. Logic and science are applied in developing practice guidelines, designing clinical monitoring systems, and developing an evidence-based clinical practice model to address a health problem for a defined population. Lecture, three hours; laboratory, four hours per week. Prereq: NUR 907.

***NUR 909 DYNAMICS AND REALITIES OF IMPLEMENTING CLINICAL PRACTICE MODELS. (4)**
The focus of this course is on implementing an evidence-based clinical practice model and evaluating its effectiveness in improving nursing health outcomes. Lecture, three hours; laboratory, four hours per week. Prereq: NUR 908.

***NUR 910 CLINICAL RESIDENCY. (3)**
This course provides students with the tools to evaluate and improve health care programs and clinical outcomes. Students develop feasible and reliable program evaluation designs. Students analyze the nature of, and explanations for variations in clinical practice patterns and clinical outcomes. Emphasis is on the use of program evaluation for improvements in clinical outcomes, efficiency, resource allocation, and cost reduction. Laboratory, 24 hours per week. Course may be repeated to a maximum of six credits. Graded pass/fail. Prereq: NUR 906.

***NUR 911 INDIVIDUAL AND GROUP DYNAMICS IN NURSING AND THE HEALTH CARE ENVIRONMENT. (4)**
Students use theories of leadership, motivation, power and influence to evaluate interpersonal relationships within health care organizations. They develop strategies for nurse executives to lead a diverse workforce and create satisfying and productive work environments. They evaluate theories of organizational communication and justice to determine approaches to promoting effective executive-level communication, coaching, and oversight in contemporary healthcare organizations. Prereq: NUR 902 or consent of instructor.

NUR 912 THEORETICAL FOUNDATIONS OF NURSING AND HEALTHCARE ORGANIZATIONS. (3)
Students learn the theoretical bases of organizational level structure, dynamics, and strategic management in nursing and health care. The course focuses on analysis and synthesis of organizational theories within the health care environment, and particularly on the impact of values, politics, and market forces on the structure and function of nursing and health care organizations. System level coordination and policy issues are evaluated, and the contributions of nurse executives to improving the health care system are analyzed. Lecture, two hours; laboratory, four hours per week. Prereq: NUR 905 or consent of instructor.

***NUR 914 ECONOMIC AND FINANCIAL ASPECTS OF CLINICAL AND POPULATION-BASED HEALTH CARE DELIVERY SYSTEMS. (4)**
This course focuses on the application of economic and financial theories to understanding the strategic impact of market dynamics, utilities, incentive structures, and driving and restraining forces in health care change. The emphasis will be on critically analyzing the actual and potential impact of these dynamics on the structure and functioning of the health care system. Prereq: Passing score on self-assessment of basic accounting and economics; applied biostatistics course.

NUR 915 PHILOSOPHY AND FOUNDATIONS OF EVIDENCE BASED PRACTICE. (3)
This course will provide students with the knowledge and tools to support, promote and implement evidence based practice in nursing and health care delivery systems. Emphasis will be on the synthesis, critique, and application of evidence to support quality clinical and organizational practices. Prereq: Enrollment in Doctor of Nursing Practice program or consent of instructor.

NUR 981 INDEPENDENT STUDY IN NURSING. (1-3)
An elective course that provides students with an opportunity to explore a topic of interest under the direction of a faculty member. The end result should be negotiated between students and faculty and should yield a scholarly product. 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: Enrollment in Doctor of Nursing Practice Program or consent of instructor.

OBG Obstetrics and Gynecology

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 852 OBSTETRICS AND GYNECOLOGY INDEPENDENT STUDY

OBG 854 CLINICAL CLERKSHIP IN OBSTETRICS

OBG 863 HIGH RISK OBSTETRICS (MFM)

OBG 890 OFF-SITE OBSTETRICS AND GYNECOLOGY

OBI Oral Biology

OBI 650 ORAL BIOLOGY FOR POSTGRADUATE DENTAL STUDENTS I. (2)
This seminar course provides a review of selected biological science topics. Emphasis is placed on the use of current literature for an in-depth study of those aspects of the subject particularly relevant to dental practice. Lecture: 32 hours. Prereq: Admission to an advanced education program of the College of Dentistry or consent of instructor.

OBI 651 ORAL BIOLOGY FOR POSTGRADUATE DENTAL STUDENTS II. (2)
This course is a continuation of OBI 650. It is a seminar that uses the scientific literature to review selected biological science topics with emphasis on those especially relevant to dental practice. Lecture: 32 hours. Prereq: OBI 650 or consent of instructor.

OBI 720 MICROBIAL STRUCTURE AND FUNCTION. (3)
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: (to reflect appropriate IBS course). (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. Prereq: Admission to the College of Dentistry. (Same as BCH 812).

OBI 813 NEUROPHYSIOLOGY. (1)
The brain uses electrical signals to process all information it receives and analyzes. Individual neurons encode complex information into simple electrical signals; the meaning behind these signals is derived from the specific interconnections of neurons. The purpose of neurophysiology is to describe how the neuron produces electrical and chemical signals and illustrate how these signals are involved in the functional organization of neural circuits. This course also describes how the central nervous system analyzes and integrates the various inputs, elicits command decisions that determine the motor and/or endocrine responses. Lecture: three hours per week for five weeks. Prereq: Admission to the College of Dentistry, or consent of the Course Director. (Same as PGY 813.)

OBI 814 HUMAN FUNCTION. (8)
This course provides in-depth instruction on the physiological mechanisms of body function from the single cell to the organism level. The course is team taught by medical scientists and clinicians. Teaching methodologies include didactic and Socratic lectures, small group discussions, demonstrations and live model and computer simulated laboratories. Lecture, 20 hours per week. Prereq: For MD 818/ PGY818: Admission to medical school (first year). For OBI 814: Admission to the Dental School and OBI 812. (Same as MD/PGY 818.)

OBI 815 GROSS ANATOMY AND NEUROANATOMY. (6)
Study of human gross anatomy and neuroanatomy, with a particular emphasis on functional anatomy and neuroanatomy of the head and neck. Lecture/laboratory course, with dissection being an essential component of the laboratory portion. 140 hours. Prereq: Admission to the College of Dentistry or some background in biology and consent of instructor. (Same as ANA 534.)

OBI 826 DENTAL PHARMACOLOGY AND THERAPEUTICS. (4)
This course will provide students with a fundamental understanding of the pharmacology and therapeutic uses of drugs commonly used by their patients and in their practice. Prereq: OBI 812 and OBI 814. (Same as PHA 822.)

OBI 828 IMMUNITY, INFECTION AND DISEASE FOR THE STUDENT DENTIST. (11)
The course provides basic concepts of immunology and bacterial, viral, fungal and protozoal biology. It focuses on mechanisms of human immunity, immunologically mediated disease, and pathogenesis in infectious disease. The material covered includes relevant pathology associated with both immunologic and infectious diseases, and a summary of infectious diseases from a clinical perspective. Lecture: 20 hours per week. Prereq: Admission to the second year of dental curriculum or permission of course director. (Same as MI 828.)

OBI 829 ORAL BIOLOGY. (2)
This course will enable the dental student to apply basic oral biology principles to the contemporary diagnosis and treatment of oral disease. Oral biology is the study of the biologic sciences and their clinical correlates that pertain to the mouth and the contiguous tissues in health and disease. Major oral systems are studied at the complete, cellular, and molecular levels with emphasis on important clinical problems affecting both hard and soft tissues. Lecture, 34 hours. Prereq: ANA 530, OBI 812, OBI 814, CDS 820 or consent of instructor.

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.)

ODM Oral Diagnosis and Oral Medicine

ODM 820 ORAL AND MAXILLOFACIAL RADIOLOGY AND DIAGNOSTIC IMAGING. (2)
This course is designed to achieve proficiency in radiographic technique and the interpretation of intraoral and extraoral dental radiographs. Adult, pediatric, panoramic and occlusal techniques and interpretations are presented. Principles of image formation, radiation biology, radiation hazards and safety, new imaging procedures and special radiographic procedures for the dentist are included. Lecture/ problem based learning/seminar/hands-on technique application; 32 hours. Prereq: CDS 815 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 815; Coreq: CDS 824.

ODM 830 MANAGEMENT OF THE MEDICALLY COMPROMISED DENTAL PATIENT. (3)
This course will provide students with the knowledge required to manage medically compromised patients in the outpatient dental office. Basic clinicopathological information about commonly occurring medical disorders, the impact medications that these patients take have, the special problems they have, and their effects on dental health care will be presented. Critical thinking is encouraged so that the students can use their diagnostic skills in the appropriate manner to identify and manage patients with systemic disorders. Lecture, 43 hours; laboratory, 4 hours. Prereq: Approval of dean and/or his designee for academic affairs and the 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.

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.

OFP 748 MASTER'S THESIS RESEARCH. (0)
Half-time to full-time work on thesis. May be requested to a maximum of six (6) semesters. Prereq: All course work toward the degree must be completed.

OFP 768 RESIDENT'S CREDIT FOR MASTER'S DEGREE. (1-6)
May be repeated for a total of 12 hours. Prereq: Admission to the Orofacial Pain graduate program and consent of the Director of Graduate Studies.

#OFP 790 RESEARCH IN OROFACIAL PAIN. (1-6)
This course provides credit hours for the graduate students' independent research efforts. May be repeated to a maximum of 12 hours. Prereq: Admission to the Orofacial Pain Graduate Program and consent of the Director of Graduate Studies in the College of Dentistry.

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 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 650 GRADUATE ORAL PATHOLOGY I. (2)
This is a seminar course in advanced oral pathology in which students study the microscopic, radiographic, and clinical features and the management of diseases that affect oral and perioral tissues. A case study format is used to discuss both common and rare conditions that illustrate all major disease categories and to provide a framework for developing a systematic approach to disease diagnosis. Lecture: 36 hours. Prereq: Dental degree and enrollment in a College of Dentistry postgraduate program, or consent of instructor.

OPT 651 GRADUATE ORAL PATHOLOGY II. (2)
This course is a continuation of OPT 650. It is a seminar in advanced oral pathology in which students study the microscopic, radiographic, and clinical features and the management of diseases that affect oral and perioral tissues. A case study format is used to discuss both common and rare conditions that illustrate all major disease categories and to provide a framework for developing a systematic approach to disease diagnosis. Lecture: 36 hours. Prereq: OPT 650 or consent of instructor.

***OPT 820 GENERAL PATHOLOGY FOR STUDENT DENTISTS. (3)**
This basic course covers general pathology, which will prepare the student dentist to concentrate on the specialized area of oral pathology. Emphasis is placed on cell damage, inflammation and repair, neoplasia and hemostasis, as well as the in-depth study of selected systemic diseases that may affect dental patient management. Prereq: Enrollment in the College of Dentistry and second year class standing, ANA 530, ANA 534, or consent of course director.

OPT 830 ORAL PATHOLOGY I. (3)
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, and 4 one-hour examinations. Prereq: OPT 820.

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, 21 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 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 213 and MA 322. (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 consent of instructor. (Same as STA 525.)

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.)

ORT Orthodontics

ORT 610 CRANIO-FACIAL FORM. (2)
This is a two credit-hour seminar course that introduces students to the basic concepts and principles of cephalometrics in orthodontic diagnosis and treatment. The course reviews historical literature as well as contemporary articles. 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. (2)
This is a two credit-hour seminar course offered at the graduate level within the specialty program in orthodontics. The course provides in-depth information concerning methods and rationale for gathering a comprehensive database for orthodontic patients. Analysis and interpretation of the database is approached by using the orthogonal analysis technique. The process of developing a treatment plan from the database will be thoroughly explored. 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. (2)
This is a two credit-hour graduate level course designed to introduce or reacquaint the student with some of the most commonly used techniques in orthodontic practice. It is closely related to the diagnosis and treatment planning course and to the course on mechanics. 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, 15 hours; laboratory, 12 hours; seminar, 22 hours. Prereq: Second year standing in College of Dentistry, CDS 812.

ORT 830 ORTHODONTICS II. (2)
This course is concerned with the teaching of pre-clinical 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 and retention in interceptive orthodontics and adjunctive orthodontic treatment in a general setting. The role of the general dentist in the management of their patients' orthodontic needs will be delineated. Special emphasis will be placed on coordination of treatment between the specialist and general practitioner and maintenance of occlusion over the life span of the patient. Lecture; 16 hours; laboratory, 16 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.

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.

PA Public Administration

#PA 500 INTEGRATIVE CARE FOR HEALTH SCIENCES. (1-3)
Integrative care involves using the best possible treatments from both complementary/alternative and allopathic medicine, based on the patient's individual needs and condition. The selection of health care providers should be based on good science and this course will introduce students to complementary and alternative health care providers and the practices and beliefs of these practices as well as the scientific evidence in support of these practices. The course integrates successes from both worlds and describe the safest, least invasive, most cost-effective approach while incorporating a holistic understanding of the individual. May be repeated to a maximum of 3 credits (1 credit didactic and up to two credits experiential/research). (Same as AT 500, HS 500, CLS 500, CNU 500, CD 500, PT 686.)

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. Lecture, two hours; laboratory, one hour per week. Prereq: MPA or MHA program status. (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 AND DECISION SUPPORT SYSTEMS. (3)
An introduction to organizational decision making under conditions of certainty, uncertainty, risk and multiple objectives. Concepts of analysis from the areas of economics, mathematics, probability, and statistics will be utilized in terms of administrative decision making in public administration. Course work includes use of various management information systems with a focus on how such systems can be used to support and inform decision making. Lecture, two hours; laboratory, one hour per week. Prereq: PA/HA 621, PUAD or HLAD program status or consent of instructor. (Same as HA 623.)

PA 624 GOVERNMENT INFORMATION SYSTEMS. (2)
Provides an overview of information strategies and management approaches to government functions and public policy programs and illustrates the interaction between information technology and information systems with management and policy decision in the public and non-profit sectors. Prereq: MPA program status.

PA 628 PERSONNEL MANAGEMENT IN HEALTH AND PUBLIC ADMINISTRATION. (3)
This course will present an overview of career development, human resource planning, staffing, training and development in the public and health care sectors. Prereq: MPA or MHA program status. (Same as HA 628.)

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: PUAD or HLAD program status, or consent of instructor.

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 633 MUNICIPAL SECURITIES. (3)
An analysis of the theoretical and operational issues associated with the municipal securities industry. Prereq: PA 632 or the equivalent and Ph.D. or M.P.A. program status or consent of instructor.

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: The economics prerequisite can be met in three ways: (a) an undergraduate principles course in microeconomics and HA/PA 652; (b) an undergraduate microeconomics principles course and a graduate course in managerial economics; or (c) an undergraduate microeconomics principles course and an intermediate microeconomics course. (Same as ECO 653/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 HA 637.)

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/MHA program status. (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. ECO 201 or equivalent. (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 MANAGERIAL EPIDEMIOLOGY. (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 660 PUBLIC POLICY OF THE NONPROFIT SECTOR. (3)
This course offers an overview of practical, legal, ethical, and theoretical issues faced by the nonprofit sector and organizations that exist today and over time.

PA 661 FINANCIAL MANAGEMENT OF NONPROFIT ORGANIZATION. (3)
This course explores the techniques and principles of financial management including budgeting, finance, and investment decision making for non-profit orgs.

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 601.)

PA 673 HEALTH POLICY DEVELOPMENT. (2)
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: MHA/MPA program status. HA 601/PA 671 and HA 611, 621 or 622. (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 654.)

PA 681 CAPSTONE IN PUBLIC ADMINISTRATION. (3)
This course provides an opportunity for students to integrate their studies with professional practice. Case studies and special projects require students to integrate knowledge from the core curriculum in the analysis of public management and policy problems. Prereq: MPA program status and completion of 33 credit hours.

PA 683 TAX POLICY. (3)
Tax policy is analyzed from an economic perspective: efficiency and distributional effects of taxation, especially in state, local and international contexts. Prereq: PA 652 or equivalent; PUAD program status or permission of instructor.

PA 690 PUBLIC POLICY ANALYSIS OVERVIEW. (3)
Economic and political foundations of policy analysis are considered in a survey fashion, followed by specific techniques used in the practice of policy analysis. Prereq: Graduate standing and MPA program status.

PA 691 ETHICS AND PUBLIC POLICY. (1)
This course provides an introduction to ethical theory, explores the ethical dimensions of practice in the public sector, and examines ethics in connection with policy development. Prereq: Graduate standing and MPA program status.

#PA 692 ECONOMETRICS FOR POLICY ANALYSTS. (3)
Maximum likelihood estimation, ordinary least squares (OLS) regression, instrumental variables (IV) regression, heteroscedasticity-consistent regression, fixed and random effects models, probit, logit and tobit models, and identification and two-state least squares estimation of simultaneous equations models. Prereq: Any undergraduate statistics course. MPA, MPP or PUAD program status for priority registration, other students with permission of instructor. (Same as ECO 692.)

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 721.)

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 750 INTRODUCTION TO ECONOMICS FOR PUBLIC POLICY. (3)
Introduction to microeconomic theory and mathematical methods for policy analysis. Prereq: PUAD Master's or Ph.D. program status or permission of the instructor.

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 and PA 750 or equivalent and Ph.D. program status or consent of the instructor. (Same as ECO 752.)

PA 754 ADVANCED TOPICS IN PUBLIC FINANCE. (3)
Principles of taxation and expenditure; applications to federal, state, and local policy; fiscal federalism; international public finance. Prereq: PA 752, ECO 701 or permission of the instructor.

#PA 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 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 610 RESEARCH METHODS AND EPIDEMIOLOGY IN PA STUDIES. (3)
An introductory course designed to introduce students to research applicable to the health care sciences and the field of epidemiology. The course will include a description of the scientific method, research design, measurement techniques, and statistical analysis. Emphasis will be placed on both clinical research and population-based studies. Students will learn how to critically review literature and how to design a research protocol. Prereq: Completion of STA 570, admission to the Physician Assistant Program, or consent of instructor.

PAS 640 SURVEY OF GERIATRIC MEDICINE. (3)
Overview of physician assistant practice with geriatric patients. Emphasis is placed on the practice of geriatric medicine including the anatomy and physiology of normal aging; pathology of aging; health care aspects of geriatric management; the diagnosis, treatment and prevention of geriatric problems; and research aspects of geriatric practice. Prereq: Admission to the Physician Assistant graduate program or consent of the instructor.

PAS 645 MASTER'S PROJECT. (1)
A 4-week course designed to introduce students to methods of identifying and analyzing a health care delivery issue that can be studied through a scientific literature search. The analysis of the topic and writing of a research paper will occur during the student's clinical clerkships. Prereq: STA 570, PAS 610, completion of the first year of the Physician Assistant graduate program.

PAS 646 MASTER'S PROJECT 2. (2-6)
This variable credit hour course is designed to allow PA students to complete a Master's Project while under the guidance of a faculty advisor. Students will identify a health care issue topic, conduct appropriate library research on the topic, develop a research paper on the topic, and make an oral presentation of their project at the conclusion of the Master of Science in Physician Assistant Studies Program. Students will be responsible for developing appropriate audiovisuals, handouts, etc. for the oral presentation. Prereq: Admission to the Physician Assistant Program.

PAS 654 CLINICAL LECTURE SERIES I. (4)
A study of diseases and disorders seen in primary care physician assistant practice. Emphasis is placed on identifying the etiology, clinical presentation, laboratory and x-ray abnormalities, management, and prevention of diseases/disorders of the cardiovascular, pulmonary, renal, gastrointestinal, hematological, endocrine, and neurological systems. Research aspects of selected diseases is also presented. Prereq: Enrollment in the Physician Assistant Studies Program.

PAS 655 PSYCHOSOCIAL FACTORS IN PRIMARY HEALTH CARE. (3)
This course provides a broad overview of the role of psychosocial factors (behavioral, cultural, and environmental) in the nature, cause, course distribution, prevention, and treatment of illness. It develops the student's communication skills for clinical practice and presents psychosocial theories and research, and is organized into fours areas: general behavioral concepts, communications skills, developmental issues, and psychopathology. Prereq: Enrollment in the Physician Assistant Program.

PAS 658 CLINICAL LECTURE SERIES II. (4)
A seminar in diseases and disorders seen by primary care physician assistants. Emphasis is placed on student research and presentation of selected diseases/ disorders associated with orthopedics, dermatology, emergency medicine, pediatrics, and obstetrics and gynecology. Prereq: Enrollment in the Physician Assistant Program.

PAS 660 FAMILY MEDICINE CLERKSHIP. (6)
This is an eight-week clinical course designed to provide physician assistant students with experience in evaluation and treating common problems encountered in Family medicine. Experience is provided at the level of a primary care physician assistant, and emphasis is placed on performing a history and physical exam, selecting and interpreting laboratory exams, establishing a logical differential diagnosis, conducting research on clinical problems, performing selected studies, and establishing a tentative treatment plan. Prereq: Enrollment in the Physician Assistant program and successful completion of the didactic portion of the curriculum.

PAS 661 PEDIATRIC CLERKSHIP. (6)
This is an eight-week clinical course designed to provide physician assistant students with experience in evaluation and treating common problems encountered in pediatrics. Experience is provided at the level of a primary care physician assistant, and emphasis is placed on performing a pediatric history and physical exam, selecting and interpreting laboratory exams, establishing a logical differential diagnosis, conducting research on pediatric problems, performing selected procedures, and establishing a tentative treatment plan. Prereq: Enrollment in the Physician Assistant program and successful completion of the didactic portion of the PA curriculum.

PAS 663 SURGERY CLERKSHIP. (6)
This is an eight-week clinical course designed to provide physician assistant students with experience in evaluating and treating surgical problems. Experience is provided at the level of a primary care physician assistant, and emphasis is placed on performing a surgical history and physical exam, assisting in surgery, selecting and interpreting laboratory exams, establishing a logical differential diagnosis, conducting research on surgical problems, and performing selected surgical procedures. Prereq: Enrollment in the Physician Assistant program and successful completion of the didactic portion of the PA curriculum.

PAS 669 INTERNAL MEDICINE CLERKSHIP. (6)
This is an eight-week clinical course designed to provide physician assistant students with experience in evaluating and treating common problems encountered in Internal Medicine. Experience is provided at the level of a primary care physician assistant, and emphasis is placed on performing a history and physical exam, selecting and interpreting laboratory exams, establishing a logical differential diagnosis, conducting research on clinical programs, performing selected studies, and establishing a tentative treatment plan. Prereq: Enrollment in the Physician Assistant program and successful completion of the didactic portion of the PA curriculum.

PAS 672 PHARMACOLOGY I. (3)
This course is designed to prepare students for the pharmacological requirements of practice as a primary care physician assistant. Emphasis is placed on a description of drug categories, prescription writing, drug abbreviations and equivalents, principles of drug research, and the laws on ethics of drug use in primary care medicine. Prereq: Enrollment in the Physician Assistant Program.

