Southern Illinois University Edwardsville
Graduate Catalog
2009 – 2010

GRADUATE COURSES Chapter 3

ACCOUNTING (ACCT)

401-3 ADVANCED FINANCIAL ACCOUNTING. Accounting principles; procedures related to special entities including governmental units, partnerships, and multi-corporate entities; foreign transactions; primary emphasis on business combinations and consolidated financial statements. Prerequisites: ACCT 302 and good standing in accountancy program, or consent of program director.

431-3 PRINCIPLES OF AUDITING. Auditor's decision process, understanding client's business, development of working papers, audit tests, statistical sampling applications, EDP systems, preparation of audit report, current pronouncements. Prerequisites: ACCT 302; 315; good standing in accountancy program, or consent of program director.

490-1 to 6 INDEPENDENT STUDY IN ACCOUNTING. Topical areas in greater depth than regularly titled courses permit, individual or small group readings, or research projects. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: consent of instructor and department chairperson; good standing in accountancy program.

510-3 ACCOUNTING AND ITS ENVIRONMENT. Discussion of international and domestic environment, politics of accounting and regulation, ethics, tax policy, institutional interrelationships, basic research techniques. Prerequisite: full admission to MSA program.

524-3 ACCOUNTING FOR MBA'S. Understanding and analysis of financial and managerial accounting information to enable internal/external users to make informaed business decisions. Prerequisite: ACCT 200 or equivalent.

531-3 SEMINAR IN FINANCIAL ACCOUNTING THEORY. Theoretical examination of measurement and reporting issues related to external financial reporting. Prerequisites: admission to any graduate program in business; completion of ACCT 303 or equivalent.

541-3 SEMINAR IN ADVANCED MANAGEMENT ACCOUNTING. Practical and theoretical aspects of management decision-making and related information needs. Examination of quantitative and behavioral issues and approaches, and review of current literature. Prerequisites: admission to any graduate program in business; completion of ACCT 312 or equivalent.

550-3 TAX RESEARCH. Advanced study in tax research. Analyze and discover solutions and alternatives to tax problems and refine technical problem-solving and communication skills. Prerequisites: admission to any graduate program in business; completion of ACCT 321 or equivalent.

553-3 TAXATION OF FLOW-THROUGH ENTITIES. Federal income taxation of flow-through entities: partnerships, S Corporations, and Limited Liability Corporations. Prerequisites: admission to any graduate program in business; completion of ACCT 321 or equivalent.

556-3 PERSONAL TAX PLANNING. Concepts and statutory, regulatory, and judicial rules relating to transfer taxes and income taxes as they affect family tax planning. Non-tax aspects of transactions also will be examined. Prerequisites: admission to any graduate program in business; completion of ACCT 321 or equivalent.

557-3 CORPORATE TAXATION. Topics include the policy motivations, technical rules, and management decision-making implications of the federal income taxation of corporations and their shareholders. Prerequisites: admission to any graduate program in business; completion of ACCT 321 or equivalent.

561-3 SEMINAR IN ADVANCED AUDITING TOPICS. Role, environment, and philosophy of auditing; legal, ethical, and moral issues. Problems of audit planning; sampling and testing considerations. Examination of audit research. Prerequisites: admission to any graduate program in business; completion of ACCT 431 or equivalent.

565-3 INTERNAL AUDITING. Nature of internal auditing; operational auditing. Prerequisites: admission to any graduate program in business; completion of ACCT 431 or equivalent.

567-3 IT AUDITING. Risk assessment and assurance methods used in an IT environment. Prerequisites: admission to any graduate program in business; completion of ACCT 431 or equivalent.

580-3 RESEARCH IN ACCOUNTING. Examination of accounting research methodologies and issues. Completion of a major individual research project resulting in a written report. Prerequisites: ACCT 510; 531 or 541 or 561; good standing in MSA program; at least 15 hours of MSA credit completed.

597-1 to 3 INDEPENDENT STUDY IN ACCOUNTING. Topics in greater depth than regularly titled courses permit; individuals or small groups may work with assigned faculty. May be repeated to a maximum of 3 hours. Prerequisites: ACCT 510; consent of instructor and department chairperson.

ADULT EDUCATION (ADED)

522-3 PROGRAM PLANNING IN ADULT AND CONTINUING EDUCATION. Design and evaluation of educational programs; emphasizes needs assessment, planning techniques, and evaluation procedures.

523-3 CURRICULUM AND INSTRUCTION IN ADULT AND CONTINUING EDUCATION. Process of designing and conducting learning activities and instruction strategies as they relate to specific curriculum models.

523-3 CURRICULUM AND INSTRUCTION IN ADULT AND CONTINUING EDUCATION. Process of designing and conducting learning activities and instruction strategies as they relate to specific curriculum models.

575-1 to 3 INDIVIDUAL RESEARCH IN ADULT AND CONTINUING EDUCATION. Selection, investigation, and writing of research topic under supervision of faculty member. May be repeated to a maximum of 3 hours. Prerequisite: consent of instructor.

ANTHROPOLOGY (ANTH)

404-3 ANTHROPOLOGY AND THE ARTS. Analyzes a variety of Western and non-Western material and visual art forms; interpretation focuses on form, process, meaning, function and value. Prerequisite: ANTH 111 or consent of instructor.

410-3 ANTHROPOLOGY OF RELIGION. Anthropological approaches to religion; cross-cultural examination of cosmology, myth, deities, ritual, ritual practitioners, religious transformation, sacred art and altered states of consciousness. Prerequisite: ANTH 111 or junior standing.

420-3 MUSEUM ANTHROPOLOGY. Examines historical development, theoretical approaches, contemporary issues, and hands-on methods of analysis in museological approaches to anthropology's four fields. Prerequisite: consent of instructor.

435-3 AMERICAN MATERIAL CULTURE. Theories and methods of interpretation applied and museum sites that express historic and contemporary American culture, including American ethnic groups. Prerequisite: ANTH 111 or consent of instructor.

475-3 ARCHAEOLOGICAL FIELD