PAS 673 PHARMACOLOGY II. (3)
This course is designed to prepare students for the pharmacological requirements of practice as a primary care physician assistant. Emphasis is placed on utilizing specific drugs and drug combinations for specific diseases, and performing literature reviews on current pharmacological problems. A research paper and presentation is required addressing a specific pharmacological problem that occurs in primary care physician assistant practice. Prereq: Enrollment in the Physician Assistant Program.

PAS 680 SEMINAR IN PHYSICIAN ASSISTANT STUDIES. (2)
A study of selected topics and contemporary issues regarding physician assistant practice. Emphasis will be placed on review of selected clinical medicine topics, research in primary care, principles of managed care, job searches and interviewing skill. Prereq: Enrollment in the Physician Assistant program and successful completion of the didactic portion of the PA curriculum.

PAS 690 PA CLERKSHIP. (3-6)
This variable credit, 1 to 2 month course is intended to allow MPAS students with a prior baccalaureate degree in PA studies to engage in clinical work relevant to their chosen area of concentration. Course objectives will be developed to include acquiring knowledge in clinical knowledge and library research. It is expected that students will use this course to develop and implement their final Master's Project. Students will be responsible for developing appropriate audiovisuals, handouts, and other presentation materials. Prereq: Completion of PAS 645, admission to the Physician Assistant Program, or consent of instructor.

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 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 862 OBSTETRICS AND GYNECOLOGY CLERKSHIP. (3)
This is a four-week course designed to provide physician assistant students with experience in evaluating and treating common problems encountered in obstetrics and gynecology. Experience is provided at the level of a primary care physician assistant, and emphasis is placed on performing a prenatal history and physical exam, assisting in surgery, selecting and interpreting laboratory exams, establishing a logical differential diagnosis, conducting research on clinical problems, performing selected studies, and establishing a tentative treatment plan. Prereq: Enrollment in the Physician Assistant program and successful completion of the didactic portion of the PA curriculum.

PAS 864 GERIATRIC CLERKSHIP. (3)
A 4-week physician assistant clinical clerkship in geriatric medicine. Objectives involve the development of knowledge and skills in the evaluation, management, and prevention of common geriatric disorders and diseases. Principles of business management, evidence-based medicine, research, and use of ancillary medical services are also covered. Prereq: Admission to the Physician Assistant graduate program, or consent of instructor.

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 870 EMERGENCY MEDICINE CLERKSHIP. (3)
This is a four-week clinical course designed to provide physician assistant students with experience in evaluating and treating problems encountered in emergency medicine. Experience is provided at the level of a primary care physician assistant, and emphasis is placed on performing a history and physical exam, selecting and interpreting laboratory exams, establishing a logical differential diagnosis, performing selected studies, and establishing a tentative treatment plan. Prereq: Enrollment in the Physician Assistant program and successful completion of the didactic portion of the curriculum.

PAS 871 PSYCHIATRIC CLERKSHIP. (3)
This is a four-week clinical course designed to provide physician assistant students with experience evaluating and treating common problems encountered in psychiatry. Experience is provided at the level of a primary care physician assistant, and emphasis is placed on performing a history and physical exam, mental status exam, selecting and interpreting laboratory exams, establishing a logical differential diagnosis, and establishing a tentative treatment plan. Prereq: Enrollment in the Physician Assistant program and successful completion of the didactic portion of the PA curriculum.

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 823 MECHANISMS OF DISEASE AND TREATMENT/PATHOLOGY. (9)
This is a course in basic mechanisms of disease causation and specific diseases of the organ systems. It introduces fundamental disease processes and the pathophysiology of major diseases affecting each of the organ systems. It stresses how disease alters normal structure and function and is closely integrated with PAT 824. Various teaching methodologies utilized include lectures, small group discussions, workshops, case studies, and computer-assisted instruction. Lecture, 20 hours per week. Prereq: Admission to second year of medical curriculum. (Same as MD 823.)

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 855 RESEARCH IN PATHOLOGY

PAT 856 FORENSIC PATHOLOGY

PDO Pediatric Dentistry

#PDO 610 PEDIATRIC DENTISTRY SEMINAR I. (2)
This seminar course is the first in a series of four such seminars that discuss essential aspects of clinical pediatric dentistry, with emphasis on the scientific evidence supporting contemporary practice. These four consecutive seminar courses over four semesters (two academic years) provide the pediatric dentistry graduate student with a conceptual basis for caring for the oral health of children. This initial seminar of sixteen two-hour sessions (32 hours) addresses: effective communication with children, strategies for management of children's behavior in the clinical setting, development of the dentition, clinical management of traumatic injuries to the oral cavity, and restoration of carious teeth. Prereq: Enrollment in the College of Dentistry's Master of Science degree program in the Pediatric Dentistry track.

#PDO 620 PEDIATRIC DENTISTRY SEMINAR II. (2)
This seminar course is the second in a series of four such seminars that discuss essential aspects of clinical pediatric dentistry, with emphasis on the scientific evidence supporting contemporary practice. These four consecutive seminar courses over four semesters (two academic years) provide the pediatric dentistry graduate student with a conceptual basis for caring for the oral health of children. This second seminar in the series consists of sixteen two-hour sessions (32 hours) and addresses: pulpal therapy, management of the arch circumference of the developing child, clinical management of the child with cleft lip/cleft palate, speech pathology, burns affecting the oral cavity, the use of antimicrobials, and medical compromising conditions affecting oral health care. Prereq: Enrollment in the College of Dentistry's Master of Science degree program in the Pediatric Dentistry track, and completion of PDO 610.

#PDO 630 PEDIATRIC DENTISTRY SEMINAR III. (2)
This seminar course is the third in a series of four such seminars that discuss essential aspects of clinical pediatric dentistry, with emphasis on the scientific evidence supporting contemporary practice. These four consecutive seminar courses over four semesters (two academic years) provide the pediatric dentistry graduate student with a conceptual basis for caring for the oral health of children. This third seminar in the series consists of sixteen two-hour sessions (32 hours) and address: deleterious oral habits, orthodontic correction of malocclusions, esthetic dentistry of the child, abnormal development of the dentition, and elements of managing a successful pediatric dental practice. Prereq: Enrollment in the College of Dentistry's Master of Science degree program in the Pediatric Dentistry track, and completion of PDO 610 and 620.

#PDO 640 PEDIATRIC DENTISTRY SEMINAR IV. (2)
This seminar course is the fourth and last of a series of four such seminars that discuss essential aspects of clinical pediatric dentistry, with emphasis on the scientific evidence supporting contemporary practice. These four consecutive seminar courses over four semesters (two academic years) provide the pediatric dentistry graduate student with a conceptual basis for caring for the oral health of children. This fourth seminar in the series consists of sixteen two-hour sessions (32 hours) and addresses the required reading list of the American Board of Pediatric Dentistry. Subsequent to completing the graduate program the pediatric dentistry graduate student will take a written and clinical examination administered by the American Board of Pediatric Dentistry in order to be board-certified in the clinical specialty. The seminar is designed to ensure the graduate student is prepared to successfully complete the examination. Prereq: Enrollment in the College of Dentistry's Master of Science degree program in the Pediatric Dentistry track, and completion of PDO 610, 620, and 630.

PDO 822 PEDIATRIC DENTISTRY I. (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, 26 hours; laboratory, 6 hours. Prereq: Second year standing in the College of Dentistry.

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 834 PEDIATRIC DENTISTRY II. (2)
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: 32 hours. Prereq: 2nd year standing in the College Dentistry.

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.

PED Pediatrics

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 853 INFECTIOUS DISEASE

PED 859 ACTING INTERNSHIP IN PEDIATRICS - UK

PED 869 PEDIATRIC ALLERGY AND CLINICAL IMMUNOLOGY

PED 870 PEDIATRIC CARDIOLOGY

PED 871 GENETICS/ENDOCRINOLOGY/METABOLISM

PED 876 DYSMORPHOLOGY/GENETICS

PED 877 PEDIATRIC DEVELOPMENTAL DISABILITIES

PED 878 PEDIATRIC INTENSIVE CARE

PED 879 ADOLESCENT MEDICINE

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 thesis 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 810 PERIODONTICS I. (1)
This course is an introduction to periodontology. Emphasis is on recognition of healthy gingival characteristics and early disease progression. The student is also introduced to etiology, epidemiology and immunology related to periodontal assessments, and plaque control measures. Lecture, two hours; laboratory, nine hours per week. Prereq: CDS 815 or consent of instructor.

PER 820 PERIODONTICS II. (3)
This course presents the components of the first stages of periodontal therapy. Emphasis is on diagnosis, prognosis, treatment planning and non-surgical treatment of the periodontally involved patient. Lecture, 36 hours; laboratory, 24 hours. Prereq: PER 810 or consent of instructor.

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.

PGY Physiology

PGY 206 ELEMENTARY PHYSIOLOGY. (3)
An introductory survey course in basic human physiology. Prereq: One semester of college biology.

PGY 207 CASE STUDIES IN PHYSIOLOGY. (1)
Group discussions of clinical cases and clinical applications relevant to human physiology. Prereq: PGY 206 or its equivalent. May be taken concurrently.

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 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 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 603 DESIGN AND ANALYSIS. (3)
This course focuses on skills necessary to critically evaluate the methodology of biological experiments. Participants evaluate research design problems which may or may not have serious design errors or inappropriate statistical inferences or invalid conclusions. Participants also prepare similar design problems in their research area. Prereq: Statistics course; consent of instructor.

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 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 611 ADVANCED MEDICAL PHYSIOLOGY. (6)
A comprehensive physiology course examining the systems, cellular and molecular basis of clinical physiology. Prereq: Second year graduate standing an completion of IBS 606.

PGY 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/GRN 612.)

PGY 615 SEMINAR IN TEACHING MEDICAL SCIENCE (MED SCIENCE TEACHING I). (2)
A two (2) credit seminar course in which issues related to the theory and practice of life science education are discussed in a Socratic manner. May be repeated to a maximum of three credits. Prereq: Current enrollment in a life science graduate program. (Same as GRN 615.)

PGY 616 PRACTICUM IN TEACHING MEDICAL SCIENCE (MED SCIENCE TEACHING II). (2)
A two (2) credit experimental course in which students will directly participate in the teaching of Physiology under supervised conditions. May be repeated to a maximum of six credits. Prereq: PGY 615 may be taken concurrently.

PGY 617 PHYSIOLOGICAL GENOMICS. (2)
The study of function by global analysis of gene expression. Teaches the concepts, techniques, and functional significance of analyzing gene expression patterns. The technical emphasis is on the design and analysis of DNA microarray experiments. Examples of normal function or disease states in which gene expression profiling has had a significant impact are also taught. Prereq: IBS 604 and IBS 602 or equivalents. (Same as PHA 617.)

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 650 ANIMAL PHYSIOLOGY LABORATORY. (2)
Hands-on laboratory exercises in animal physiology. Prereq: Previous or concurrent enrollment in BIO 550. (Same as BIO 650.)

PGY 660 BIOLOGY OF REPRODUCTION. (3)
Advanced study of current topics in reproductive biology. The course is comprised equally of student-led discussions and lectures given by faculty with research expertise in selected topics. Readings will be taken from current and classic literature. Topics covered include (but are not limited to) molecular and cellular endocrinology, hormone receptors and mechanism of action, reproductive neuroendocrinology, reproductive behavior, gametogenesis, fertilization, sexual differentiation, puberty, menopause and environmental effects on reproduction. Emphasis will be placed on the analysis and understanding of the experimental basis for current concepts in reproductive biology. Prereq: ASC/PGY 601 and ASC 364 or BIO/PGY 502 or consent of instructor. (Same as ANA 660 and ASC 660).

PGY 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. (Same as ANA/GRN/PHA 710.)

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 813 NEUROPHYSIOLOGY. (1)
The brain uses electrical signals to process all information it receives and analyzes. Individual neurons encode complex information into simple electrical signals; the meaning behind these signals is derived from the specific interconnections of neurons. The purpose of neurophysiology is to describe how the neuron produces electrical and chemical signals and illustrate how these signals are involved in the functional organization of neural circuits. This course also describes how the central nervous system analyzes and integrates the various inputs, elicits command decisions that determine the motor and/or endocrine responses. Lecture: three hours per week for five weeks. Prereq: Admission to the College of Dentistry, or consent of the Course Director. (Same as OBI 813.)

PGY 818 HUMAN FUNCTION. (8)
This course provides in-depth instruction on the physiological mechanisms of body function from the single cell to the organism level. The course is team taught by medical scientists and clinicians. Teaching methodologies include didactic and Socratic lectures, small group discussions, demonstrations and live model and computer simulated laboratories. Lecture, 20 hours per week. Prereq: For MD 818/PGY818: Admission to medical school (first year). For OBI 814: Admission to the Dental School and OBI 812. (Same as MD 818/OBI 814.)

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 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 616 BIOLOGY AND THERAPY OF CANCER. (3)
Biology of cancer will be discussed at the molecular, cellular and organismic level. Emphasis will be placed on cellular signaling, apostosis and cell cycle unique to cancer cells, which affects tumor cell behavior and its interactions with the host immune system. The biology of hematopoitic cells will also be included. Clinicians active in treatment and research of various types of cancer will be invited to participate in the lectures. Prereq: BCH 501, 502, BIO 685. (Same as MED/MI 616.)

PHA 617 PHYSIOLOGICAL GENOMICS. (2)
The study of function by global analysis of gene expression. Teaches the concepts, techniques, and functional significance of analyzing gene expression patterns. The technical emphasis is on the design and analysis of DNA microarray experiments. Examples of normal function or disease states in which gene expression profiling has had a significant impact are also taught. Prereq: IBS 604 and IBS 602 or equivalents. (Same as PGY 617.)

PHA 621 PRINCIPLES OF DRUG ACTION. (3)
The objective of this course is to familiarize graduate students with the principles and mechanisms of drug action in biochemical and physiological systems. Students will discuss the quantitative approaches to assessing drug responses, metabolism and toxicity. 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 ADVANCED CARDIOVASCULAR PHARMACOLOGY. (2)
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 ADVANCED MOLECULAR PHARMACOLOGY. (2)
This course will provide in-depth coverage of the molecular pharmacology of growth factors, transcription factors, receptors, and ion channels. Emphasis will be placed on both the normal functions of these cell-signaling molecules and perturbations that result in several prevalent human diseases, including cancer, Alzheimer's, diabetes, osteoporosis, and inherited human illnesses. Students will be introduced to experimental approaches to diagnosing and treating these illnesses in the light of our evolving knowledge of molecular pharmacology. Prereq: IBS 601-606 or consent of instructor. (Same as PHR/TOX 649.)

PHA 658 ADVANCED NEUROPHARMACOLOGY. (2)
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: PHA 522, IBS 601-606, or consent of instructor.

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 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. (Same as ANA/GRN/PGY 710.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 822 DENTAL PHARMACOLOGY AND THERAPEUTICS. (4)
This course will provide students with a fundamental understanding of the pharmacology and therapeutic uses of drugs commonly used by their patients and in their practice. Prereq: OBI 812 and OBI 814. (Same as OBI 826.)

PHA 824 MECHANISMS OF DISEASE AND TREATMENT/PHARMACOLOGY. (7)
This course introduces the principal actions of substances which are used as drugs for treatment of diseases and suffering in humans. It will cover the general principles of drug action, how drugs alter the function of normal and pathologic tissues and organisms and how they influence the disease process. Drugs used in the treatment of disease processes will be integrated with discussion of those diseases in PAT 823. Lecture, 20 hours per week. Prereq: Admission to second year of medical curriculum. (Same as MD 824.)

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 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 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 331 ETHICS. (3)
An examination of fundamental issues in ethics, such as duty, character, virtue and vice, evil, moral responsibility, free will, the good life, the emotions, skepticism, and rationality.

***PHI 332 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 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 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 351 METAPHYSICS AND EPISTEMOLOGY. (3)
An examination of fundamental issues in metaphysics and epistemology, such as causation, the nature of space and time, personal identity, free will, the existence of God, the nature and types of knowledge, the character of human existence, skepticism, and rationality.

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 380 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 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.

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 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 519 CRITICAL SOCIAL THOUGHT. (3)
This course provides a pluralistic introduction to major 20th-century paradigms of critical social thought. Critical social thought in philosophy comprises those authors and schools that focus philosophical methods and questions on the analysis of social conditions and/or focus sociocultural methods and questions on the study of philosophy. These include feminist philosophy, Marxist-influenced social theory, poststructuralism, critical race theory, and post-analytic philosophy. Prereq: For undergraduates, PHI 260 and 270. For graduate students outside the philosophy department, permission of the instructor.

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 531 ADVANCED TOPICS IN ETHICS (SUBTITLE REQUIRED). (3)
A topical study in ethics, emphasizing, but not restricted to, contemporary issues. Topics may include the nature of practical reason, justification of moral theories, moral luck, amorality and immorality, moral language, and weakness of will. May be repeated to a maximum of six credits under different subtitles. Prereq: One of the following: PHI 130, 305, 330, or 530; or graduate standing.

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 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.

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 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 VALUE THEORY. (3)
A specialized graduate course in value theory that treats the history of value theoretic 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 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: MA 213, CHE 538, CHE 548 and PHR 631.

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 ADVANCED MOLECULAR PHARMACOLOGY. (2)
This course will provide in-depth coverage of the molecular pharmacology of growth factors, transcription factors, receptors, and ion channels. Emphasis will be placed on both the normal functions of these cell-signaling molecules and perturbations that result in several prevalent human diseases, including cancer, Alzheimer's, diabetes, osteoporosis, and inherited human illnesses. Students will be introduced to experimental approaches to diagnosing and treating these illnesses in the light of our evolving knowledge of molecular pharmacology. Prereq: IBS 601-606 or consent of instructor. (Same as PHA/TOX 649.)

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. (1-4)
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 764 DRUG DEVELOPMENT REGULATION AND CLINICAL RESEARCH. (3)
A study of the pharmaceutical development process and its regulation, including a detailed examination of clinical research methodologies. Students will demonstrate their competence by developing a clinical trial protocol. Prereq: Enrollment in the Pharmaceutical Sciences graduate program or consent of instructor.

#PHR 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 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 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 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 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 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 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 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 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 874 DRUG LITERATURE EVALUATION. (3)
This course apprises 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 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 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 issues. 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: PHARMACEUTICS AND BIOPHARMACEUTICS I. (3)
The first of a two course sequence in basic principles of Pharmaceutical Science concentrating on absorption, distribution, metabolism, excretion and bioavailability of drugs; and an introduction to dosage forms, oral drug delivery systems, drug solutions and drug solids, bioequivalence determinations and ratings, and official compendia. Variable mixtures 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: PHARMACEUTICS AND BIOPHARMACEUTICS II. (3)
The second of a two course sequence in the basic principles of Pharmaceutical Science concentrating on modified release oral dosage forms; modified release parenteral dosage forms; nasal, buccal, rectal, vaginal and ophthalmic delivery systems; aerosols and pulmonary delivery systems, and the drug development process. Variable mixture of lecture, group discussion and independent study. Prereq: Admission to the first year, College of Pharmacy.

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 928 EARLY PHARMACY PRACTICE EXPERIENCE. (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 920 series and consent of instructor.

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. (5)
A study of human disease processes and rational pharmacotherapeutics relating to the autonomic, central and peripheral nervous system including a discussion of the factors influencing the development of substance dependence and the strategies for risk reduction. 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 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 944 BASIC PRINCIPLES OF MEDICINAL CHEMISTRY. (3)
The rational design of molecules to produce safe and effective therapeutic responses in humans; molecular changes in drug molecules that affect affinity and activity at drug receptors and influence the absorption, distribution, metabolism, excretion and stability of drugs; and the properties of drug molecules which are important in their formulation into drug products. Variable mixture of lecture, group discussion and independent study. Prerq: Admission to the second year, College of Pharmacy.

***PHR 946 ADVANCED PHARMACOTHERAPY I. (5)**
An advanced study of the pathology, pathophysiology and optimal treatment of common diseases. Through a series of case studies students will acquire and/or reinforce their skill at understanding diseases and developing and defending optimal treatment plans for successfully managing those diseases. The case studies utilized will integrate relevant pathophysiological, pharmacokinetic, pharmacoeconomic and pharmacological concepts with appropriate patient specific parameters. Students will be expected to communicate and defend their decisions, including the process followed in making those decisions, in understandable, appropriate written and verbal formats. Variable mixture of discussion, lecture, independent study and laboratory. Prereq: PHR 93X series courses; coreq: PHR 947 and 949.

***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.

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 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 third year, College of Pharmacy.

***PHR 957 ADVANCED PHARMACOTHERAPY II. (5)**
A continuation of PHR 946. Variable mixture of discussion, lecture, independent study and laboratory. Taught part of term. Prereq: Admission to third year, College of Pharmacy; co-req: PHR 959.

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 966 ADVANCED PHARMACOTHERAPY III. (5)**
A continuation of PHR 957. Variable mixture of discussion, lecture, independent study and laboratory. Taught part of term. Prereq: Admission to the third year, College of Pharmacy; PHR 957, 959; co-req: PHR 969.

***PHR 967 ADVANCED PHARMACOTHERAPY IV. (5)**
A continuation of PHR 966. Variable mixture of discussion, lecture, independent study and laboratory. Taught part of term. Prereq: Admission to third year College of Pharmacy; PHR 957, 959; co-req: PHR 969.

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 976 COMPUTER AND INFORMATION TECHNOLOGIES IN PHARMACY. (2)
A discussion and introduction to the use of computer and other information technologies, such as Personal Data Assistants (PDAs) and patient management software, as aids to providing more effective and efficient pharmaceutical care services. Lecture: 1 hour; laboratory, 2 hours per week. Prereq: Admission to the second or third year, College of Pharmacy.

PHR 988 ADVANCED PHARMACY PRACTICE EXPERIENCE. (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 48 credits. Laboratory, 40 or more hours per week. Prereq: Admission to the fourth year, College of Pharmacy 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 120 HOW THINGS WORK. (3)
The close relationship between physical science, technology and our everyday lives will be illuminated by examination of the technology we purchase and use and by observations of natural phenomena we can make using only the informed mind and eye.

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 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 MIDDLE SCHOOL TEACHERS. (1)
Laboratory to accompany PHY 151-152 with experiments and exercises designed especially for students preparing to be 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.

PHY 170 BLACK HOLES AND TIME TRAVEL. (3)
The course will discuss basic concepts in physics prior to the 20th century and the backdrop to the emergence of the Special Theory of Relativity. Elements of Special and General Relativity will be discussed at a non-technical level. These concepts will be used to explain how very massive stars inevitably collapse to form black holes. Their observational signatures will be discussed. The work of Hawking leading to the prediction that black holes emit faint radiation will be explained. Finally, the possibility of existence of wormholes leading to time travel will be explored.

PHY 210 SPECIAL LABORATORY FOR GENERAL PHYSICS PHY 201. (1)
Special laboratory for students who have completed PHY 201 and later determine that they need an accompanying laboratory. Laboratory, two hours per week. Prereq: PHY 201.

PHY 211 GENERAL PHYSICS. (5)
First part of a two-semester survey of classical and modern physics, focusing on the motion of solids and fluids as governed by Newton's Laws and by the conservation laws of energy, momentum, and angular momentum. 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 trigonometry as obtainable in MA 109 and MA 112, or as demonstrated by an ACT math score of 25 or higher.

PHY 212 SPECIAL LABORATORY FOR GENERAL PHYSICS PHY 203. (1)
Special laboratory for students who have completed PHY 203 and later determine that they need an accompanying laboratory. Laboratory, two hours per week. Prereq: PHY 203.

PHY 213 GENERAL PHYSICS. (5)
Continuation of PHY 211, covering electrostatics, de circuits, magnetism, Maxwell's Equations, electromagnetic radiation, light and some modern physics. Lecture, two hours; recitation, two hours; laboratory, two hours. Credit is not given to students who already have credit for PHY 232 and 242. Prereq: PHY 211 or equivalent.

PHY 228 OPTICS, RELATIVITY AND THERMAL PHYSICS. (3)
A lecture and problems course covering the principles of geometrical optics, special relativity, and thermal physics. Prereq or concur: MA 114.

PHY 231 GENERAL UNIVERSITY PHYSICS. (4)
First part of a two-semester survey of classical physics. Consequences of the principles of mechanics are developed conceptually, analytically and quantitatively. Lecture, three hours; recitation, one hour per week. Prereq or concur: MA 113.

PHY 232 GENERAL UNIVERSITY PHYSICS. (4)
A general course covering electricity, magnetism, electromagnetic waves and physical optics. Lecture, three hours; recitation, one hour per week. Prereq: PHY 231; concur: MA 213.

PHY 241 GENERAL UNIVERSITY PHYSICS LABORATORY. (1)
A laboratory course offering experiments in mechanics and heat, framed in a small group environment that requires coordination and team work in the development of a well-written lab report. Prereq or concur: PHY 231.

PHY 242 GENERAL UNIVERSITY PHYSICS LABORATORY. (1)
A laboratory course offering experiments in electricity, magnetism, and light, framed in a small group environment that requires coordination and team work in the development of a well written lab report. Prereq: PHY 241; concur: PHY 232.

PHY 306 THEORETICAL METHODS OF PHYSICS. (3)
A lecture and problems course on the applications in physics of vector calculus, Fourier series and transforms, special functions and asymptotic forms. Prereq or concur: MA 214.

PHY 335 DATA ANALYSIS FOR PHYSICISTS. (1)
An integrated lecture and demonstration computational laboratory course in the theory and techniques of data analysis and error propagation. An emphasis is given to applications common to physical sciences: curve fitting, statistical methods of data analysis, systematic uncertainties, and both independent and correlated errors in several variables. Prereq: PHY 242. (Same as STA 335.)

PHY 361 PRINCIPLES OF MODERN PHYSICS. (3)
An introduction to the foundations of quantum mechanics and selected topics in atomic, nuclear, particle, solid sate, and statistical physics. Prereq: MA 213; PHY 232 or, with consent of instructor, PHY 213.

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, MIDDLE SCHOOL AND HIGH SCHOOL TEACHERS. (1-4)
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, middle school and high school teachers.

PHY 402G ELECTRONIC INSTRUMENTATION AND MEASUREMENTS. (3)
Elementary treatment of electronic circuits emphasizing laboratory work. Topics include AC circuits, filters, theory and operation of transistors and other semiconductor devices and a simple treatment of operational amplifiers. Lecture, two hours per week; laboratory, three hours per week. Prereq: PHY 242 or EE 305 or consent of instructor. (Same as EE 402G.)

PHY 404G MECHANICS. (3)
A lecture and problem course covering the fundamental laws of mechanics. Topics include Newton's Laws, Kepler's Laws, oscillatory motion and an introduction to Lagrangian methods. Prereq: PHY 232, or with permission of Director of Undergraduate Studies, PHY 213; concur: MA 214.

PHY 416G ELECTRICITY AND MAGNETISM. (3)
First of two lecture and problem courses covering: the theory of electrostatic fields in the presence of conductors and dielectric materials, magnetic fields due to steady currents in the presence of magnetic materials, electromagnetic induction, and electromagnetic fields due to time-varying currents. Prereq: PHY 308, MA 214. MA 432G recommended.

PHY 417G ELECTRICITY AND MAGNETISM. (3)
Second of two lecture and problem courses covering: the theory of electrostatic fields in the presence of conductors and dielectric materials, magnetic fields due to steady currents in the presence of magnetic materials, electromagnetic induction, and electromagnetic fields due to time-varying currents. 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 495 SENIOR THESIS. (3)
With mentoring from faculty member(s), advanced undergraduate students propose and execute an independent research project. A final report will be written and a presentation will be made in a forum such as a professional meeting, a student group such as a regional or national Society of Physics Students meeting, or a small group of faculty. May be repeated to a maximum of six credits. Prereq: Advanced standing.

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 520 INTRODUCTION TO QUANTUM MECHANICS. (3)
A lecture and problem course providing an introduction to the concepts and formalism of quantum mechanics. Primary emphasis is on the Schrodinger equation and its applications including the simple harmonic oscillator, the square well, the hydrogen atom, orbital and spin angular momenta, matrix representation of two level systems. Prereq: PHY 361, MA 214; recommended: MA 322.

PHY 522 THERMODYNAMICS AND STATISTICAL PHYSICS. (3)
Temperature, heat, and entropy, and the Laws of Thermodynamics, as applied to simple systems. Introduction to statistical mechanics and the description of thermodynamic quantities in terms of ensemble averages. Prereq: PHY 361 and MA 214.

PHY 524 SOLID STATE PHYSICS. (3)
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: PHY 520, or consent of instructor. Engineering standing required for EE 524. (Same as EE 524.)

PHY 525 CONDENSED MATTER PHYSICS. (3)
Optical, magnetic, and transport properties of metals, semiconductors, superconductors, and dielectrics; cooperative phenomena and phase transitions. Prereq: PHY 524 or consent of instructor.

†PHY 530 EXPERIMENTAL PHYSICS: OPTICS AND SPECTROSCOPY.

***PHY 535 EXPERIMENTAL PHYSICS: ADVANCED PHYSICS LABORATORY. (2)**
An advanced laboratory course covering topics in atomic, solid state, and nuclear physics, geometrical and wave optics, and principles and techniques of spectroscopy. May be repeated to a maximum of 4 credits. Prereq: PHY 335, 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 FUNDAMENTALS OF ATOMIC PHYSICS. (3)
A continuation of introductory quantum mechanics with application to atomic systems. Topics include angular momentum, perturbation theory, variational principles, interaction of radiation with matter, atomic spectra and 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, symmetrics and conservation laws, particle reactions and decays, quark dynamics, and elements of quantumchrodynamics 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: EE 360, EE 468G, or PHY 417G, 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)
The physics of stars from star formation to stellar death. Topics include stellar structure and evolution, energy generation and transport, the later stages of stellar evolution and stellar remnants. Prereq: PHY 361, PHY 416G, PHY 417G or consent of instructor. (Same as AST 591.)

PHY 592 ASTROPHYSICS II – GALAXIES AND INTERSTELLAR MATERIAL. (3)
The physics of galaxies and of the interstellar medium. Topics include galaxy formation, evolution and interaction, phases of the interstellar medium, and physical processes in the interstellar medium. Prereq: PHY 361, PHY 416G, PHY 417G or consent of instructor. (Same as AST 592.)

PHY 600 SELECTED TOPICS IN ADVANCED PHYSICS. (2-3)
An advanced seminar course on topics related to departmental research programs. Topics may include astrophysics, atomic physics, condensed matter physics, nuclear physics and particle physics. 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 616 QUANTUM FIELD THEORY I. (3)
An introduction to field theory and many-body theory. Topics include path integral quantization, second quantization, relativistic field theory of bosons and fermions, Green's function and perturbation theory, field theories on the lattice, renormalization of scalar fields and applications to critical phenomena. Prereq: PHY 615, PHY 632.

PHY 624 CONDENSED MATTER THEORY. (3)
Electron band theory, lattice dynamics, electron-phonon and electron-electron interactions, superconductivity and superfluidity, Fermi liquid theory. Prereq: PHY 524, 614, 632.

PHY 630 TOPICS IN NUCLEAR AND INTERMEDIATE ENERGY PHYSICS (SUBTITLE REQUIRED). (3)
A course in nuclear physics, hadron physics and particle physics. Emphasis is placed on topics related to departmental research activities at Jefferson laboratory and elsewhere. Such topics include study of the structure and interactions of hadrons in terms of quarks and gluons. They also include low energy tests of Standard Model predictions. (PHY 630 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 504, 520, 522.

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 716 QUANTUM FIELD THEORY II. (3)
A continuation of PHY 616. Topics include approximation methods in many body theory and applications to condensed matter and nuclear systems, quantum electrodynamics, radiative corrections, Higgs mechanism and applications to particle physics and superconductivity, introduction to non-Abelian gauge fields and the standard model. Prereq: PHY 616.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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. (1-9)
May be repeated to a maximum of 18 credits. Prereq: Graduate standing in Physics.

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

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 oganismic 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. (4)
Study of the physical, chemical and biological properties of soils and how these properties relate to plant nutrient availability and plant growth, land-use planning and management issues, and soil and water quality issues. Lecture, three hours; laboratory, three hours. Prereq: CHE 105.

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 210 and PLS 366 or concurrently or consent of instructor.

PLS 399 EXPERIENTIAL LEARNING IN PLANT AND SOIL SCIENCE. (1-6)
A field-based learning experience in plant and soil science under the supervision of a faculty member. May be repeated for a maximum of six credits. Pass/fail only. Prereq: Complete learning contract before registration.

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.

PLS 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 PLS 597. Students may not repeat under the same subtitle. Prereq: Permission of instructor.

PLS 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. (Same as PPA 640.)

PLS 697 SPECIAL TOPICS IN PLANT AND SOIL SCIENCE (SUBTITLE REQUIRED). (1-3)
Special topic or experimental course in cross science, horticulture, plant physiology or soil science for advanced graduate students. Special title required and must be approved by the chairpersons of the Departments of Agronomy and Horticulture. A particular title may be offered twice, at most, under PLS 697. Students may not repeat under the same title. May be repeated to a maximum of six hours. Prereq: Consent of appropriate instructor before registering.

PLS 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.

#PLS 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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

AGRONOMY

PLS 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: Concurrent enrollment in PLS 366.

PLS 395 SPECIAL PROBLEMS IN PLANT AND SOIL SCIENCE. (1-4)
May be repeated for a maximum of nine credits. Prereq: Consent of appropriate instructor before registration.

PLS 396 SOIL JUDGING. (1-2)
This course involves basic soil resource evaluation designed to provide the students with essential field training needed to pursue careers as soil scientists, conservationists, planners, agricultural chemical representatives and environmental assessors. It is also used to prepare the UK soil judging team for regional college competition. May be repeated to a maximum of five credit hours. Prereq: Consent of instructor.

PLS 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.

PLS 406 ADVANCED SOIL JUDGING. (1)
A more advanced treatment of soil site evaluations under diverse climatic and physiographic environments. Students will obtain expertise in assessing properties of contrasting soil types and rating them for soil use and management suitability. The course is also used for preparing the UK soil judging team for national college competition. May be repeated to a maximum of four credit hours. Prereq: PLS 396 and qualifying for national competition.

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

PLS 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.

PLS 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.)

PLS 455G WETLAND DELINEATION. (3)
Basic concepts of natural wetland ecosystems, their importance, functions, and major features used for their identification and classification. Application of basic hydrology, hydrophytic vegetation and hydric soil indicators for identification of jurisdictional wetlands utilizing documentation and analysis of field collected data. Three laboratory exercises and four short field trips required. Prereq: PLS 366 or consent of instructor. (Same as NRC 455G.)

PLS 456G CONSTRUCTED WETLANDS. (3)
Important aspects of the functions of natural and constructed wetlands as water purifiers. Principles and mechanisms of the purification process, design, construction, operation and management criteria for efficient usage. Case studies and design problems of constructed wetlands on mining, agricultural, industrial and municipal wastewater treatment applications. Two all day field trips are required. Prereq: PLS 366 or consent of instructor. (Same as NRC 456G.)

PLS 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.

PLS 470G SOIL NUTRIENT MANAGEMENT. (3)
Sources and manufacture of fertilizer materials; soil reaction of elements essential for plant growth; effective use of fertilizers for various soil situations. Prereq: CHE 105, PLS 366 and PLS 386 or consent of instructor.

PLS 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.)

PLS 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.

PLS 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.

PLS 510 FORAGE MANAGEMENT AND UTILIZATION. (3)
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. Prereq: PLS 386, or consent of instructor.

PLS 514 GRASS TAXONOMY AND IDENTIFICATION. (3)
Overview of the grass family, concentrating on taxonomic issues and identification skills for ~200 species (turf, forages, weeds, etc.). Lecture: two hours; laboratory: two hours per week. Prereq: PLS 220 or permission from instructor.

PLS 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: PLS 210 and PLS 366.

PLS 531 FIELD SCHOOLS IN CROP PEST MANAGEMENT. (2)
A course for the Plant Pest Management option in Plant and Soil science to reinforce the concepts of pest management learned in previous courses. Emphasis will be placed on integrating information to develop pest management strategies. Instructional methods will include formal lectures and laboratories in the field. Prereq: ENT 300 or ENT 310 or ENT 320; PLS 404 and PPA 400G; or consent of instructor.

PLS 556 SEED PRODUCTION AND TECHNOLOGY. (3)
A study of seeds of improved cultivars as a delivery system for plant genetics. Principles of seed production, harvesting and conditioning for agronomic and horticultural crops within and outside of the region of adaptation. Seed multiplication systems, seed testing and the laws and regulations related to marketing high quality seed. Lecture, two hours; laboratory, four hours for 12 weeks. Prereq: PLS 386 or consent of instructor.

PLS 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.

PLS 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.

PLS 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 PLS 367 or consent of instructor.

PLS 575 SOIL PHYSICS. (3)
This course deals with the state and movement of matter, and with the fluxes and transformations of energy, in soil systems. Its objectives are to develop a basic theoretical understanding of soil physical properties and processes (with emphasis on the statics and dynamics of soil water), and to demonstrate how this understanding can be applied under field conditions to make sound management decisions concerning both agricultural and non-agricultural uses of soils. Prereq: MA 113 or MA 123, PHY 201 or PHY 211, PLS 366 or consent of instructor.

PLS 576 LABORATORY IN SOIL PHYSICS. (1)
This course consists of laboratory and field exercises designed to increase understanding of important soil physical properties and processes. Its objectives are to develop familiarity with standard methods of measuring soil physical parameters, and to instill scientific methods of data collection, analysis and interpretation. Prereq: PLS 367, concurrent enrollment in PLS 575, or consent of instructor.

PLS 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.

PLS 599 SPECIAL PROBLEMS IN PLANT AND SOIL SCIENCE. (1-4)
May be repeated for a maximum of nine credits. Prereq: Consent of instructor.

PLS 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.)

PLS 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.

PLS 605 PHYSIOLOGICAL MECHANISMS IN HORTICULTURAL PLANTS. (3)
A critical evaluation of the recent concepts in certain selected areas of horticultural science. Prereq: BIO 430G.

PLS 609 PLANT BIOCHEMISTRY. (3)
The course will consider the chemical constituents of plants (with emphasis on biologically or nutritionally significant compounds unique to plants), their biosynthesis, contribution to key metabolic and defense processes and the regulation of their synthesis. Included will be discussions of photosynthesis, carbohydrates, lipids, isoprenoids and phenylpropanoids, nitrogen fixation, nitrogen and sulfur reduction and assimilation, alkaloids and additional secondary compounds, frontiers in plant biochemistry. Prereq: BCH 607 or equivalent or consent of instructor. (Same as BCH/PPA 609.)

PLS 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: ABT/ASC/ENT 360 or BIO 304. (Same as BIO 619.)

PLS 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.)

PLS 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 607. (Same as BIO/FOR 622.)

PLS 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 or consent of coordinator. Prereq or concur: BCH 607. (Same as BIO/FOR 623.)

PLS 650 SOIL-PLANT RELATIONSHIPS. (3)
An advanced course on the relationships between media and the root systems of plants growing therein. Prereq: PLS 366, BIO 430G (or equivalent), or consent of instructor.

PLS 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: ABT 360, BIO 430G or consent of instructor.

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

PLS 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.

PLS 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: PLS 470G, 581; CHE 442G, or consent of instructor.

PLS 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, and STA 672. (Same as STA 676.)

PLS 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: PLS 470G or PLS 650 or consent of instructor.

PLS 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 360 or consent of instructor. (Same as GLY 741.)

PLS 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.

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

PLS 772 SEMINAR IN PLANT AND SOIL SCIENCE (SUBTITLE REQUIRED). (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.

PLS 799 RESEARCH IN PLANT AND SOIL SCIENCE. (1-4)
May be repeated for a maximum of 12 credits. Prereq: Consent of instructor.

HORTICULTURE

PLS 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.

PLS 320 WOODY HORTICULTURAL 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: PLS 220.

PLS 330 HERBACEOUS HORTICULTURAL 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.

PLS 332 HERBACEOUS HORTICULTURAL 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.

†PLS 340 FLORAL DESIGN.

PLS 440 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.

PLS 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.

PLS 465 GREENHOUSES AND CONTROLLED ENVIRONMENTS. (3)
A study of greenhouse structures, coverings, equipment, and the monitoring and regulation of the environment including temperature, light, carbon dioxide, and relative humidity as these factors relate to the commercial production of greenhouse crops. Other types of controlled environments are also included. Lecture, two hours; laboratory, two hours per week. Prereq: PLS 386.

***PLS 520 FRUIT AND VEGETABLE PRODUCTION. (4)**
Commercial production practices for major fruits and vegetables. Prereq: PLS 386.

PLS 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: PLS 440 and PLS 465.

PM Preventive Medicine and Environmental Health

***PM 601 ENVIRONMENTAL AND OCCUPATIONAL HEALTH. (3)**
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. Prereq: Undergraduate chemistry and biology, or permission 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 620 EPIDEMIOLOGY. (3)
This is an initial graduate level course in the principles of epidemiology and applications in preventive medicine and environmental health. The course consists of lectures and informal discussions. Principles and methods of epidemiologic research with a focus on issues of study design and analysis will be presented. Prereq: Graduate student in good standing in the MPH program, MSPH program, or community health nursing, or consent of instructor. (Same as SPH 605.)

PM 621 ADVANCED EPIDEMIOLOGY. (3)
This course provides specialized epidemiologic content and method designed to meet the research and practice needs of health professionals. Practice-based problem sets and hands-on computer assignments will complement this seminar-oriented course, focusing on the role of epidemiology in the prevention of disease and injury. Prereq: SPH 605 or consent of instructor. (Same as SPH 611.)

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 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 670 CLINICAL EPIDEMIOLOGY. (3)
The student will learn the fundamentals of designing clinical research studies of diagnostic tests, prognosis, and causation. Students will practice these skills through focused critiques of the medical literature and by designing clinical research studies. Prereq: PM 521 or consent of instructor. STA 570 or equivalent is recommended.

PM 675 RESEARCH DESIGN IN PUBLIC HEALTH. (4)
The techniques, strategies, and issues of conducting scientific investigations within the domain of public health and preventive medicine. Numerous theoretical and methodological approaches to public health problems will be addressed in a chronological manner that matches the sections of a peer-reviewed journal article, e.g., background, methods, results, and discussion. Prereq: PM 521 and STA 570 and/or permission of instructor.

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 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 CHRONIC DISEASE EPIDEMIOLOGY. (3)
A survey course on the leading chronic diseases in the U.S., including cardiovascular disease, cancer and diabetes with focus on surveillance and risk factors. Prereq: Enrollment in a Public Health degree program, SPH 605/PM 620 Introduction to Epidemiology or consent of instructor. (Same as SPH 711.)

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 ELECTIVE:

PM 852 RESEARCH IN PREVENTIVE MEDICINE AND ENVIRONMENTAL HEALTH.

PPA Plant Pathology

PPA 395 INDEPENDENT STUDY IN PLANT PATHOLOGY. (3-4)
Independent study in Plant Pathology under the supervision of a faculty member. Prereq: Consent of appropriate instructor.

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 500 PHYSIOLOGY OF PLANT HEALTH AND DISEASE. (2)
Physiological and molecular aspects of plant biology underlying interactions with microbial pathogens and symbionts. Prereq: PPA 400G can be concurrent.

#PPA 600 CRITICAL METHODS IN PLANT-MICROBE INTERACTIONS. (2)
The course will provide instruction on experimental methods commonly used in Plant-Microbe Interaction and will train students in critical thinking, grant writing, scientific ethics and seminar presentation. Prereq: PPA 500.

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 BIO/BCH/MI/PLS 601.)

PPA 609 PLANT BIOCHEMISTRY. (3)
The course will consider the chemical constituents of plants (with emphasis on biologically or nutritionally significant compounds unique to plants), their biosynthesis, contribution to key metabolic and defense processes and the regulation of their synthesis. Included will be discussions of photosynthesis, carbohydrates, lipids, isoprenoids and phenylpropanoids, nitrogen fixation, nitrogen and sulfur reduction and assimilation, alkaloids and additional secondary compounds, frontiers in plant biochemistry. Prereq: BCH 607 or equivalent or consent of instructor. (Same as BCH/PLS 609.)

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. (Same as PLS 640.)

PPA 641 ESSENTIALS OF PLANT DISEASE EPIDEMIOLOGY. (1)
An examination of fundamental concepts of plant disease development at the population level. Emphasis will be given to the influence of host resistance and other selective forces on pathogen population dynamics. Prereq: PPA 400G.

†PPA 652 PLANT PATHOGENIC FUNGI.

†PPA 656 PLANT VIROLOGY.

†PPA 660 PLANT-MICROBE INTERACTIONS I.

†PPA 661 PLANT-MICROBE INTERACTIONS II.

#PPA 670 PLANT BACTERIOLOGY. (1)
Bacterial mechanisms underlying pathogenesis and virulence in interactions causing plant disease, and symbiotic compatibility in mutualisms. Prereq: PPA 400G, PPA 500, PPA 600, PPA 640 can be concurrent.

#PPA 671 ADVANCED PLANT VIROLOGY. (1)
Molecular basis of plant virus infection of plants. Virus replication and spread. Virus control strategies. Prereq: PPA 400G, PPA 500, PPA 600.

#PPA 672 ADVANCED PLANT MYCOLOGY. (1)
Advanced study of the fungal life cycle and life style (including metabolism, developmental biology, cell biology, ecology, and reproductive processes). Prereq: PPA 400G, PPA 500, PPA 600, PPA 640 can be concurrent.

#PPA 673 ADVANCED PLANT DISEASE RESISTANCE. (1)
Bacterial mechanisms underlying pathogenesis and virulence in interactions causing plant disease, and symbiotic compatibility in mutualisms. Prereq: PPA 400G, PPA 500, PPA 600.

#PPA 700 PLANT PATHOLOGY LABORATORY VISITS. (1-3)
Semester-long rotations in Plant Pathology laboratories other than the students' "home lab". An opportunity will be provided to apply new approaches that are utilized in those labs to the students' research problems. May be repeated to a maximum of six credit hours.

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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. (1-9)**
May be repeated to a maximum of 30 credits. Prereq: PPA 400G or equivalent or consent of instructor.

PPA 799 TEACHING IN PLANT PATHOLOGY. (1-2)
Discussion of, and experience with, various instructional techniques in plant pathology; effective preparation, presentation and evaluation of lectures and laboratories focusing on plant diseases; practical experience in lectures, teaching laboratories and/or mentoring undergraduate research projects. May be repeated to a maximum of four credits. Prereq: PPA 400G or equivalent.

PRO Prosthodontics

PRO 820 PRECLINICAL COMPLETE DENTURE PROSTHODONTICS. (4)
This preclinical lecture and laboratory course provides an introduction to basic concepts of diagnosis and treatment planning, fabrication, placement and maintenance of complete dentures, as well as the related biological and mechanical factors that must be incorporated for living tissue to be compatible with complete dentures. Lecture, 36 hours; laboratory 63 hours. Prereq: Advancement to Second Year standing or consent of course director.

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, 19 hours; laboratory, 45 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 834 PRECLINICAL RESTORATIVE DENTISTRY III. (4)**
This is a preclinical course with emphasis on dental hard tissue surgery and restorative procedures for anterior and posterior fixed prosthodontics. Contemporary principles of fixed prosthodontics, including the long term maintenance of dental health, are presented in lectures and applied in practice using manikins. Knowledge gained in previous restorative dentistry courses are applied to more extensive restorations. Lecture, 24 hours; laboratory, 84 hours. Prereq: RSD 822, 823, 824, 825 and 826.

PRO 836 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 replacements to occlusion, periodontics, orthodontics and removable prosthodontics in both treatment planning and treatment is emphasized. Lecture, 30 hours. Prereq: RSD 823, RSD 821, RSD 822, RSD 824; and/or consent of course director.

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.

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 210 INTRODUCTION TO COMPARATIVE POLITICS. (3)
A general introduction to the domestic politics of countries in the various regions of the world, with an emphasis on the concepts used to understand why political issues and processes differ across developed and developing nations. Students also learn how domestic politics are shaped by super-national institutions and by national integration into a global economy.

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 INTRODUCTION TO POLITICAL THEORY. (3)
An introduction to modern political thought as it relates to debates over the meaning of democracy, citizenship, justice, authority, and identity. Readings and discussions center on the themes and ideologies dominant in Western political theory, but also will explore contemporary challenges to that tradition, such as feminist political theory and the work of theorists concerned with what is popularly called globalization.

***PS 372 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. Prereq: UN2 status; PS majors only.

***PS 391 SPECIAL TOPICS IN POLITICAL SCIENCE (SUBTITLE REQUIRED). (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. Prereq: UN2 status.

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 410 TOPICS IN REGIONAL POLITICS (SUBTITLE REQUIRED). (3)
A survey of politics and government in one region of the world. The course will consider the region's unique political character, but also explain how and why nations within the region differ from each other politically. Some sections will compare and contrast a region's political systems in general, whereas others may be more specialized topically. Prereq: PS 210 or PS 212.

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. (Same as AAS 417G.)

***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. Prereq: PS 210 or 212.

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.

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. Prereq: PS 210 or 212.

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. Prereq: PS 235.

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 SPECIAL TOPICS IN INTERNATIONAL RELATIONS (SUBTITLE REQUIRED). (3)**
Course will focus on selected advanced topics in international relations drawn from various areas of that field of political science, taught by faculty members with special interests and competence. May be repeated in courses of differing topics for a maximum of 9 credits. Prereq: PS 235.

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.

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 458 AMERICAN STATE AND LOCAL GOVERNMENT. (3)**
A comparative examination of subnational governments, especially state governments but also smaller units such as cities, counties, and school districts. Readings and discussions will explore the variety of institutions and policies found across the United States, seeking an understanding of why places differ from each other politically. The course also will examine the relationship between the national government and the states. Prereq: PS 101; UN2 status.

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 JUDICIAL POLITICS. (3)**
A survey of how politics influences, and in turn is influenced by, the behavior of judicial institutions and the judges who staff them. Draws heavily on the social science literature studying judicial behavior, the structure of the court system, and the implementation of legal rulings. Prereq: PS 101 and UN2 status.

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.

***PS 470G AMERICAN POLITICAL PARTIES. (3)**
An analysis of American national and state party systems, organization, and functions; nominations and elections; and voting patterns. Prereq: PS 101; UN2 status.

PS 471 RACE, ETHNICITY AND POLITICS. (3)
An examination of the role that race and ethnicity play in the political arena. Students will explore the nature of race, racism, and ethnocentrism, as well as their impact on political institutions and public policy. Particular attention will be given to elections, public opinion, mass media and social movements in the United States. (Same as AAS 471.)

***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. Prereq: PS 101; UN2 status.

***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. Prereq: PS 101; UN2 status.

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. Prereq: PS 101; UN2 status.

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 484G THE AMERICAN PRESIDENCY. (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. Prereq: PS 101; UN2 status.

†PS 487G INTRODUCTION TO PUBLIC 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. Prereq: PS 101; UN2 status.

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 492 SEMINAR IN POLITICAL SCIENCE (SUBTITLE REQUIRED). (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: UN2, previous PS course.

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 539 THE FOREIGN POLICY OF THE SOVIET UNION.

***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. Prereq: UN3 status.

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 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 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 681 AMERICAN POLITICAL BEHAVIOR. (3)
A proseminar providing a survey of major theoretical approaches and empirical research in the field of American political behavior. Intended to explore various individual-level models of behavior and then apply them to specific forms of political behavior.

PS 684 PROSEMINAR IN POLICY STUDIES. (3)
A survey of the various approaches to the study and analysis of public policy impacts. Special emphasis will be given to the normative and ethical implications of alternative conceptualizations of the policy process and the role of the policy analyst.

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 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 732 COMPARATIVE FOREIGN POLICY (SUBTITLE REQUIRED). (3)
This seminar will emphasize comparative analysis of foreign policy. It will compare the foreign policies of a number of countries in order to develop propositions and arrive at generalizations regarding foreign policy process and behavior. The comparative focus will vary. May be repeated to a maximum of six credits under different subtitles.

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 734 GREAT BOOKS OF WORLD POLITICS. (3)
Overview of classic texts on war and statecraft. Prereq: Consent of instructor. (Same as DIS 710.)

PS 735 DEMOCRACY AND INTERNATIONAL AFFAIRS. (3)
Discussion of the impact of the global spread of democracy on foreign policy and war. Prereq: Graduate status and consent of instructor. (Same as DIP 715.)

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 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 756 REGIONAL POLITICS (SUBTITLE REQUIRED). (3)
This seminar focuses on the domestic politics and international relations of countries within a specific geographic region (Latin America, the Commonwealth of Independent States, Western Europe, Africa, East Asia, etc.). Theoretical foci include political economy, policymaking, regional integration and national security, development, and political culture.

PS 760 SEMINAR IN JUDICIAL PROCESS. (3)
A thorough survey of literature in judicial process, focusing largely on judicial recruitment and decision-making, litigants' strategies, the implementation and impact of judicial policies and relations between the courts and other power centers. May be repeated to a maximum of six credits.

#PS 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 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 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 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 826 MECHANISMS OF DISEASE AND TREATMENT/PSYCHIATRY. (2)
This is an introduction to psychopathology and the psychiatric nomenclature for second year medical students. It occurs during the spring and fits within the context of the larger pathology segment of MD 826. Integration with the pharmacology sequence that runs before and after is in place. Prereq: Promotion to the second year of medical school. (Same as MD 826.)

PSC 841 ADULT PSYCHIATRY ELECTIVE. (4)
Adult psychiatry elective in Inpatient Psychiatry, Consultation-Liaison/Emergency Psychiatry or Outpatient Psychiatry. Prereq: Third-year Psychiatry Clerkship, MD 833.

PSC 842 CHILD AND ADOLESCENT PSYCHIATRY ELECTIVE. (4)
Psychiatry elective for fourth-year medical students offering a combined experience in inpatient, outpatient, consult/liaison child and adolescent psychiatry. Prereq: MD 833 or equivalent.

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 (PEDIATRICS, PSYCHIATRY, CHILD AND ADOLESCENT PSYCHIATRY) ELECTIVE

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.

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 311 LEARNING AND COGNITION. (3)
Theory and experimental techniques in the study of learning and cognition. Emphasis on research in the biological basis of learning, perceptual processing, classical conditioning, instrumental conditioning, memory, and language. Prereq: PSY 100 and PSY 215 or 216.

PSY 312 BRAIN AND BEHAVIOR. (3)
An introduction to structural and functional characteristics of the nervous system. The emphasis is on exploring the relationship between brain and behavior. Topics range from simple structures and behaviors to more complex functions. The biological basis of normal and abnormal behavior is explored from a multidisciplinary perspective. Prereq: PSY 100 and PSY 215 or 216.

PSY 313 PERSONALITY AND INDIVIDUAL DIFFERENCES. (3)
An introduction to the psychology of individual differences, theories of personality and personality development. Individual differences in cognitive ability and personality will be addressed. Differing theoretical approaches to personality will be covered. Prereq: PSY 100 and PSY 215 or 216.

PSY 314 SOCIAL PSYCHOLOGY AND CULTURAL PROCESSES. (3)
A selective survey of classic and contemporary theories and research in social psychology from a multicultural perspective. Topics will include social perception, the self, attitudes, aggression, prejudice, and group processes. Credit is not given to students who already have credit for PSY/SOC 344. Prereq: PSY 100 and PSY 215 or 216.

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 344 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.) Credit is not given to students who already have credit for PSY 314. Prereq: PSY 100.

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. 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 427 COGNITIVE PROCESSES. (4)
A general introduction to cognitive psychology through lecture and lab. Emphasis is placed on theory and research in information processing, memory, decision-making, language and the means by which cognitive psychology is applied to our lives. The lab is designed to provide an opportunity for individualized experience with research equipment and methodology in cognitive psychology. Lecture, three hours per week; laboratory, two hours per week. Prereq: Declared major in Psychology, PSY 215, 216, and 311.

PSY 430 RESEARCH IN PERSONALITY. (4)
A lecture-lab course intended to introduce students to the field of contemporary personality psychology. Includes a survey of the methods used and issues examined by current personality psychologists. Lectures will focus on selected current theories and issues, whereas labs will involve an in-depth examination of scale construction and the correlational approach to research. Lecture/discussion, three hours per week; laboratory, two hours per week. Prereq: Declared major, PSY 215, 216, and PSY 313.

PSY 440 RESEARCH IN SOCIAL PSYCHOLOGY. (4)
An advanced course in research methods in social psychology. Emphasis will be placed on learning and applying experimental and nonexperimental methods to social psychological issues. In the laboratory component, students will design, conduct, and write up their own social psychological study. Lecture/discussion, three hours per week; laboratory, two hours per week. Prereq: Declared major in Psychology, PSY 215, 216, and 314.

PSY 450 LEARNING. (4)
The contemporary theoretical and empirical bases of conditioning and learning in humans and nonhumans will be studied through an integration of lectures and intensive, hands-on laboratory experiences. Lecture, three hours per week; laboratory, two hours per week. Prereq: Declared major in psychology, PSY 215, 216, and 311.

PSY 456 BEHAVIORAL NEUROSCIENCE. (4)
An intensive investigation of the neural basis of behavior using an integrated lecture and laboratory format. Principles of neuroanatomy, neurophysiology and neuropharmacology are applied to behavioral processes such as perception, movement, learning, motivation and emotion. Lecture, three hours per week; laboratory, two hours per week. Prereq: Declared major in Psychology, PSY 215, 216, 312, BIO 103, or consent of instructor.

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 460 PROCESSES OF PSYCHOLOGICAL DEVELOPMENT. (4)
A systematic examination of the major theoretical issues and the logic and methods of the scientific study of developmental psychology. The course is organized around theoretical perspectives that have directed the study of developmental processes. In the laboratory component, students will engage in demonstration exercises designed to illustrate selected topics and research techniques. Students will be required to design and implement a research project. Lecture/discussion, three hours per week; laboratory, two hours per week. Prereq: Declared major in Psychology, PSY 215, 216, and 223.

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 499 SENIOR INTERNSHIP IN PSYCHOLOGY. (3)
Designed as a senior-capstone course for psychology majors to integrate classroom learning, theory, and practice in the context of a research or field-based experience in psychology under the supervision of a psychology faculty member. Students spend nine hours weekly in the placement site and meet weekly as a group with the course instructor to discuss placements, readings, and writing assignments. Prereq: Declared major in Psychology, seniors only; consent of instructor; contract with department; and faculty supervision.

PSY 500 HISTORY AND SYSTEMS OF PSYCHOLOGY. (3)
The course reviews the historical context, influences, and individuals instrumental in the development of psychological research, theories, and systems. Readings and discussions of original sources and contemporary research are emphasized. Prereq: 28 hours of Psychology completed or consent of instructor.

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. (4)
Experimental techniques, principles, and theories applied to the field of animal behavior. Topics include comparative cognition, learning and memory, imitation, sexual selection, reproductive strategies, altruism, evolutionary psychology, and sociobiology. A required laboratory component consists of applications of techniques used to study animal behavior. Students will design and conduct experiments, organize and discuss results, and explore theoretical and applied implications. Prereq: Declared major in Psychology, PSY 215, 216, 311, or consent of instructor.

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: Completion of 28 hours in psychology, including PSY 430 or PSY 533, or consent of instructor.

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: Completion of 28 hours in psychology, including PSY 427, or consent of instructor.

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: Completion of 28 hours in psychology, including PSY 460, or consent of instructor.

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: Completion of 28 hours in psychology, including PSY 450 or 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: Completion of 28 hours in psychology, 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: Completion of 28 hours in psychology, including PSY 440, 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.

PSY 622 PROSEMINAR IN PERSONALITY. (3)
An intensive treatment of theories, methods of investigation and current developments in the area of personality. Prereq: Enrollment in graduate program in Psychology or consent of instructor.

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 344 or 314 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: Enrollment in the graduate program in Clinical 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: Enrollment in graduate program in Clinical Psychology and prior or concurrent enrollment in 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 PSYCHOLOGICAL ASSESSMENT AND INTERVENTION. (1-3)
Supervised experience in the techniques of psychological assessment and intervention with adults, children, families, and groups. Laboratory, two to six hours per week. May be repeated up to sixteen hours. 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 708 INTERNSHIP IN CLINICAL PSYCHOLOGY. (0)
Full time practice in an APA-accredited internship setting, with on-site supervision provided by the internship setting and with academic supervision provided by the Director of Clinical Training at the University of Kentucky. May be repeated twice. Prereq: All course work in doctoral program in clinical psychology, approved dissertation proposal, and consent of Director of Clinical Training.

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 766 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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: 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. (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 I. (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 604 PHARMACOLOGY II. (1)
This course will build on the material covered in PT 603, Pharmacology I in Physical Therapy, focusing on how drug classes influence rehabilitation treatment strategies. Prereq: Successful completion of PT 603.

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/NS 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 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 655 NEUROMOTOR DEVELOPMENT. (3)
This is an advanced course on normal neuromotor development and the deviations from normal with emphasis on the infant. Prereq: Consent of instructor.

PT 668 RESEARCH TOPICS IN PHYSICAL THERAPY: ANALYSIS. (1-3)
This course is intended to introduce the student to methods of analyzing data and problems of writing a scientific paper for publication. Students will analyze data they have collected as it relates to their research problems. Their written manuscripts will be due at the end of this course. May be repeated to a maximum of three credits. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year or permission of the instructor.

PT 669 RESEARCH TOPICS IN PHYSICAL THERAPY: OUTCOMES. (1-3)
This course is intended to introduce students to the process of turning a finished research manuscript into an oral research presentation. Students will be responsible for audiovisuals, handouts, and any other methods used to make their presentations. In addition to faculty advisor input and grading, students will critique their own presentations and gain experience in critique of other professional research presentations. May be repeated to a maximum of three credits. Prereq: Admission to the Physical Therapy professional program and successful completion of the second year or permission of the instructor.

PT 676 ELECTROPHYSIOLOGICAL TESTING AND THERAPEUTICS. (1-3)
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. Students in the professional program will enroll for at least one credit in the first year of the professional program and at least one credit in the second year of the professional program. May be repeated to a maximum of three credits. Prereq: Admission to the Physical Therapy Professional program and successful completion of the first two semesters of the program.

#PT 686 INTEGRATIVE CARE FOR HEALTH SCIENCES. (1-3)
Integrative care involves using the best possible treatments from both complementary/alternative and allopathic medicine, based on the patient's individual needs and condition. The selection of health care providers should be based on good science and this course will introduce students to complementary and alternative health care providers and the practices and beliefs of these practices as well as the scientific evidence in support of these practices. The course integrates successes from both worlds and describe the safest, least invasive, most cost-effective approach while incorporating a holistic understanding of the individual. May be repeated to a maximum of 3 credits (1 credit didactic and up to two credits experiential/research). (Same as AT 500, HS 500, CLS 500, CNU 500, CD 500, PA 500.)

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 705 SKELETAL MUSCLE PHYSIOLOGY AND ADAPTABILITY. (3)
This course is designed to present a broad series of topics central to the understanding of human skeletal muscle physiology and therapeutic interventions. Course emphases will include muscle physiology rather than anatomic factors enabling the clinical implications of the dynamic alterable nature of muscle to be central. Included in these implications are aging, disease and injury processes, and therapeutic interventions/strategies. Prereq: Admission to the graduate program in Physical Therapy, or the Rehabilitation Sciences Ph.D. program or 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 studies 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. (5)
Theory, techniques, rationale, physiological effects, and indications of basic physical therapeutic procedures of electromodalities, hydrotherapy and massage, thermal therapy, cryotherapy, 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. Lecture, forty hours; laboratory, one hundred hours for twelve weeks. 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 825 PROSTHETICS. (2)
This course will prepare the student to perform physical therapy evaluation and provide patient management as part of a prosthetic team. Lecture, 18 hours; laboratory, 34 hours. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

PT 826 ORTHOTICS. (2)
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, 18 hours; laboratory, 30 hours. Prereq: Admission to the Physical Therapy professional program and successful completion of the first year.

PT 827 PHYSICAL THERAPY MANAGEMENT OF THE SPINAL CORD INJURED PATIENT. (1)
Prepare the student as a participating member of the rehabilitation team with an emphasis on the role of the physical therapist. Patient evaluation and treatment techniques are presented in lecture, clinical and laboratory settings. Lecture, eight hours; laboratory, 16 hours per term. 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 PHYSICAL THERAPY CLERKSHIP I. (1)
The student receives campus based clinical and classroom preparation for clinical experience. The student then 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. Prereq: Admission to the Physical Therapy professional program and successful completion of the first two semesters of the professional program.

PT 836 PHYSICAL THERAPY CLERKSHIP II. (3)
Students progress 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. Prereq: Admission to the Physical Therapy professional program and successful completion of the first three semesters of the professional program.

PT 837 PHYSICAL THERAPY INTERNSHIP I. (4)
This course is the first clinical internship. Students remain under supervision of clinical instructors but have increasing independence in evaluation, examination, treatment and discharge planning in a variety of clinical settings at selected sites. Offered on a pass/fail basis only. Prereq: Admission to the Physical Therapy professional program and successful completion of the first six semesters of the professional program.

PT 838 PHYSICAL THERAPY INTERNSHIP II. (6)
This course is the second clinical internship. Structure is similar to PT 837 but students continue to increase their repertoire of clinical skills and meet higher passing standards while receiving two additional weeks of clinical experience. Students will continue to perform physical therapy evaluation, examination, treatment and discharge. Offered on a pass/fail basis only. Prereq: Admission to the Physical Therapy professional program and successful completion of the first two years of the professional program.

PT 839 PHYSICAL THERAPY INTERNSHIP III. (6)
This course is the third of three clinical internships. Structure is similar to PT 837 and PT 838 but students continue to increase their repertoire of clinical skills. Students are expected to perform as entry level physical therapist by the end of the internship. Students are placed in appropriate sites throughout the Commonwealth and the United States. International experiences are available for selected students. Offered on a pass/fail basis only. Prereq: Admission to the Physical Therapy professional program and successful completion of the first two years of the professional program.

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 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.

RAS Radiation Sciences

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 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 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 the in radiation sciences.

RBM Physical Medicine and Rehabilitation

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 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.

RBM 851 OUTPATIENT REHABILITATION (PHYSICAL MEDICINE). (4)
An introduction to outpatient physical medicine and rehabilitation that encompasses primarily musculoskeletal disorders such as low back pain, chronic pain, sports medicine and amputee clinic. In addition, the medical student will be exposed to electrodiagnostic procedures and soft-tissue injection techniques. Students will be under direct supervision of a resident and an attending during clinic hours (8 a.m. - 5 p.m.) five days per week. Laboratory, 40 hours per week.

RBM 852 PEDIATRIC ORTHOPAEDIC REHABILITATION. (4)
An introduction to pediatric rehabilitation and pediatric orthopaedics with emphasis on the total care of children with chronic neuromuscular or orthopaedic diseases, including cerebral palsy, spina bifida, and juvenile rheumatoid arthritis. Other possibilities for clinical involvement include pediatric clinics in hip disease, foot and hand problems, spine disease and pediatric prosthetics. Students will be under the direct supervision of attendings from Rehabilitation Medicine, Pediatrics, and Orthopaedic Surgery. Laboratory, 40 hours per week.

RC Rehabilitation Counseling

RC 510 ORIENTATION TO REHABILITATION RESOURCES. (3)
A study of the breadth of agencies, programs, and services involved in the provision of rehabilitation services for persons with disabilities, including medical, educational, institutional, and community resources. Relationships among agencies, staffing patterns, funding sources, and professionals involved in providing services to individuals with disabilities are overviewed. Lecture, two hours; laboratory, two hours 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 530 CULTURAL DIVERSITY IN REHABILITATION COUNSELING. (2)
This course is designed to assist students to develop an understanding of factors which relate to race/ethnicity, gender, disability, age, and sexual orientation as these concern participation and successful completion of rehabilitation programs. Emphasis is placed on addressing cultural myths and stereotypes. Case studies and illustrations for counseling persons from culturally diverse backgrounds will be presented. Prereq: Consent of instructor.

RC 540 CHEMICAL DEPENDENCY IN REHABILITATION COUNSELING. (3)
This course is designed to provide students with information about the effects of alcohol and other drug usage. Implications for rehabilitation counseling will be presented. Content will include an overview of theories, models of substance abuse, evaluation and assessment, and case management. Issues pertaining to gender, age, ethnicity, family prenatal exposure, dual diagnosis, and adult children of substance abusers will be addressed. Prereq: Consent of instructor.

***RC 546 TRANSDISCIPLINARY SERVICES FOR YOUNG CHILDREN. (3)**
This course will focus on the philosophical issues related to teaching young children with multiple disabilities. Topics related to planning for the population of children, participants in the areas of communication, physical and motor development, health, vitality and sensory input will be presented. Strategies presented for planning will include transdisciplinary assessment persons centered planning and activity based instruction. Prereq: EDS 375 or EDS 600. (Same as EDS 546 and IEC 546.)

RC 547 COLLABORATION AND INCLUSION IN SCHOOL AND COMMUNITY SETTINGS. (3)
This course will focus on inclusion of students with moderate to severe disabilities in all aspects of school and community life, with special consideration given to the individual student planning variables that must be addressed in meeting the needs of each school-age student and for preparing students to function as fully and independently in their communities as possible. The course is designed to meet the needs of those pursuing certification in Moderate and Severe Disabilities and pursuing degrees in Elementary and Secondary Education, Vocational Rehabilitation, School Psychology, Social Work, Physical Therapy, Communication Disorders, and related disciplines. Prereq: Consent of instructor. (Same as EDS 547.)

RC 558 SPECIAL TOPICS IN REHABILITATION COUNSELING. (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. (Same as EDS 558.)

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 613 LEGAL AND PARENTAL ISSUES SCHOOL ADMINISTRATION. (3)
This course is designed as a required course for certification in the school administration program or elective in graduate or post baccalaureate degree. Essential course questions will emphasize the delivery of a free and appropriate public education for children with disabilities within a practical application format that is accessible and useful to educational professionals. In addition, the course will consider the implications of federal requirements in state and local policy. Particular attention will be given to leadership within an educational reform environment as well as the legal and programmatic implications for children with disabilities and their families. Finally, the course will model appropriate ways in which educational professionals working with families can maximize educational results for children with and without disabilities. Prereq: Be admitted to an Administrator preparation program, or received permission of instructor. (Same as EDS 613.)

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 650 REHABILITATION COUNSELING THEORY AND PRACTICE I. (3)
This is a two semester sequence course. This sequence is designed to provide an overview of theories of counseling and how they can be applied in a rehabilitation counseling context with regard to persons with disabilities. A goal of this course is to acquire knowledge about theoretical orientations and to integrate theory with practice. Emphasis will be on helping students clarify beliefs, values, and personal style, and connecting those to the beliefs and values of the various theories. Emphasis will be on helping to recognize culture, class, and gender components, as well as identifying commonalties across theories as these relate to rehabilitation counseling. A goal is to develop rehabilitation counselors who function as reflective decision makers. Prereq: Admission to the rehabilitation counseling program or consent of instructor.

RC 660 REHABILITATION COUNSELING THEORY AND PRACTICE II. (3)
This is a two semester sequence course. This sequence is designed to provide an integration of techniques of counseling which are derived from theories of counseling and how they can be applied in a rehabilitation counseling context with regard to persons with disabilities. A goal of this course is to integrate theory with practice. The emphasis in this second course will be on the application of counseling theory to rehabilitation counseling practice with persons who have disabilities. Counseling techniques will be taught in the context of rehabilitation settings. A primary objective is to develop rehabilitation counselors who function as reflective decision makers. Prereq: RC 650 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.

RHB Rehabilitation Sciences

RHB 701 REHABILITATION THEORIES AND APPLICATION THROUGH THE LIFE SPAN. (3)
Explores the theories common to all the rehabilitation therapies (PT, CD, OT) and that form a foundation for the rehabilitation sciences. Included are theories specific to rehabilitation, attachment, adaptation and resilience, cognition, motor learning, empowerment, loss and grief, psycho-immunology, and the societal responses to stigmatized groups. Theories are applied to rehabilitation practice and research design across the life span. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of the instructor.

RHB 702 REHABILITATION SERVICES IN HEALTH CARE SYSTEMS AND DELIVERY. (3)
An analysis of emerging trends in health care systems and delivery with specific emphasis on the impact on the rehabilitation fields. Topics include the financing of health care delivery, organizational changes in response to evolving reimbursement strategies, team functioning, managing change, legislative issues, and the ethical and legal implications of rehabilitation service delivery in the new models. Prereq: Admission to the Rehabilitation Sciences Ph.D. Program or consent of instructor.

RHB 710 NEUROPLASTICITY IN REHABILITATION. (2)
This course will examine the neurological principles utilized by each of the rehabilitation disciplines (PT, OT, SLP) in the context of current research data and determine whether these principles hold up to scientific examination. The format of this course will utilize formal lectures on current theories of neuroplasticity and class discussion on current literature in each of these areas. Case studies will be utilized to apply current theories to practical application within each of the listed disciplines. Prereq: Course in Neuroanatomy, Admission to the Rehabilitation Sciences Doctoral Program or by consent of the instructor.

RHB 712 PHARMACOLOGY IN REHABILITATION. (2-3)
This course will provide the basic science background necessary to understand the effects of medications on patients treated in the rehabilitation setting and the their influence on treatment. Topics will include mechanisms of drug action, side effects, and how age and disease alter those mechanisms. The course will also address newly developing drug treatment strategies, including those in clinical trials. Students may either take the course for two credits or complete an additional advanced project for 3 credits, as outlined in the syllabus. The advanced project will enable the more interested student to pursue a topic in greater depth. Prereq: Admission to the Rehabilitation Sciences Doctoral Program or consent of instructor.

RHB 740 PEDIATRIC ASSESSMENT: NEONATES TO ADOLESCENTS. (3)
Provides information regarding the assessment of children, neonates to adolescents, in areas of gross, fine, and oral motor and sensory-perceptual skills. Evaluates various qualitative and quantitative measures of motor development, motor control, and activities of daily living in a pediatric population. Investigates the use of assessment tools and protocols for specific disciplines and interdisciplinary teams including speech/language pathology, and physical and occupational therapies. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of the instructor.

RHB 742 INTERVENTION STRATEGIES: NEONATES TO ADOLESCENTS. (3)
Investigation of treatment interventions for children with physical disabilities to maximize independence in functional activities. Overview of the treatment and management of children in areas of gross, fine, and oral motor, sensory-perceptual, and communication skills. Development of treatment and management protocols for specific disciplines and inter- disciplinary teams including speech/language pathology, and physical and occupational therapies. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of the instructor.

RHB 744 ADVANCED TOPICS IN MOTOR DEVELOPMENT. (3)
Investigation of motor development, control, and learning and teaching strategies in pediatrics. In depth analysis of movement for specific function tasks and motor dysfunction with identification of both primary and secondary designated problem areas in children with neuro-developmental concerns. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of the instructor.

RHB 749 DISSERTATION RESEARCH IN REHABILITATION SCIENCES. (0)
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Admission to the Rehabilitation Sciences Ph.D. program.

RHB 750 AGING AND ADULT NEUROLOGICAL DISORDERS: ASSESSMENT. (3)
This interdisciplinary course prepares the student to assess functional abilities in the adult with a neuromotor disorder. The student will learn functional assessment strategies for motor control, cognition, communication, feeding, swallowing, and activities of daily living (ADL) for adults with neuromotor disorders. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of instructor.

RHB 752 AGING AND ADULT NEUROLOGICAL DISORDERS: INTERVENTION. (3)
This course provides an interdisciplinary view of management of the rehabilitation needs of the adult with a neuromotor disorder. The course will concentrate on ways to maximize independence in functional activities and improve the quality of life in this population of adults. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of instructor.

RHB 760 ASSESSMENT OF MOVEMENT DYSFUNCTION. (3)
An introduction to the normal and abnormal movement patterns and its relationship to dysfunction in individuals from birth to advanced age. Topics include theories of motor programming, skill acquisition and maturation; assessment of movement patterns (normal) and abnormal (dysfunction) and theories of interventions to impact movement strategies. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of instructor.

RHB 762 TREATMENT OF MOVEMENT DYSFUNCTION. (3)
Treatment interventions for individuals to enhance normal and improve or alter abnormal movement patterns serves as the focus of this course. The implications of dysfunction on individuals from birth to advanced age will be examined. Topics include theories of motor programming and how they are impacted via therapeutic measures; skill acquisition and redevelopment following injury or disease; how therapeutic measures impact movement patterns (normal) and abnormal (dysfunction); and an examination of theories of interventions to impact movement strategies. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of instructor.

#RHB 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

RHB 769 RESIDENCE CREDIT FOR THE DOCTORAL DEGREE. (0-9)
May be repeated to a maximum of 18 credits. Prereq: Admission to the Rehabilitation Sciences Ph.D. program.

RHB 770 PROFESSIONAL SEMINAR IN REHABILITATION SCIENCES. (1-3)
A study of selected topics related to leadership issues in the Rehabilitation Sciences with emphasis on recent research and theory related to higher education and to the communication disorders, occupational therapy, and physical therapy disciplines. Sample topics include research methods and current topics, interdisciplinary issues, health systems, grant writing, teaching and learning in higher education, and the culture of colleges and universities. May be repeated to a maximum of six credits. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of the instructor.

RHB 787 TEACHING APPRENTICESHIP IN REHABILITATION SCIENCES. (1-4)
Study of instructional methods in higher education including development of syllabi, class presentations, and examinations. Emphasis on classroom dynamics and innovative techniques for instruction. May be repeated to a maximum of four credits. Prereq: Admission to the Rehabilitation Sciences Ph.D. program in communication disorders or physical therapy or consent of the instructor.

RHB 788 INDEPENDENT STUDY IN REHABILITATION SCIENCES. (1-3)
Independent study for graduate students interested in specific interdisciplinary topics in Rehabilitation Sciences. May be repeated to a maximum of six credits. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of the instructor.

RHB 789 RESEARCH APPRENTICESHIP IN REHABILITATION SCIENCES. (1-4)
In-depth study of a discipline specific topic under the direction of a member of the graduate faculty. Emphasis on scientific method including development of a research question, methodology, data collection and analysis. Students will complete a supervised research project during the course. May be repeated to a maximum of four credits. Prereq: Admission to the Rehabilitation Sciences Ph.D. program or consent of the instructor.

RM Radiation Medicine

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 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 810 FUNDAMENTALS OF OPERATIVE DENTISTRY I. (2)
This lecture course in operative dentistry is designed to provide a beginning student with basic knowledge about cavity preparation and restorative techniques for amalgam and resin composite. This course, together with a complementary laboratory course, RSD 814, is directed at preparing the student with knowledge and skills in the diagnosis and treatment of carious lesions necessary for patient care in operative dentistry. Prereq: RSD 812, or consent of course director; coreq: RSD 814.

RSD 812 PRINCIPLES OF DENTAL ANATOMY, MORPHOLOGY AND OCCLUSION. (6)
This introductory course is designed to provide the student dentist with the necessary working knowledge of dental anatomy, dental morphology and basic dental occlusion for all succeeding courses in preclinical and clinical dentistry. This includes a detailed study of individual teeth, the relationship of dental form and function, mandibular movement and the basic introduction and use of the dental articulator. Lectures and laboratory experiences related to dental biomaterials are included as needed. Lecture, 45 hours; laboratory 99 hours. Prereq: Approval of the dean and/or his designee for academic affairs and the consent of the course director.

RSD 814 PRECLINICAL OPERATIVE DENTISTRY I. (2)
This first-year preclinical laboratory course in operative dentistry is designed to provide a beginning student with basic skills for cavity preparation and restorative techniques for amalgam and resin composite. This course, together with the complementary lecture series course, RSD 810, is directed at preparing the student with the knowledge and skill necessary for patient care in operative dentistry. Laboratory 69 hours. Prereq: RSD 812, RSD 810 as corequisite, or consent of instructor.

RSD 816 ESTHETIC DENTISTRY I. (1)
This lecture course is designed to provide a beginning student the basic principles of cavity preparation and restoration with esthetic dental materials. Materials include resin composite, resin ionomer and glass ionomer. This course, together with the complementary laboratory course, RSD 818, is directed at preparing the student with knowledge and skills in the diagnosis and treatment of defective tooth structure associated with anterior teeth. Prereq: RSD 812, RSD 810, RSD 814 or the consent of the course director.

RSD 818 PRECLINICAL ESTHETIC DENTISTRY I. (1)
This first-year preclinical course in esthetic dentistry is designed to provide a beginning student with the basic skills for cavity preparation and restorative techniques for using tooth-colored restorative materials. This course, together with the complementary lecture series course, RSD 816, is directed at preparing the student for patient care in esthetic dentistry. Prereq: RSD 812, RSD 810, RSD 814 or consent of the 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 PRINCIPLES OF DENTAL OCCLUSION AND ARTICULATION. (3)
This course is directed toward the examination, diagnosis, treatment planning, and treatment of various occlusal problems. The student will learn the skills needed to analyze the dental occlusion of patients and to plan successful occlusal therapy including restorative procedures and fixed prosthodontic treatment. The course will concentrate on developing technical skills and learning assessment criteria related to mounted study casts, occlusal examination and analysis, selective occlusal adjustment, diagnostic pre-waxing and planning, and the fabrication of a muscle relaxation occlusal splint. Lecture, 23 hours; laboratory, 27 hours; clinic, 27 hours. Prereq: CDS 815, RSD 812, or with approval of the course director.

RSD 823 PRECLINICAL RESTORATIVE DENTISTRY II. (1)
This is a didactic course with emphasis on the basic knowledge required for tooth preparation and indirect single tooth dental restoration. The materials science and correct manipulation of dental stones, alloys and luting agents are emphasized. Prereq: RSD 812, RSD 810, RSD 814, RSD 816, or consent of instructor.

RSD 824 PRECLINICAL RESTORATIVE DENTISTRY II. (2)
This preclinical course places emphasis on dental hard tissue surgery and on their restoration to meet the biological needs of the patient. Tooth preparation and extracoronal restorations are performed on manikins and extracted teeth. The materials science and correct manipulation of investments, alloys and cements used to make case restorations are emphasized. Knowledge gained in dental morphology and occlusion is applied in the course. Laboratory: 54 hours. Prereq: RSD 812, RSD 814, RSD 818; concur: RSD 823, or consent of instructor.

RSD 825 PRECLINICAL RESTORATIVE DENTISTRY II. (1)
This course is a continuation of RSD 823 with emphasis on single tooth indirect intracoronal restorations and restorations of the endontically treated tooth. Prereq: RSD 823.

RSD 826 PRECLINICAL DENTISTRY II LABORATORY. (2)
This is a preclinical course with emphasis on dental hard tissue surgery and restorative procedures for single tooth indirect restorations. Clinical simulation procedures are performed on manikins and extracted teeth. Prereq: RSD 823, RSD 824, or consent of course instructor. Coreq: RSD 825.

RSD 827 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 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 835 ADVANCED ESTHETICS IN RESTORATIVE DENTISTRY. (2)
This course is designed to introduce current concepts in esthetic restorative dentistry to undergraduate dental students in their third year. The techniques presented will build upon previously developed restorative didactic and clinical knowledge, but incorporate additional dental techniques and materials developed specifically for esthetic dentistry. Current dental materials being used by this discipline will be discussed as they apply to specific topics. Lecture, 16 hours; laboratory, 27 hours. Prereq: RSD 810, 812, 814, 816, 818, 821, 822, 823/825, 824, 826, and 827.

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 882 ESTHETIC DENTISTRY ELECTIVE. (1)
This course is designed to introduce current concepts in esthetic restorative dentistry to undergraduate dental students in their 4th academic year. The techniques presented will build upon previously developed restorative didactic and clinical knowledge, but incorporate additional dental techniques and materials developed specifically for esthetic dentistry. Current dental materials being used by this discipline will be discussed as they apply to specific topics. Lecture, nine hours. Note: scheduling for this course will be outside of regularly scheduled clinic/class time. Prereq: RSD 810, 814, 816, 818, 821, 822, 823/824, 825/826, 827 or consent of course director.

RSD 883 INTRODUCTION TO SPORTS DENTISTRY. (1)
Introduction to Sports Dentistry is an elective course designed to educate about the opportunities available to become involved with sports teams in your community. The course topics will include: Types of dental injuries related to athletics, prevention of injuries, role of team dentist, types of sports guards and methods of fabrication of sports guards. Lecture: 10 hours; laboratory 6 hours, per course. Prereq: 4th year dental student in good standing; consent of course director. Note: Scheduling of this course will be outside the regularly scheduled clinic/class time.

RUS Russian

RUS 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. Prereq: Russian Placement Exam. All students who have had two or more years of high school Russian or are native speakers of Russian and are enrolling in college-level Russian for the first time must take the Russian Placement Exam.

RUS 102 ELEMENTARY RUSSIAN. (4)
A continuation of RUS 101. Lecture, three hours; supervised recitation, one hour per week. Prereq: RUS 101 or RAE 101, Russian Placement Exam or equivalent.

RUS 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: RUS 102 or RAE 102, Russian Placement Exam or the equivalent. (Required.)

RUS 202 INTERMEDIATE RUSSIAN. (4)
A continuation of RUS 201. Lecture, three hours; recitation, one hour per week. Prereq: RUS 201 or RAE 201, Russian Placement Exam or equivalent. (Required.)

RUS 261 INTRODUCTION TO RUSSIAN STUDIES. (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.

RUS 270 RUSSIAN CULTURE 900-1900. (3)
An introduction to and survey of Russian culture from its origins until the 20th century that acquaints students with the roots of Russian religion, the arts, architecture, music, folklore, and everyday life. Taught in English.

RUS 271 RUSSIAN CULTURE 1900-PRESENT. (3)
An introduction to and survey of Russian culture since 1900 that acquaints students with the development of Russian and Soviet culture as manifested in the arts, architecture, music, folklore, religion, and everyday life. Taught in English.

***RUS 301 ADVANCED INTERMEDIATE RUSSIAN I. (3)**
A course designed to increase students' skills in the areas of listening, speaking, writing, reading and culture. More complex grammatical forms introduced; focus on control of basic grammar. Development of students' lexicon through more advanced reading, conversation, watching films, listening to tapes, etc. Prereq: RUS 202 or equivalent.

***RUS 302 ADVANCED INTERMEDIATE RUSSIAN II. (3)**
A course designed to increase students' skills in the areas of listening, speaking, writing, reading and culture. More complex grammatical forms introduced; focus on control of basic grammar. Development of students' lexicon through more advanced reading, conversation, watching films, listening to tapes, etc. Prereq: RUS 301 or equivalent.

RUS 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.

#RUS 375 SEMINAR IN RUSSIAN FILM. (3)
This seminar will focus on the major films and film makers of the Soviet Union and Russia. As such it will trace the major artistic, political, cultural, and social influences and movements that shaped and produced Russian and Soviet film. Students will view not only masterpieces of Russian feature films, but also the best documentary films and animation that cinematographers and animators have produced over the last 90 years. In addition, students will explore how the history and products of Russian and Soviet film are woven into the larger context of world cinema history and practice. At the seminar's conclusion students will understand not only the influence of Russian/Soviet cinema on the world stage, but also the components of the films themselves that contribute to their notoriety and lasting appeal.

RUS 380 NINETEENTH 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.

RUS 381 RUSSIAN LITERATURE 1900-PRESENT (IN ENGLISH). (3)
An in-depth examination of Russian literature since 1900, with special attention given to modernist trends, Socialist Realism, non-conformism, Russian literature abroad. Students taking the course for Russian major credit will be assigned readings in Russian.

RUS 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.)

RUS 400G RUSSIAN CULTURAL STUDIES (SUBTITLE REQUIRED). (3)
An in-depth exploration of a particular literary, cultural, cinematic topic in Russian cultural history. There will be a session for Russian speakers who will be expected to conduct part of their research using Russian materials. May be repeated to a maximum of six credits under a different subtitle.

***RUS 403 ADVANCED RUSSIAN I. (3)**
Detailed study of complex grammatical forms. Continued emphasis on speaking, reading, listening, and writing on the advanced level. Prereq: RUS 302 or equivalent, consent of instructor.

***RUS 404 ADVANCED RUSSIAN II. (3)**
Detailed study of complex grammatical forms. Continued emphasis on speaking, reading, listening, and writing on the advanced level. Prereq: RUS 403 or consent of instructor.

†RUS 420 RUSSIAN TRANSLATION.

†RUS 430G BUSINESS RUSSIAN.

RUS 460G MAJOR RUSSIAN WRITERS: (SUBTITLE REQUIRED). (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. May be repeated under different subtitles to a maximum of six credits.

RUS 463 RUSSIAN FILM AND THEATER: (SUBTITLE REQUIRED). (3)
Reading of selected major Russian plays as a basis for perfection of language skills, involving class discussions, compositions and translation practice. May be repeated under different subtitles to a maximum of six credits. Prereq: Third year knowledge of Russian or consent of instructor.

RUS 495G ADVANCED INDEPENDENT WORK IN RUSSIAN STUDIES. (1-3)
Independent research in Russian Studies on an advanced level for undergraduates and for graduate students outside the discipline. 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 RUS 395 and 495G. Prereq: Consent of instructor.

RUS 499 RUSSIAN STUDIES CAPSTONE SEMINAR (SUBTITLE REQUIRED). (3)
This interdisciplinary seminar on a topic in Russian Studies serves as a capstone course for Russian Studies majors. As such majors are required to write a substantive research paper in which they demonstrate their command of the depth and breadth of Russian studies across disciplines, as well as their ability to interpret and use sources in Russian. Prereq: Junior standing.

***RUS 501 STRUCTURE OF RUSSIAN. (3)**
An in-depth study of the history and structure of Russian in a variety of textual contexts. Historical changes that have led to significant contemporary features will be emphasized. Taught in Russian. Prereq: RUS 404 or consent of instructor.

***RUS 502 STRUCTURE OF RUSSIAN. (3)**
An overview of the sound system, morphological system and syntax of contemporary Russian. Prereq: RUS 501 or permission of instructor.

#RUS 520 RUSSIAN TRANSLATION. (3)
Translation of un-adapted texts from Russian to English, theory of translation, practice translation of various Russian texts, both technical and literary, focus on specific stylistic requirements, translation of short texts from English to Russian, introduction to oral interpretation. Prereq: RUS 302 or consent of instructor.

#RUS 530 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 or consent of instructor.

#RUS 670 TOPICS IN RUSSIAN CULTURE AND FOLKLORE (SUBTITLE REQUIRED). (3)
An investigation of Russian culture from the 1800's to the present, with emphasis on specific topics. May be repeated up to nine credits under different subtitles.

#RUS 680 TOPICS IN RUSSIAN/SOVIET LITERATURE (SUBTITLE REQUIRED). (3)
An in-depth examination of the classics of Russian and/or Soviet literature using original texts. Conducted in Russian. MATWL students will learn how to present Russian literary works in their language curriculum. May be repeated to a maximum of nine credits under different subtitles.

#RUS 690 SPECIAL TOPICS IN RUSSIAN STUDIES (SUBTITLE REQUIRED). (3)
An in-depth exploration of a particular literary, cultural, cinematic topic in Russian cultural history. Students will be expected to conduct part of their research using Russian materials. MAT students will learn how to synthesize content-based material into their language curriculum. Taught in Russian. May be repeated to a maximum of six credits under a different subtitle.

#RUS 695 INDEPENDENT STUDY IN RUSSIAN STUDIES. (1-3)
Independent work devoted to specific problems or areas of interest in Russian language, literature, culture, or pedagogy. May be repeated to a maximum of six credits. Prereq: Consent of instructor.

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 INTRODUCTION TO SOCIOLOGY. (3)**
Introduction to the concepts and methods of sociology. Topics shall include socialization; group processes, social inequalities; social institutions; and social change. This course or its equivalent (RSO 102) serves as a prerequisite to all other Sociology courses. Students may not receive credit for both this course and RSO 102.

†SOC 152 MODERN SOCIAL PROBLEMS.

***SOC 235 INEQUALITIES IN SOCIETY. (3)**
Analysis of the social origins, development, and persistence of inequality in various societies. Prereq: SOC 101 or RSO 102. (Same as AAS 235.)

†SOC 249 MASS MEDIA AND MASS CULTURE.

†SOC 260 POPULATION, RESOURCES AND CHANGE.

***SOC 299 INTRODUCTORY TOPICS IN SOCIOLOGY (SUBTITLE REQUIRED). (3)**
An introductory study of a selected topic in sociology. Prereq: SOC 101 or RSO 102.

***SOC 302 SOCIOLOGICAL RESEARCH METHODS. (3)**
A focus on issues of social and behavioral research design, covering such topics as the relationship between theory and research, the ethics of social science research, units of analysis, identification of variables and statement of hypotheses, sampling, measurement, and modes of social observation. Required for majors. Prereq: Sociology majors and minors only.

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 304 CLASSICAL SOCIOLOGICAL THEORY. (3)**
A survey and analysis of theories of human social interaction and society from the nineteenth and early twentieth centuries. Works of theorists, such as Marx, Weber, Durkheim, Simmel, and Mead will be considered. Emphasis is on the development of sociology as a discipline. Required for majors. Prereq: SOC 101 or RSO 102.

SOC 305 CONTEMPORARY SOCIOLOGICAL 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 304.

***SOC 334 SOCIOLOGY OF FAMILIES. (3)**
A sociological study of the concepts, theories, issues, and research findings on families and the dynamics of family life, with an emphasis on the social context and diversity of families. Prereq: SOC 101 or RSO 102.

***SOC 335 SOCIOLOGY OF GENDER. (3)**
A sociological study of gender as a socially and culturally constructed phenomenon. Topics shall include the intersection of gender and race/ethnicity and class; sexualities; gender and social movements; sociological theories concerning gender; feminist theory; and research on the relevance of gender to various subfields of sociology. Prereq: SOC 101 or RSO 102.

#SOC 339 INTRODUCTION TO CRIME, LAW AND DEVIANCE. (3)
A sociological study of the extent and nature of crime, delinquency, and more general deviant behavior. Topics may include the relationship between crime, deviance and law; measurement of crime and deviance; sociological theories of crime and deviance; and crime/deviance typologies. Students may not receive credit for both this course and either SOC 436 or SOC 437. Prereq: SOC 101 or RSO 102.

#SOC 340 COMMUNITY INTERACTION. (3)
Examines community effects on group and individual behavior from the perspective of sociological social psychology. By focusing on individuals, individuals in groups, and groups, special emphasis is given to how community context shapes the attitudes, beliefs, and actions of individuals as well as their interactions with others. Prereq: CLD 102 or SOC 101 or consent of instructor. Primary registration access limited to SOC and CLD majors and remaining seats open during secondary registration. (Same as CLD 340.)

***SOC 342 ORGANIZATIONS AND WORK IN SOCIETY. (3)**
A sociological study of the roles of formal organizations and workplaces in society, including consideration of their structures and processes. Topics may include contemporary issues in the sociology of organizations and work, including bureaucratic and alternative structures; opportunities for worker participation; the role of leadership and decision making; and the exercise of power in organizations. Prereq: SOC 101 or RSO 102.

***SOC 343 POLITICAL SOCIOLOGY. (3)**
A sociological study of the causes and consequences of the distribution of power in society. Topics may include the means by which social movements challenge power; the political institutions in which power is exercised; and the relationship of the political arena to other social institutions and policies. Prereq: SOC 101 or RSO 102.

†SOC 344 SOCIAL PSYCHOLOGY.

***SOC 350 TOPICS IN SOCIOLOGY (SUBTITLE REQUIRED). (3)**
Current research and conceptual developments in a selected topic or subfield of sociology. May be repeated to a maximum of six credits under different subtitles. Prereq: SOC 101 or RSO 102.

#SOC 360 ENVIRONMENTAL SOCIOLOGY. (3)
A sociological study of the emergence of the environment as a social issue in contemporary societies. Topics may include the social, cultural and economic factors associated with the perception of environmental issues; risk perception; and the mobilization of publics around environmental issues. Prereq: SOC 101 or RSO 102.

†SOC 362 PRACTICUM IN VOCATIONAL EDUCATION, AGRICULTURAL COMMUNICATIONS, AND LEADERSHIP.

***SOC 380 GLOBALIZATION: A CROSS-CULTURAL PERSPECTIVE. (3)**
A sociological study of how globalization processes affect development in various countries and world regions. Topics shall include development theory; comparative development processes and outcomes; and development policy options. Prereq: SOC 101 or RSO 102.

***SOC 395 INDEPENDENT WORK. (1-3)**
Independent study of special topic under the supervision of faculty. Students must identify both a project topic and a sociology faculty mentor who has agreed to supervise this project. Students taking this course must be Sociology majors or minors and must have a 3.0 GPA in the department. A learning contract must be filed in the department in order to receive a grade for this course. May be repeated to a maximum of six credits. Prereq: SOC 101 or RSO 102, SOC major or minor, GPA of 3.0 or above in the department, consent of faculty mentor and learning contract.

***SOC 399 PRACTICUM IN SOCIOLOGY. (1-12)**
A service learning or internship experience in sociology under the supervision of a faculty member or instructor. May be repeated to a maximum of 12 credits. Maximum of six hours of SOC 399 will count toward Sociology Major requirements; maximum of 3 hours of SOC 399 will count toward Sociology Minor requirements. Pass/fail only. Prereq: SOC 101 or RSO 102, SOC major or minor, consent of instructor and learning contract.

†SOC 418 SOCIAL CHANGE.

***SOC 420 SOCIOLOGY OF COMMUNITIES. (3)**
A sociological study of issues relevant to communities. Topics may include: conceptual approaches to community; organizational and institutional linkages within and beyond the community; social inequality and social processes within communities such as social networks, social capital, power and decision-making, and social change. Prereq: SOC 101 or RSO 102 or CLD 102; and one of the following: SOC 302 or 304 or CLD 405; or consent of instructor. (Same as CLD 420.)

†SOC 425 DIMENSIONS OF AGING.

†SOC 432 RACE AND ETHNIC RELATIONS.

#SOC 433 TOPICS IN SOCIAL INEQUALITIES (SUBTITLE REQUIRED). (3)
A sociological study of topics relevant to social inequalities and stratification. May be repeated under different subtitles to a maximum of six credits. Prereq: SOC 101 or RSO 102; SOC 235; and either SOC 302 or 304. (Same as AAS 433.)

†SOC 434 SOCIAL CLASSES.

†SOC 436 SOCIOLOGY OF DEVIANT BEHAVIOR.

†SOC 437 CRIMINOLOGY.

†SOC 438 JUVENILE DELINQUENCY.

***SOC 439 TOPICS IN CRIME, LAW AND DEVIANCE (SUBTITLE REQUIRED). (3)**
A sociological study of a special topic central to the scientific study of crime, law, or deviance. May include such topics as deviant subcultures; substance use; social control of crime; sociology of law; and philosophies of punishment. May be repeated to a maximum of six credits under different subtitles. Prereq: SOC 101; SOC 399; and either SOC 302 or 304, and AEC 102.

#SOC 440 COMMUNITY PROCESSES AND COMMUNICATION. (3)
This course examines the relationship between community organization and change and the media. Special emphasis is given to the place of media organizations in community structure, the effects of media on community processes, and how community members use the media. Prereq: CLD 102 or SOC 101 and CLD/SOC 340 or consent of instructor. Primary registration access limited to majors and remaining seats open during secondary registration. (Same as CLD 440.)

***SOC 442 TOPICS IN WORK, ORGANIZATIONS AND ECONOMY (SUBTITLE REQUIRED). (3)**
A sociological study of selected topics related to organizations and work. Topics may include decision-making and leadership in organizations; environmental impacts of organizations; the future of unions and workplace democracy; and changes in labor markets. May be repeated to a maximum of six credits under different subtitles. Prereq: SOC 101 or RSO 102; SOC 342; and either SOC 302 or SOC 304.

†SOC 443 SOCIAL CONFLICT AND COOPERATION AT WORK.

#SOC 444 TOPICS IN POLITICAL SOCIOLOGY (SUBTITLE REQUIRED). (3)
A sociological study of topics related to politics and government. Topics may include national and supra national government; citizenship; political parties; interest groups; social movements; and globalization. May be repeated to a maximum of six credits under different subtitles. Prereq: SOC 101 or RSO 102; SOC 343; and either SOC 302 or 304.

†SOC 449 SOCIAL PROCESSES AND EFFECTS OF MASS COMMUNICATION.

†SOC 499 TOPICAL SENIOR SEMINAR (SUBTITLE REQUIRED).

†SOC 509 THE U.S. FAMILY IN HISTORICAL PERSPECTIVE.

***SOC 517 RURAL SOCIOLOGY. (3)**
A sociological study of the issues relevant to rural communities. Topics may include transformations in rural communities; the agrifood system; and the natural environment in the U.S. and the world. Prereq: Sociology senior major or minor; graduate student status; or consent of instructor.

***SOC 534 SOCIOLOGY OF APPALACHIA. (3)**
A sociological study of selected social issues facing Appalachian communities, with an emphasis on placing regional political economy, society and culture in a global context. Prereq: Sociology or Anthropology senior major or minor; graduate student status; or consent of instructor. (Same as ANT 534.)

***SOC 535 ADVANCED TOPICS IN SOCIAL INEQUALITIES (SUBTITLE REQUIRED). (3)**
A sociological study of topics relevant to social inequalities and stratification. May be repeated to a maximum of six credits under different subtitles. Prereq: Sociology senior major; Sociology or African American Studies senior minor; graduate student status; or consent of instructor. (Same as AAS 535.)

#SOC 539 ADVANCED TOPICS IN CRIME, LAW AND DEVIANCE (SUBTITLE REQUIRED). (3)
A sociological study of a special topic central to the scientific study of crime, law or deviance. Topics may include deviant subcultures; substance use; social control of crime; sociology of law; and philosophies of punishment. May be repeated to a maximum of six credits under different subtitles. Prereq: Sociology senior major or minor; graduate student status; or consent of instructor.

#SOC 541 ADVANCED TOPICS IN WORK, ORGANIZATIONS, AND ECONOMY (SUBTITLE REQUIRED). (3)
A sociological study of selected topics related to work, organizations, and the economy. Topics may include economic sociology; sociology of occupations and professions; and sociology of organizational administration. Prereq: Sociology senior major or minor; graduate student status; or consent of instructor.

†SOC 542 HUMAN RELATIONS IN ADMINISTRATION OF ORGANIZATIONS.

#SOC 543 ADVANCED TOPICS IN POLITICAL SOCIOLOGY (SUBTITLE REQUIRED). (3)
A sociological study of selected topics related to politics and government. Topics may include national and supra national government; citizenship; contestation; political parties, social movements; strategic protests; ideology; identity; and globalization. Prereq: Sociology senior major or minor; graduate student status; or consent of instructor.

†SOC 547 SOCIAL AND PSYCHOLOGICAL ASPECTS OF APPAREL.

#SOC 550 ADVANCED TOPICS IN SOCIOLOGY (SUBTITLE REQUIRED). (3)
A sociological study of topics, theories, or research findings from selected sociological subfield. May be repeated to a maximum of six credits under different subtopics. Prereq: Sociology senior major or minor; graduate student status; or consent of instructor.

†SOC 555 GEOGRAPHIC INFORMATION SYSTEMS AND LANDSCAPE ANALYSIS.

†SOC 556 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS (GIS) AND LANDSCAPE ANALYSIS.

***SOC 565 INDEPENDENT WORK. (1-3)**
Independent sociological study of a topic under the supervision of faculty. Students must identify both a project topic and a sociology faculty mentor who has agreed to supervise this project. A learning contract must be filed in the department in order to receive a grade for this course. May be repeated to a maximum of six credits. Prereq: Sociology senior major or minor; graduate student status; or consent of instructor.

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 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 SEMINAR IN SOCIAL INEQUALITIES. (3)
This course provides a graduate-level introduction to sociological theory and research on social inequalities and stratification. It includes both classic and contemporary works on topics such as political economy, the state, domination, democracy, work, poverty, welfare, resistance, class, race, ethnicities, and gender. The course serves as a foundational course for graduate students with interests in social inequalities, and is required for Sociology graduate students seeking a specialization in this area. Prereq: SOC 650 or SOC 651 or consent of instructor. (Same as AAS 635.)

SOC 636 STRATIFICATION AND MOBILITY. (3)
Examination of the main areas of research in social stratification and mobility. The course is centered primarily around the core readings, both classical and contemporary, of stratification and mobility research. Topics include educational and occupational attainment, occupational status and prestige, inter- and intra-generational occupational mobility, classes, the consequences of stratification, and the role of labor markets, gender, ethnicity, and race in stratification and mobility. A familiarity with statistics or survey research is strongly recommended. Prereq: SOC 635 or 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 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 642 THE SOCIOLOGY OF WORK, OCCUPATIONS AND LABOR MARKETS. (3)
This course examines the theories of work and occupations; the industrial structure of the labor force, the nature of mental and manual labor; the structure of labor markets including underemployment, unemployment, and segmentation; occupational mobility and status attainment; worker resistance and informal groups; worker participation and teamwork; labor and management relations; and state and national legislation regarding work, conflict, safety, and discrimination. Prereq: Graduate standing in sociology or other graduate department.

SOC 645 TOPICS IN POLITICAL SOCIOLOGY. (3)
This course examines how states, capital, and other relevant social groups interact to produce new or stabilize old frameworks for work or other aspects of society. Its topics may include many different areas including: employee representation; health and safety issues; race and gender discrimination; corporate relocation and the international division of labor. No matter what topic chosen for the course, the basic aspects of political sociology including pluralist, elite, neo-corporatist, and citizenship theories will be covered. Prereq: Graduate standing in sociology or other graduate department.

SOC 646 SOCIAL MOVEMENTS AND SOCIAL CHANGE. (3)
This seminar focuses on literature pertaining to collective, extra-institutional efforts to form new or maintain old forms of social order in the United States and other countries. While specific content might vary in response to instructors' interests and department demands, attention will be given to such issues as movement emergence, maintenance, and transformation, labor and resource mobilization, social networks, organization cultures, movement identities and ideologies, social problems construction, strategies and tactics development, as well as the relative success of social movement activities. The seminar can include illustrative material from a variety of social movements and counter-movements (e.g., political, lifestyle, religious, etc.) Prereq: Graduate standing in sociology or other graduate department.

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 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 SOCIAL INEQUALITIES. (3)
Advanced study of topics of current importance in the study of social inequalities and stratification. May be repeated under different subtitles to a maximum of 12 credits. Prereq: SOC 635 or consent of instructor.

SOC 737 CULTURE, ENVIRONMENT AND DEVELOPMENT. (3)
This seminar explores the interrelationships between social processes, development and the environment. It provides the graduate student with the necessary theoretical and analytical tools to examine the social and cultural processes of environmental degradation and change. Topics include political ecology, health impacts of development, deforestation, resource tenure systems, environmental grassroots movements and large-scale development organizations. Prereq: Consent of instructor. (Same as ANT 736.)

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 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 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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. (1-3)
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 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. (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.

SPA Hispanic Studies

SPA 011 SPANISH READING FOR GRADUATE STUDENTS. (3)
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.

SPA 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 SPA 141.

SPA 102 ELEMENTARY SPANISH II (SPOKEN APPROACH). (4)
A continuation of SPA 101. Not open to students who have credit for SPA 142. Prereq: SPA 101 or consent of the department and placement test.

SPA 103 HIGH BEGINNER SPANISH. (3)
This course is designed to expand upon the students' already existing knowledge of Spanish in order to prepare them for intermediate level courses. The textbook and supplementary material will develop students' abilities in the four basic skills of language learning (speaking, listening, reading and writing). Prereq: Placement exam or two years of high school Spanish, as indicated on transcripts.

SPA 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 SPA 101.

SPA 142 ELEMENTARY SPANISH II (READING APPROACH). (3)
A continuation of SPA 141. Selected readings. Offered by correspondence only. Not open to students who have credit for SPA 102. Prereq: SPA 141 or consent of department and placement test.

SPA 151 SPANISH FOR HEALTH PROFESSIONALS. (3)
The course will teach Spanish terminology and basic grammar related to medical patients, including vocabulary for diagnosis and treatment. Prereq: Prior college or high school Spanish or other experience with the Spanish language roughly equivalent to one semester of college study.

SPA 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 SPA 241. Prereq: SPA 102 or consent of department and placement test.

SPA 202 INTERMEDIATE SPANISH IV (SPOKEN APPROACH). (3)
Continuation of SPA 201. Not open to students who have credit for SPA 242. Prereq: SPA 201 or consent of department and placement test.

SPA 203 HIGH INTERMEDIATE SPANISH. (3)
This course is designed to advance students' knowledge of Spanish at the intermediate level by fine-tuning the skills of reading, speaking, listening, and writing. The goal of the course will be to focus on useful vocabulary, to practice functional grammar, to further explore cross-cultural analysis and to develop students' communicative competence in Spanish. Not open to Students from SPA 102 or 103. This course is designed for students' transition directly from high school Spanish to second-year college Spanish. Prereq: Placement exam or 3 years of high school Spanish as indicated on transcripts.

SPA 210 SPANISH GRAMMAR AND SYNTAX. (3)
Introduction to advanced Spanish grammar and syntax and development of Spanish vocabulary and writing skills. Concurrent enrollment in SPA 211 is encouraged. Prereq: SPA 202, SPA 203 or equivalent.

SPA 211 INTERMEDIATE SPANISH CONVERSATION. (3)
Oral-aural practice in the spoken language. Special emphasis placed on the acquisition of idioms and vocabulary. Prereq: SPA 202, 203 or equivalent or consent of chair.

SPA 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 SPA 201. Prereq: SPA 142 or consent of department and placement test.

SPA 242 INTERMEDIATE SPANISH IV (READING APPROACH). (3)
A continuation of SPA 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 SPA 202. Prereq: SPA 241 or consent of department and placement test.

SPA 262 SPANISH LITERATURE IN TRANSLATION: (SUBTITLE REQUIRED). (3)
This course examines particular authors, periods, regions, cultural events, or movements from Spain. Special attention will be paid to links between literature and culture, politics and society through reading, discussion, and writing assignments to be conducted in English. Course may be repeated under different titles for a maximum of six credits.

SPA 302 COMMERCIAL AND TECHNICAL SPANISH. (3)
A course designed to develop a more specialized vocabulary and usage in specific areas of interest, including business, the social sciences and technical fields. Prereq: SPA 210, 211.

SPA 310 SPANISH COMPOSITION THROUGH TEXTUAL ANALYSIS. (3)
Critical readings and interpretation of texts in Spanish. Text may include literary, political, sociological, and cultural documents. Emphasis on mastery of written Spanish. This course is required of all majors. Prereq: SPA 210 and 211 with a B or better or consent of instructor.

SPA 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: SPA 210 and 211, or consent of instructor.

SPA 313 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: SPA 210 and 211, and a 300-level Spanish course.

SPA 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: SPA 210 and 211, or consent of instructor.

SPA 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: SPA 210 and SPA 211, or consent of instructor.

SPA 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: SPA 210 and SPA 211, or consent of instructor.

SPA 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: SPA 210 and 211.

SPA 361 LATIN AMERICAN LITERATURE IN TRANSLATION (SUBTITLE REQUIRED). (3)
This course examines particular authors, periods, regions, cultural events, or movements from Latin America. Special attention will be paid to links between literature and culture, politics and society through reading, discussion, and writing assignments to be conducted in English. Course may be repeated under different titles to a maximum of six credits. (Same as LAS 361.)

SPA 371 LATIN AMERICAN CINEMA: (SUBTITLE REQUIRED). (3)
An introduction to the analysis and interpretation of cinema in general and Latin American cinema in particular. The course will focus on films from the main Latin American schools of cinema which will be studied in their social, political, and cultural context and introduce students to basic critical vocabulary. Viewing of films (with English subtitles) outside of class is required. Class lectures in English; discussion groups will take place in either English or Spanish. Course cannot be repeated. Prereq: For majors or consent of instructor; ENG 104.

SPA 372 SPANISH CINEMA: (SUBTITLE REQUIRED). (3)
An introduction to the analysis and interpretation of cinema in general and Spanish cinema in particular. The course will focus on films from the main Spanish schools of cinema which will be studied in their social, political, and cultural context and introduce students to basic critical vocabulary. Viewing of films (with English subtitles) outside of class is required. Class lectures in English; discussion groups will take place in either English or Spanish. Course cannot be repeated. Prereq: For majors or consent of instructor; ENG 104.

SPA 397 INDEPENDENT WORK IN SPANISH. (3)
May be repeated once. Prereq: Major and standing of 3.0 in the department.

SPA 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.

SPA 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.

SPA 413 ADVANCED SPANISH CONVERSATION AND PHONETICS. (3)
Intensive practice in oral Spanish, emphasizing refinement of intonation, pronunciation, and idiomatic expressions. Designed to increase and maintain oral fluency in Spanish. Includes basic phonetics component. Not open to native speakers of Spanish. May be taken concurrently with SPA 310. Majors are encouraged to take this course. Prereq: SPA 210, 211 or equivalent.

SPA 424 MEDIEVAL AND EARLY MODERN SPANISH STUDIES (SUBTITLE REQUIRED). (3)
Readings and analysis of texts from and about Medieval and Early Modern Spain, with emphasis on cultural production within social and historical contexts. May be repeated to a maximum of 6 credits with topic change. Prereq: SPA 310, SPA 311. Permission of instructor for students who did not receive B or better in SPA 310.

SPA 432 18TH AND 19TH CENTURY SPANISH STUDIES (SUBTITLE REQUIRED). (3)
Reading and analysis of Spanish literary and cultural works from the 18th and 19th century. The course may cover multiple genres, authors, periods, regions, or topics. Course may be repeated under different titles to a maximum of six credits. Prereq: SPA 310. Permission of instructor for students who did not receive a B or better in SPA 310.

SPA 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.

SPA 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.

SPA 444 20TH AND 21ST CENTURY SPANISH STUDIES (SUBTITLE REQUIRED). (3)
Reading and analysis of Spanish literary and cultural works from the 20th and 21st century. The course may cover multiple genres, authors, periods, regions, or topics. Course may be repeated under different titles to a maximum of six credits. Prereq: SPA 310. Permission of instructor for students who did not receive a B or better in SPA 310.

SPA 454 COLONIALISM AND 19TH CENTURY SPANISH-AMERICAN STUDIES (SUBTITLE REQUIRED). (3)
A topics course in Latin American literature and culture from the colonial period through the 19th century. Special emphasis on the interaction between literature, historical and social developments. Taught in Spanish. May be repeated to a maximum of 6 credits with topic change. Prereq: SPA 310, SPA 311. Permission of instructor for students who did not receive a B or better in SPA 310.

SPA 464 CONTEMPORARY SPANISH-AMERICAN STUDIES (SUBTITLE REQUIRED). (3)
A topics course in 20th century Latin American literature and culture. Special emphasis on the interaction between literature, historical and social developments and popular culture. Taught in Spanish. May be repeated to a maximum of 6 credits with topic change. Prereq: SPA 310, SPA 311. Permission of instructor for students who did not receive a B or better in SPA 310.

SPA 474 TOPICS IN HISPANIC STUDIES (SUBTITLE REQUIRED). (3)
Reading and analysis of Hispanic literature and culture organized by topics. May cover multiple genres, authors, periods, regions or topics. May be repeated to a maximum of 6 credits with topic change. Prereq: SPA 310, SPA 311. Permission of instructor for students who did not receive a B or better in SPA 310.

SPA 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: SPA 210 and SPA 211, and a 300-500 level Spanish course.

SPA 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).

#SPA 519 THEMES IN MEDIEVAL AND EARLY MODERN SPANISH LITERATURE AND CULTURE (SUBTITLE REQUIRED). (3)
This course is a topics course in Medieval and Early Modern Spanish Literature and Culture. Appropriate for advanced undergraduates and MA level graduate students. May be repeated to a maximum of six credits under different subtitles. Prereq: For undergraduates: SPA 400 or permission of instructor.

#SPA 529 THEMES IN MODERN AND CONTEMPORARY SPANISH LITERATURE, CULTURE AND FILM (SUBTITLE REQUIRED). (3)
This course is a topics course in Modern and Contemporary Spanish Literature, Film and Culture. Appropriate for advanced undergraduates and MA level graduate students. May be repeated to a maximum of six credits under different topic. Prereq: For undergraduates: SPA 400 or permission of instructor.

#SPA 539 THEMES IN LATIN AMERICAN LITERATURE, CULTURE AND FILM (SUBTITLE REQUIRED). (3)
This course is a topics course in Modern and Contemporary Latin American Literature, Film and Culture. Appropriate for advanced undergraduates and MA level graduate students. May be repeated to a maximum of six credits under different subtopic. Prereq: For undergraduates: SPA 400 or permission of instructor.

SPA 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.

SPA 600 HISTORY OF THE SPANISH LANGUAGE. (3)
Introduction to the historical development of the Spanish language. The central focus of this course will be the dialogic and dialectic processes that gave rise the historical, cultural, phonological, morphological and lexical transformations of the Castilian languages, with particular emphasis on the changes that Castilian underwent as it evolved from Latin into modern Castilian.

SPA 601 STUDIES IN SPANISH PEDAGOGY: (SUBTITLE REQUIRED). (1)
A one credit course that may or may not run concurrently with the 553 course on Spanish Pedagogy. Seminar topics may include an overview of second language acquisition theories as applicable to English learners of Spanish: contemporary teaching methodologies for instructors of Spanish language, integration of technology into curriculum; issues in testing and assessment. May be repeated to a maximum of 3 credits when taught under different subtitles.

SPA 602 STUDIES IN SPANISH LINGUISTICS: (SUBTITLE REQUIRED). (3)
Readings and discussion of issues in Spanish linguistics and the teaching of Spanish. May be repeated to a maximum of 9 credits taught under different subtitles.

SPA 606 INTRODUCTION TO CRITICAL THEORY AND CULTURAL STUDIES. (3)
Survey of major trends in critical and cultural theory since the early 20th century, from Formalism and New Criticism through Cultural Studies. Required of all new graduate students.

SPA 607 SPECIAL TOPICS IN CRITICAL THEORY AND CULTURAL STUDIES: (SUBTITLE REQUIRED). (1)
Readings and discussion of special topics in critical theory and cultural studies. May be taught in English or Spanish. May be repeated to a maximum of 3 credits when taught under different subtitles.

SPA 608 SPECIAL TOPICS IN SPANISH LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Readings and discussion in essay, film and cultural production of Spain and Spanish America. May be taught in English or Spanish. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 609 SPECIAL TOPICS IN LATIN AMERICAN AND U.S. HISPANIC LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Intensive study of an author, genre, period, or movement of Latin American or U.S. Hispanic literature, or an aspect of Latin American or U.S. Hispanic linguistics or culture. Taught in English or Spanish. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 610 STUDIES IN MEDIEVAL SPANISH LITERATURE: (SUBTITLE REQUIRED). (3)
Readings and discussion of Spanish literature from the 13th century through the 15th century. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 620 STUDIES IN EARLY MODERN AND BAROQUE SPANISH LITERATURE (SUBTITLE REQUIRED). (3)
Readings and discussion of Spanish literature and culture from the 16th and 17th centuries. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 630 STUDIES IN 18TH AND 19TH CENTURY SPANISH LITERATURE: (SUBTITLE REQUIRED). (3)
Readings and discussion of Spanish literature and culture from the 18th and 19th century. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 640 STUDIES IN 20TH AND 21ST CENTURY SPANISH LITERATURE: (SUBTITLE REQUIRED). (3)
Readings and discussion of contemporary Spanish literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 650 STUDIES IN COLONIAL LATIN AMERICAN LITERATURE: (SUBTITLE REQUIRED). (3)
Readings and discussion of Colonial Latin American literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 660 STUDIES IN 19TH CENTURY LATIN AMERICAN LITERATURE: (SUBTITLE REQUIRED). (3)
Readings and discussion of 19th century Latin American literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 680 STUDIES IN 20TH CENTURY LATIN AMERICAN LITERATURE 1900-1950'S: (SUBTITLE REQUIRED). (3)
Readings and discussion of Latin American literature and culture through the first half of the 20th century. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 681 STUDIES IN CONTEMPORARY LATIN AMERICAN LITERATURE 1960'S TO PRESENT: (SUBTITLE REQUIRED). (3)
Readings and discussion of contemporary Latin American literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 685 STUDIES IN U.S. HISPANIC LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Readings and discussion of U.S. Latino literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 690 STUDIES IN SPANISH AND/OR LATIN AMERICAN FILM: (SUBTITLE REQUIRED). (3)
Viewings and discussion of Spanish or Latin American film, emphasizing its political, social, economics, and cultural contexts of the Hispanic world. Viewing of films (in Spanish) outside class is required. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 706 ADVANCED READINGS IN CRITICAL THEORY AND CULTURAL STUDIES: (SUBTITLE REQUIRED). (3)
Advanced readings and discussion of contemporary issues in critical theory and cultural studies. Taught in Spanish or English. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 708 CRITICAL PERSPECTIVES ON SPANISH LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Advanced readings and discussion of Spanish literature and culture: open topic with preference for cross-disciplinary or trans-historical subjects. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 709 CRITICAL PERSPECTIVES ON LATIN AMERICAN AND U.S. HISPANIC LITERATURE AND CULTURE (SUBTITLE REQUIRED). (3)
Advanced readings and discussion of Latin American and U.S. Hispanic literature or culture. May deal with a single author's work, a genre or a cultural phenomenon: open topic with preference for cross-disciplinary or trans-historical subjects. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 710 SEMINAR IN MEDIEVAL SPANISH LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Special and intensive study of selected topics in Spanish literature and culture from the 13th through the 15th century. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 720 SEMINAR IN EARLY MODERN AND BAROQUE SPANISH LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Special and intensive study of selected topics in Spanish literature and culture of the 15th and 16th centuries. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 730 SEMINAR IN 18TH AND 19TH CENTURY SPANISH LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Special and intensive study of selected topics in 18th and 19th century Spanish literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 740 SEMINAR 20-21ST CENTURY SPANISH LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Special and intensive study of selected topics in contemporary Spanish literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 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.

SPA 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.

SPA 750 SEMINAR IN COLONIAL LATIN AMERICAN LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Special and intensive study of selected topics in Colonial Latin American literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 760 SEMINAR IN 19TH CENTURY LATIN AMERICAN LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Special and intensive study of selected topics in 19th century Latin American literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

#SPA 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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

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

SPA 780 SEMINAR IN 20TH CENTURY LATIN AMERICAN LITERATURE AND CULTURE 1900-1950'S: (SUBTITLE REQUIRED). (3)
Special and intensive study of selected topics in Latin American literature and culture of the first half of the 20th century. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 781 SEMINAR IN CONTEMPORARY LATIN AMERICAN LITERATURE AND CULTURE 1960'S TO PRESENT: (SUBTITLE REQUIRED). (3)
Special and intensive study of selected topics in contemporary 20th and 21st century Latin American literature and culture. May be repeated to a maximum of 9 credits when taught under different subtitles.

SPA 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.

SPA 785 SEMINAR IN U.S. HISPANIC AND BORDER LITERATURE AND CULTURE: (SUBTITLE REQUIRED). (3)
Special and intensive study of related topics in U.S. Hispanic and Border literature and culture. May be taught in Spanish or English. May be repeated to a maximum of 9 credits when taught under different subtitles.

ST Social Theory

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 *DISCLOSURE* 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 or 132.

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 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 equivalent.

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 X and S^2; confidence intervals and tests of hypotheses about the mean and variance of a normal population: the X2 and t-distributions. Prereq: STA 292 and 293.

STA 295 THE ART AND PRACTICE OF PROBABILITY. (3)
Introduction to the structure and techniques that are the foundations of probability. Emphasis on applications to real world problems and case studies, possibly involving DNA matching, sports statistics, forecasting, lotteries and epidemics. Interface of probability and inference. Prereq: MA 113 or MA 123.

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 322 STATISTICAL METHODS IN NONPARAMETRIC INFERENCE AND SURVEY SAMPLING. (4)
Introduction to statistical methodology appropriate for data that fail to meet the assumptions of parametric inference. Familiarity with classical sampling techniques as well as modern sampling practice. Emphasis on applications to real-world problems and case studies, possibly involving questionnaire construction, random digit dialing, response bias, use of modern sampling software, categorical regression, and skewed data. Prereq: STA 291 and STA 295; or STA 321.

STA 335 DATA ANALYSIS FOR PHYSICISTS. (1)
An integrated lecture and demonstration computational laboratory course in the theory and techniques of data analysis and error propagation. An emphasis is given to applications common to physical sciences: curve fitting, statistical methods of data analysis, systematic uncertainties, and both independent and correlated errors in several variables. Prereq: PHY 242. (Same as PHY 335.)

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 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 MA 417G.)

STA 422G BASIC STATISTICAL THEORY II. (4)
Theory of least squares; regression; analysis of variance and covariance; experimental design models; factorial experiments; variance component models. Lecture, three hours; laboratory, two hours per week. Prereq: STA 291 and STA 295; or STA 321.

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: Graduate standing in Statistics.

STA 515 LINEAR AND COMBINATORIAL OPTIMIZATION. (3)
Mathematical and computational aspects of linear programming and combinatorial optimization. Linear optimization is introduced by presenting solution techniques (primal and dual simplex) and studying geometric properties and duality for linear systems of inequalities. Asics of combinatorial optimization, including trees, paths, flows, matchings, and matroids, and the corresponding algorithms are presented. 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 213 and MA 322. (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 consent of instructor. (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 580 BIOSTATISTICS I. (3)
Descriptive statistics, hypothesis testing, paired and unpaired tests, ANOVA, contingency tables, log rank test, and regression with biostatistics applications. Prereq: MA 109 or equivalent.

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 532.

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 X^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 612 SEQUENTIAL ANALYSIS. (3)
Survey and application of sequential sampling. Sufficiency and estimation. Two Stage sampling. The SPRT and its properties, both exact and approximate. Truncated and grouped SPRT's. Decision Theoretic approach. Sequential Estimation. Fixed width confidence intervals. Composite hypotheses and nuisance parameters. Generalized SPRT's. K hypothesis problems. Optimal Stopping. Prereq: 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 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, auto-regressive 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 630 BAYESIAN INFERENCE. (3)
Likelihood principles, sufficiency, natural conjugate and hierarchical priors, empirical Baysian analysis for estimation and testing. Prereq: STA 601.

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 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 estimaters. The use of PRESS, C_p, and R^2 statistics as selection criteria. Modern computational methods. Nonlinear models and their methodology. Robust Regression. Prereq: STA 603.

STA 653 CLINICAL TRIALS. (3)
Design and analysis of Phase I-III clinical trials, interim monitoring of trials, sample size, power, crossover trials, bioequivalency, mixed models, and meta analysis. Prereq: STA 643.

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 662 RESAMPLING AND RELATED METHODS. (3)
Theory and application of the bootstrap, jackknife and other resampling methods. Prereq: STA 601, 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 STA 580.

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 STA 580.

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 STA 580.

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, and STA 672. (Same as PLS 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 T^2, multivariate analysis of variance and covariance; structural models for the covariance matrix; utilization of existing computer programs. Prereq: STA 671 and 672.

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 restrictional and two restrictional lattice and incomplete block designs. Combining analyses of similar experiments. Prereq: STA 671 and 672 or equivalent.

STA 681 BIOSTATISTICS II. (3)
Students will learn statistical methods used in public health studies. This includes receiver operator curves, multiple regression logistic regression, confounding and stratification, the Mantel-Haenzel procedure, and the Cox proportional hazardous model. Lecture, two hours; laboratory, two hours per week. Prereq: STA 580 or equivalent. (Same as SPH 630.)

STA 690 SEMINAR IN STATISTICS. (1)
May be repeated to a maximum of three credits.

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 700 FOUNDATIONS OF PROBABILITY AND INFERENCE. (3)
Measures on the real line and probability spaces, Lebesque measure, properties of distribution functions and random variables, integrals and expectations. Prereq: MA 471G.

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: STA 700 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: STA 700 and STA 532.

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 705 ADVANCED COMPUTATIONAL INFERENCE. (3)
Numerical maximization and integration, resampling methods, EM algorithm, Markov Chain Monte Carlo methods. Prereq: STA 601, 624.

STA 707 ADVANCED DATA ANALYSIS. (3)
Theory and data analysis involving likelihood functions, mixed models, missing responses. Prereq: STA 643.

STA 709 ADVANCED SURVIVAL ANALYSIS. (3)
Lindberg CLT, Kaplan-Meier and related estimators, Cox proportional hazards and related methods, approximations of type I and II error. Prereq: STA 635, 701.

STA 715 READINGS IN STATISTICS AND PROBABILITY (SUBTITLE REQUIRED). (1-6)
Supervised reading and discussion of a selected research topic. May be repeated to a maximum of nine credits. Prereq: STA 701 and STA 703 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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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 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 875 MAXILLOFACIAL DISEASE FOR THE HEALTH CARE PROFESSIONAL

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.

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. Option of agency visitation, group experiences, social service. Not open to those having SW 124 or 222.

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 505 CHILD WELFARE SERVICES. (2-3)
This course provides a comprehensive introduction to child abuse and neglect, including historical perspectives, indicators of maltreatment, theories about its etiology, and effective interventions on the micro and macro levels. Students will learn about child protective policies and services, and the social worker's roles and responsibilities.

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 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. (Same as AAS 523.)

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 595 COOPERATIVE SOCIAL WORK EDUCATION. (0)
A course designed for social work students who, through the 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 repeated with the permission of the cooperation education office. Prereq: Approval of the Cooperative Education Coordinator.

SW 600 SOCIAL WORK PRACTICE I. (3)
This is the first course of a two-semester generalist social work practice sequence. This course enhances analytic thinking and focuses on mastering the skills that underlie assessment in social work. Cases for analysis and study may be drawn from individuals, families, groups, communities, or organization. Prereq: Admission into the MSW program.

SW 601 SOCIAL WORK PRACTICE II. (3)
This is the second course of a two-semester generalist social work practice sequence. This course requires utilization of analytical thinking to master the social work skills that underlie the social work problem-solving process with a focus on intervention. Prereq: Admission into the MSW program and SW 600.

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 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 608 INTRO TO MSW PRACTICE. (2)
For students receiving advanced standing, this "bridge" course is designed to stress the importance of theoretical orientation, critical thinking, ethical problem-solving and the use of informational resources in making decisions about practices as a graduate social worker. Prereq: Admission into the MSW program with advanced standing.

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 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 620 HUMAN BEHAVIOR AND THE SOCIAL ENVIRONMENT. (3)
This foundation course focuses on theory as a tool for understanding human behavior on multiple interacting levels, including: individual, family, small group, organization, community, and society. The course will explore the interrelatedness of biological, social, cultural, psychological, and environmental factors in human behavior and development. Attention will be given to exploring the impact of racism, sexism, ethnocentrism, classism, and homophobia on human behavior at each level. Prereq: Acceptance into the MSW 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 625 INTRODUCTION TO THE SOCIAL WORK PROFESSION. (3)
This course introduces students to the history and philosophy of social welfare and social work including social work's relationship to other professions. Additionally, the course presents basic skills necessary for effective, culturally competent social work practice and success in the field education program. The effects of culture, language, age, gender, sexual orientation, and other group characteristics are discussed as they relate to understanding diversity within society. Prereq: Acceptance into the MSW program or permission of the instructor.

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 COLLABORATIVE PRACTICE: SUBSTANCE ABUSE, MENTAL HEALTH AND SOCIAL SERVICE. (3)
This course provides students with critical knowledge about substance abuse and mental health problems experienced by families. A variety of subjects related to substance use disorders and mental health problems will be discussed such as screening, assessment, case management, and referral services. Collaborative practice with substance abuse, mental health service providers, social services, and other providers is addressed. Prereq: Completion of a baccalaureate degree.

SW 630 INTRODUCTION TO SOCIAL WELFARE POLICY AND SERVICES. (3)
This first course in the policy sequence emphasizes the analysis of social programs, policies, and the policy-making process. An important focus of the course is to identify and understand the impact of a wide range of social policies on social work clients and the human service delivery system within a social justice framework. The course content reflects the interdisciplinary efforts of the social, political, legal, economic, and administrative processes which are vital to policy-making at all levels. Prereq: Admission into the MSW program.

SW 635 INTRODUCTION TO PROFESSIONAL ETHICS. (2)
This course introduces students to the place of ethics in professional social work practice; the philosophical formulations that underlie ethics; and relevant concepts derived from these formulations. The course emphasizes the development of ethical reasoning and decision-making. Prereq: Admission into the MSW program and SW 600.

SW 640 FOUNDATION PRACTICUM. (4)
This introductory field-based course under faculty direction requires that students apply and integrate generalist social work knowledge from the foundation curriculum. Students study the special strengths and needs of populations at-risk for reaching their full potential. Emphasis is given to the beginning development of social work practice skills for work with individuals, families, groups, organizations, and communities toward the goals of restoration and enhancement of social functioning. Students examine many social work roles in the direct delivery of social services with specific attention paid to the NASW Code of Ethics. Experiential learning, 300 hours including weekly seminars. Prereq: SW 600, SW 620, SW 630, SW 625, and SW 650.

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 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 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 ADULT ASSESSMENT AND TREATMENT. (3)
This course is designed to enhance the student's professional judgment and clinical decision-making capacity with adult clients across mental health and human service systems of care. This course provides knowledge and skills for assessment and intervention with a broad range of adult biopsychosocial disorders, including situationally precipitated conditions or disorders. An integrative, comparative, and analytic approach will be utilized to explore the relationship between these conditions and the matrix created by biology, society, culture and environment, and to apply this knowledge to the assessment and treatment process. Prereq: Admission into the MSW program with advanced standing or SW 722.

SW 701 ASSET-BASED COMMUNITY DEVELOPMENT AND ASSESSMENT. (3)
This course is one of two assessment and intervention courses in the Family and Community Practice Concentration. The course examines the community context of social work practice with an emphasis on organizations, neighborhoods, communities, and larger social systems that influence quality of life. Models of community practice are presented to assess and intervene in social problems and acts of social injustice that constrain opportunities and limit access to resources for individuals and families. Particular attention is given to the concept of asset-based development for building community capacity and empowering individuals and groups. Prereq: SW 722, SW 731, and completion of foundation courses or advanced standing.

SW 702 SUBSTANCE MISUSE, VIOLENCE AND RISK MANAGEMENT. (3)
Designed to enhance clinical judgment and decision-making with populations at high risk for victimization or perpetration of violence and substance misuse, this course provides contemporary scientific and clinical knowledge and explores the associations of violence, child abuse, and mental disorders with substance misuse. Theories of addiction are explored with attention to genetic, familial, gender, geographical, and cultural contribution. Neurochemical and neuroanatomical correlates of addiction are explored. Assessment approaches and major interventions are analyzed and applied to practice situations. Prereq: Admission into the MSW program with advanced standing.

SW 704 CHILD ASSESSMENT AND TREATMENT. (3)
Designed to enhance professional judgment and clinical decision-making concerning child and adolescent clients, this course provides knowledge and skills for assessment and intervention concerning a broad range of biopsychosocial disorders, including situationally precipitated conditions or disorders. An integrative, comparative, and analytic approach is used to explore the relationship between these conditions and the matrix created by biology, society, culture and environment, and to apply this knowledge to assessment and treatment. Prereq: SW 722.

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. (Same as AAS 720.)

SW 722 PSYCHOPATHOLOGY FOR SOCIAL WORK PRACTICE. (3)
This course offers a survey of the major mental disorders typically encountered by social workers in clinical practice, and in relation to other areas of social work practice such as protective services, court-related service areas, family services, and other environments. It is designed to increase the social worker's familiarity with diagnostic classifications, criteria, etiologies, and the epidemiology of disorders and social work treatments for disorders. Prereq: Admission into the MSW program with advanced standing or SW 600 and SW 620.

SW 727 SOCIAL WORK ASSESSMENT AND INTERVENTION IN FAMILY PROBLEMS. (3)
This is the first of two required assessment and intervention courses in the Family/Community Practice Concentration. The course presents theoretical and evidence-based approaches to social work assessment and intervention with diverse family forms, and multiple family-related problems within the primary contexts of neighborhoods, schools, and communities. Some of the social work interventions presented include family preservation, case management, and family treatment models. Prereq: SW 722, SW 731, and completion of foundation courses.

SW 730 MENTAL HEALTH POLICY. (3)
Building on the social justice tradition and the policy analysis framework provided in SW 630, this course will consider the response of government, business, communities and professional groups to dealing with the current range of mental health policy issues. The interrelationship of social welfare and health care systems will be considered, as well as the legal aspects of providing mental health treatment. Attention will be paid to the behavioral health model, managed care and privatization. Prereq: Admission into the MSW program with advanced standing or SW 630.

SW 731 COMMUNITY AND FAMILY POLICY. (3)
This course builds on the social justice tradition and the policy analysis framework provided in SW 630 to prepare students to engage in the policy making processes that impact and are impacted by the family and community service delivery system. Controversial issues within the child welfare, school social work, aging, and community development policy arenas are examined. Prereq: Admission into the MSW program with advanced standing or SW 630.

SW 735 INTEGRATIVE SEMINAR. (2)
This seminar is usually taken by MSW students in their last semester. Students develop a case analysis to assist in integrating their course of study. This includes knowledge of human behavior theories, assessment, micro and macro level interventions, policy-analytic models, ethical reasoning, and research methodology. Prereq: Admission into the MSW program with advanced standing or SW 750.

SW 736 ADMINISTRATION AND SUPERVISION IN SOCIAL WORK PRACTICE. (2)
This course examines the overlapping but distinct roles of program planning, management, administration and supervision within social work and other human service organizations. Focus will be on human resources development and management, program development, implementation and evaluation, the acquisition of finding and financial management, and public relations and constituency building. Special emphasis will be placed on issues of leadership roles, organizational culture, and outcome-based decision-making from a social work perspective. Prereq: Admission into the MSW program with advanced standing or completion of all foundation courses.

SW 740 MENTAL HEALTH CONCENTRATION PRACTICUM. (4)
This field-based course prepares students to practice as social workers at the advanced level in an area of concentration. Students perform a variety of tasks including assessment, case management, psycho-education, as well as individual, family, and/or Community-based interventions. Placement in a human service agency and experiential learning of 300 hours including weekly seminars. May be repeated to eight hours. Prereq: SW 640 or advanced standing.

SW 741 FAMILY AND COMMUNITY CONCENTRATION PRACTICUM II. (4)
In this required internship students continue to apply and refine their skills and competencies under faculty direction. Placement in a human service agency and experiential learning of 300 hours including weekly seminars. May be repeated to eight hours. Prereq: Admission into the MSW program with advanced standing. Prereq for Practicum II is Practicum I.

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. (3)
An intermediate course in research methodology and design including program evaluation and meta-analysis. Requires students to conduct research related to practice issues or program evaluation in their fields of concentration as they prepare proposals to be implemented in SW 751. Prereq: Admission into the MSW program with advanced standing or SW 650.

SW 751 RESEARCH DESIGN AND IMPLEMENTATION II. (3)
Implementation of a research or program evaluation project designed in SW 750. Students are required to conduct research related to practice issues or program evaluation in their fields of concentration. They will collect or otherwise access study data, enter and analyze it in SPSS or other computer package, and present the results in various formats. Prereq: SW 750.

#SW 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

SW 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (0-12)
May be repeated indefinitely. Prereq: Successful completion of qualifying exam.

SW 770 DOCTORAL RESEARCH I. (3)
This course focuses on the role of research in the profession, the logic of research, the major strategies and techniques for conducting research in social work settings, and preparation of a research proposal. This is the first of a two-course sequence with a primary focus on quantitative methods. Prereq: Admission into the Social Work doctoral program.

SW 771 DOCTORAL RESEARCH II. (3)
In this second of two required research methods courses, students will conduct and report on the quantitative research project proposed in the first semester. They will also conduct a meta-analysis, test a research instrument's reliability and validity, conduct an exercise using qualitative methodology, and explore large public databases. Prereq: SW 770.

SW 773 DOCTORAL STATISTICS II. (3)
This social work course aims to help students understand and apply multivariate techniques in the fields of social welfare and social work research. Topics covered will include multivariate regression, factor analysis, path analysis, event history analysis, as well as logit and probit analysis. Prereq: STA 570 or other graduate level statistics course.

SW 774 MENTAL HEALTH RESEARCH METHODS. (3)
This course will explore the principles and procedures that govern mental health research by examining the different ways researchers study mental health phenomenon. In this course, students will learn the skills to engage in the scientific investigation of significant mental health problems, and dissemination strategies utilized to transfer empirical findings into mental health practice and policy development. This course emphasizes aspects of methodological design essential for conducting meta-analysis, treatment, prevention and epidemiological research that may be outside the scope of a general research course. Prereq: SW 770 and SW 771 (SW 771 may be taken concurrently).

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 or consent of the program director.

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. Prereq: Admission to the doctoral program.

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: Admission to the doctoral program and 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.

SW 790 SEMINAR IN TEACHING AND LEARNING. (3)
Students will facilitate seminar sessions drawing upon educational theory and relevant literature, create syllabi, observe each other teaching, and develop papers elucidating their grading practices and philosophy of teaching. Prereq: Admission into the doctoral program or consent of instructor.

SW 795 ADVANCED DOCTORAL SEMINAR IN SOCIAL WORK (SUBTITLE REQUIRED). (3)
Topics of current importance in Social Work research and practice, including philosophical, theoretical, ethical, and technical considerations. May be repeated to a maximum of twelve credits under different subtitles. Prereq: Admission to the joint Ph.D. program.

TA Theatre

TA 100 THEATRE ROUNDTABLE. (0)
Discussion of issues and topics relative to the theatre profession and the university theatre in particular. Majors are required to enroll a minimum of four semesters. Pass/fail only. May be repeated to a maximum of eight times.

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 I: FUNDAMENTALS OF ACTING. (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 150 FUNDAMENTALS OF DESIGN AND 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 ACTING II: SCENE STUDY (REALISM). (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 ACTING III: SCENE STUDY (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 265 COSTUME CONSTRUCTION. (3)
A study of the principles and techniques of costume construction. Lecture, one hour; laboratory, three hours per week. Prereq: TA 150.

TA 267 LIGHTING AND SOUND TECHNOLOGY. (3)
An introduction to lighting and sound practice in today's theatre. Lighting topics include use and maintenance of lighting equipment, photometrics, basic theatrical wiring and modern theatre systems. Sound topics include use of sound equipment for enhancement and reinforcement of theatrical productions and basic sound editing. Lecture, three hours; laboratory, two hours per week.

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 280 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 310 AUDITION TECHNIQUES. (3)
This class will provide actors with practical information on the "business" of acting. It will address networking strategies, interviewing tactics, headshots, resumes, and representations. Each student will prepare a personal repertoire of audition material. Lecture, two hours; laboratory, two hours per week. May be repeated to a maximum of nine hours. Prereq: TA 226 and TA 227.

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 325 TOPICS IN MOVEMENT. (3)
The study, practice, and principles of various theatre movement techniques, including Period Movement, Musical Theatre Dance, and other dance styles applicable to theatre. Lecture, one hour; laboratory, five hours per week. May be repeated to a maximum of six credits. Prereq: TA 320.

TA 326 ACTING IV: CLASSICAL STYLES. (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-Classic, Restoration, Eighteenth and Nineteenth Centuries. Lecture, two hours; laboratory, four hours per week. Prereq: TA 226, B.F.A. candidate (acting concentration) or consent of instructor.

TA 327 ACTING V: EUROPEAN REALISM. (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. Lecture, two hours; laboratory, four hours per week. Prereq: TA 326, B.F.A. candidate (acting concentration) or consent of instructor.

TA 330 THEATRE DIRECTING I. (3)
Discussion and practice of the director's basic techniques, methods and responsibilities. Study of movement, interpretation of line, use of stage areas, use of levels, script analysis, and understanding dramatic action. Lecture, two hours; laboratory, two hours per week. Prereq: Major or consent of instructor.

TA 345 RENDERING. (3)
A studio course to develop or improve rendering skills with relation to theatrical design. Rendering for scenery, costume, and lighting design are explored. May be repeated to a maximum of 6 hours. Lecture, one hour; studio, four hours per week. Prereq: A-S 102 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 365 COSTUME DESIGN. (3)
A lecture/studio course to teach basic skills in costume design through analysis, collaboration, research, and rendering. Lecture, one hour; studio, four hours per week. Prereq: TA 150.

TA 367 LIGHTING DESIGN. (3)
Theory, practice and design of lighting for the theatre. Examination of the practical and aesthetic requirements of lighting through research and analysis. Application of theory to light in a variety of contexts including theatre, opera, musicals and concerts. Lecture, three hours; laboratory, three hours per week. Prereq: TA 150, TA 267, 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 382 AMERICAN THEATRE (SUBTITLE REQUIRED). (3)
Subtitle required. This course investigates a specific topic in American theatre history as specified by a different subtitle. May be repeated up to six hours when identified by a different subtitle.

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 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 430 THEATRE DIRECTING II. (3)
An extension of TA 330 with an emphasis on analysis and practice. Lecture, two hours; laboratory, two hours per week. Prereq: TA 330 or consent of instructor.

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 III. (3)
Analysis and direction of the characteristics of genre and styles. Intensive application of techniques studied in TA 430. Lecture, two hours; laboratory, two hours per week. Prereq: TA 430 or consent of instructor.

TA 570 ADVANCED STUDIO IN DESIGN AND TECHNOLOGY. (3)
A continuation of course work in a student's chosen area of design and production (scenery, costumes, or lighting). The first half of the course will focus on design, and the second half on the production of design. Lecture, one hour; studio, four hours per week. May be repeated to a maximum of six credits. Prereq: TA 260, TA 265, TA 267, and one of the following: TA 365, TA 367, or TA 374; senior standing.

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 600 ADVANCED STUDIES IN SCRIPT ANALYSIS. (3)
An advanced study of dramatic literature in its context as a basis for theatrical production. Textual interpretation is considered from the viewpoint of all members of the artistic team. The course requires practical application of analytical theories. Prereq: Graduate standing.

TA 610 CRITICAL THEORIES AND PERFORMANCE. (3)
This class introduces students to critical theories of performance and production and to the various issues raised by the professional production of selected plays. May be repeated to a maximum of six credits.

TA 620 APPLIED RESEARCH IN THEATRE (SUBTITLE REQUIRED). (3)
This course focuses on the application of performance/production research to the actual production of a dramatic text. Students will investigate the work of a selected writer, examine critical and historical materials relative to that writer, and then apply this research to the production of one play. The play will be produced as a part of the department's Studio Season. May be repeated to a maximum of six credits.

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 630 DRAMATURGY. (3)
Study of conceptual collaboration while working within the production environment. Prereq: TA 600.

TA 650 TOPICS IN AMERICAN THEATRE (SUBTITLE REQUIRED). (3)
Selected topics in contemporary and historical American Theatre. May be repeated to a maximum of six credits.

TA 660 ADVANCED STUDIES IN DESIGN/TECHNOLOGY: (SUBTITLE REQUIRED). (3)
Advanced problems in design and technology. Subtitle required. Course may be repeated to a maximum of twelve hours when identified under different subtitles. Prereq: Graduate standing in Theatre.

TA 690 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 691 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 692 DIRECTING/DRAMATURGY PRACTICUM. (1-3)
The practice of directing or acting as dramaturg for a selected play script through rehearsal and performance phases. May repeat once to a maximum of six credits. Prereq: TA 730, consent of instructor and filing of prospectus.

TA 725 SPECIAL PROBLEMS IN ACTING: (SUBTITLE REQUIRED). (3)
Advanced practice and research in acting theory and technique for the director or dramaturg. May be repeated to a maximum of 6 credits when identified by a different subtitle. Lecture: 3 hours; laboratory: 2 hours per week. Prereq: Graduate Standing in Theatre.

TA 730 ADVANCED STUDIES IN DIRECTING: (SUBTITLE REQUIRED). (3)
Seminar and research in the aesthetics, history, style, and directional techniques required for theatrical production. May be repeated to a maximum of 6 credits when identified by a different subtitle. Lecture: 3 hours; laboratory: 2 hours per week. Prereq: TA 600.

TA 739 INTERNSHIP IN THEATRE. (3-6)
A field based learning experience in the student's area of expertise conducted at a nationally recognized theatre venue. The internship appointment is secured by the student with the consent and supervision of a faculty advisor. May be repeated to a maximum of 12 hours. Prereq: Completion of course requirements in Ph.D. program, consent of instructor, and filing of prospectus.

TA 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.

TA 749 DISSERTATION RESEARCH. (0)
Half-time to full-time work on dissertation. May be repeated to a maximum of 6 semesters. Prereq: Registration for 2 full-time semesters of TA 769 following successful completion of qualifying examination.

TA 760 THEATRE PRACTICE: EFFECTIVE ARTISTIC COMMUNICATION. (3)
This course is designed to foster collaboration among members of the artistic team, examine each member's role, and develop communication skills through practical application. Prereq: Graduate standing in Theatre.

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

TA 769 RESIDENCE CREDIT. (0-12)
Residence Credit for the Doctoral Degree. May be repeated indefinitely.

TA 770 SEMINAR IN THEATRE: (SUBTITLE REQUIRED). (3)
Intensive study in a designated area of theatre. Subtitle required. May be repeated to a maximum of nine hours when identified under different subtitles. Prereq: Graduate standing in Theatre.

TA 771 ADVANCED STUDIES IN THEATRE HISTORY: (SUBTITLE REQUIRED). (3)
Seminar designed to provide extensive reading and research over historical issues relating to dramatic literature and theatre practices of a designated period. May be repeated to a maximum of six credits when identified by different subtitles. Prereq: Graduate Standing in Theatre.

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.

TA 790 RESEARCH SYMPOSIUM. (0-1)
This course is a forum for doctoral students to present current research projects. Students in the M.A. program may register for 0 credit. May be repeated to a maximum of three credits. Prereq: Graduate Standing in Theatre.

TEL Telecommunications

TEL 101 TELECOMMUNICATIONS I: MASS COMMUNICATION SYSTEMS. (3)
An overview of electronic technologies used for mass communication, emphasizing their historical development and interrelationships with economics, policy, and society. These include one-way media such as broadcast radio, television, and cable, as well as newer technologies such as wireless cable, HDTV, and other multi-channel video systems. The convergence of technologies is addressed in the treatment of two-way systems now being used for mass communication, including the Internet, World Wide Web, and other interactive communication systems.

TEL 201 TELECOMMUNICATIONS II: INTERACTIVE COMMUNICATION SYSTEMS. (3)
An overview of electronic technologies used primarily for personal communication, emphasizing their historical development and interrelationships with economics, policy, and society. These include telephony, voice mail, and teleconferencing technologies, as well as electronic mail and other text-, voice-, and video-based communication systems. The convergence of technologies is addressed in the treatment of two-way systems now being used for mass communication, including the Internet and the World Wide Web.

TEL 300 TELECOMMUNICATIONS RESEARCH METHODS. (3)
An introduction to quantitative and qualitative social science research relating to telecommunications, including survey and experimental methods. Prereq: Telecom major status.

TEL 310 TELECOMMUNICATIONS POLICY AND REGULATION. (3)
A study of policy and regulation of telecommunications in the U.S., primarily broadcasting, cable, telephony, and the Internet. This includes traditional issues in the regulation of content, such as freedom of speech, copyright, obscenity, and privacy. It also includes traditional areas in the regulation of the industry structure including monopolies, licensing, cross ownership rules, mergers, and illegal practices. Prereq: Telecom major status.

TEL 312 VIDEO PRODUCTION I. (3)
An introduction to the fundamentals of studio 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: Telecom major status or consent of instructor.

***TEL 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: JOU 101, TEL 101, or ISC 161. (Same as ISC/JOU 319.)

†TEL 320 TELECOMMUNICATIONS PROGRAM ANALYSIS.

TEL 322 MULTIMEDIA I. (3)
Introduction to techniques of multimedia production and the basic principles of communication via multimedia. Practical, hands-on experience with various media used in computer-based multimedia including: text, still graphics, motion graphics, animation, sound, and hyperlinking. Includes stand-alone computer- and Web-based applications. Lecture, two hours; laboratory, two hours per week. Prereq: Telecom major status or consent of instructor.

TEL 355 COMMUNICATION AND INFORMATION SYSTEMS IN ORGANIZATIONS. (3)
An examination of the role of a variety of communication and information systems used in organizations. This includes the study of communication processes across a variety of systems, including the telephone, e-mail, voice mail, and audio- and video-conferencing. It also includes an examination of the uses for a variety of information systems and technologies, including computer networks, integrated voice response systems, computer-telephony integration, call centers, automated attendants, voice recognition, and synthesis, database management systems, and a variety of additional hardware and software tools used in business today. Prereq: Telecom major status or consent of instructor.

***TEL 390 SPECIAL TOPICS IN TELECOMMUNICATIONS PRODUCTION (SUBTITLE REQUIRED). (3)**
Course will focus on selected topics in the practice and theory of electronic media production. Course will be offered on demand. May be repeated to a maximum of six credits under a different subtitle. Prereq: Consent of instructor.

TEL 412 VIDEO PRODUCTION II. (3)
A follow-up to TEL 312, this course is an advanced video production course focusing on electronic field production (EFP). This course features technical and creative aspects of directing, camera work, editing, and lighting. Lecture, three hours; laboratory, one hour per week. Prereq: TEL 312 or consent of instructor.

TEL 420 ELECTRONIC MEDIA 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: Telecom major status or consent of instructor.

TEL 432 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: Telecom major status or consent of instructor.

†TEL 453 MASS COMMUNICATION AND SOCIAL ISSUES.

TEL 482 ELECTRONIC MEDIA SALES MANAGEMENT. (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: Telecom major status or consent of instructor.

TEL 504 MEDIA ORGANIZATIONS. (3)
An examination of the structure of video entertainment and on-line communications organizations and industries. Includes the organization and management of various types of telecommunications properties, as well as their traditional and new competitors. Prereq: Telecom major status or consent of instructor.

TEL 510 MEDIA ECONOMICS. (3)
Exploration of the economics of information industries, with particular attention to the special characteristics of information, the economic behavior of communications channels, and the role of information in decision making, the economy, organizational behavior, and other domains. Prereq: TEL 300, TEL 310; or consent of instructor.

TEL 520 SOCIAL EFFECTS OF THE MASS MEDIA. (3)
An examination of the political, social, cultural and behavioral effects of telecommunications systems in American society. Focus on theory and empirical research generated since 1940. Prereq: TEL 300 or consent of instructor.

TEL 530 PRO-SEMINAR IN TELECOMMUNICATIONS. (3)
Discussion and reports on current trends in telecommunications industries and the behavioral, political and regulatory implications attending such trends. Prereq: Consent of instructor.

TEL 555 CYBERSPACE AND COMMUNICATION. (3)
An examination of the political, social, and behavioral effects of on-line communication systems, including systems for various forms of personal communication, information retrieval, transaction processing, monitoring, and other purposes. Lecture, three hours; laboratory, one hour per week. Prereq: TEL 300 or consent of instructor.

***TEL 590 SPECIAL TOPICS IN MEDIA STUDIES (SUBTITLE REQUIRED). (3)**
Course will focus on a single topical issue in the theory, research, and criticism of electronic media. Course will be offered on demand. May be repeated to a maximum of six credits under a different subtitle. Prereq: Consent of instructor.

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 BIOCHEMICAL AND ENVIRONMENTAL 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 560 ENVIRONMENTAL PHYSIOLOGY AND TOXICOLOGY. (4)
Emphasis will be placed on the physiological and toxicological effects of chemicals on natural biota, including considerations at cellular, organismal, population, and community levels. This will include assimilation and metabolism of pollutants by animal species, with emphasis upon biochemical and physiological mechanisms involved in stress-induced responses and stress reduction. Additional areas of concern will include the transport, fate, and effects of chemical stressors on structure and function of biotic communities and will include introductions to ecotoxicology and environmental regulatory strategies. Lecture, three hours; recitation, two hours per week. Prereq: BIO 350 or PGY 502 or equivalent or consent of instructor. (Same as BIO 560.)

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 649 ADVANCED MOLECULAR PHARMACOLOGY. (2)
This course will provide in-depth coverage of the molecular pharmacology of growth factors, transcription factors, receptors, and ion channels. Emphasis will be placed on both the normal functions of these cell-signaling molecules and perturbations that result in several prevalent human diseases, including cancer, Alzheimer's, diabetes, osteoporosis, and inherited human illnesses. Students will be introduced to experimental approaches to diagnosing and treating these illnesses in the light of our evolving knowledge of molecular pharmacology. Prereq: IBS 601-606 or consent of instructor. (Same as PHA/PHR 649.)

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 MOLECULAR MECHANISMS IN 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 690 PRACTICAL ANALYTICAL TOXICOLOGY. (3)
An evaluation of techniques for the isolation, identification, and quantitation of drugs, pesticides and other toxicants in biological samples. Concepts and theory will be presented in the lecture portion, while the laboratory will be devoted to actual sample analysis by the students. Lecture, 1 hour; laboratory, six hours. Prereq: Consent of the instructor and graduate standing in toxicology. (Same as VS 690.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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

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. (1-3)
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. Sections offered for three credits will devote approximately half the classroom hours to career planning and to the choice of a major. Offered on a pass/fail basis only. Lecture hours will be determined by the instructor, depending on the content of the course.

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.

USP University Studies Program

USP 100-109 NATURAL SCIENCES (SUBTITLE REQUIRED). (3)
An introductory course of an interdisciplinary, topical, or experimental nature which may be used toward partial fulfillment of the natural science requirement in the University Studies Program. Each proposal must include the discipline in which the course is being offered and the options available to the student to complete the USP natural science requirement. Each proposal must be approved by the Dean of Undergraduate Studies.

USP 110-119 SOCIAL SCIENCES (SUBTITLE REQUIRED). (3)
An introductory course of an interdisciplinary, topical, or experimental nature which may be used toward partial fulfillment of the social science requirement in the University Studies Program. Each proposal must include the discipline in which the course is being offered and the options available to the student to complete the USP social science requirement. Each proposal must be approved by the Dean of Undergraduate Studies.

USP 120-149 HUMANITIES (SUBTITLE REQUIRED). (3)
An introductory course of an interdisciplinary, topical, or experimental nature which may be used toward partial fulfillment of the humanities requirement in the University Studies Program. Each proposal must include the discipline in which the course is being offered and the options available to the student to complete the USP humanities requirement. Each proposal must be approved by the Dean of Undergraduate Studies.

VS Veterinary Science

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 690 PRACTICAL ANALYTICAL TOXICOLOGY. (3)
An evaluation of techniques for the isolation, identification, and quantitation of drugs, pesticides and other toxicants in biological samples. Concepts and theory will be presented in the lecture portion, while the laboratory will be devoted to actual sample analysis by the students. Lecture, 1 hour; laboratory, six hours. Prereq: Consent of the instructor and graduate standing in toxicology. (Same as TOX 690.)

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 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

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 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. (Same as BIO 782.)

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.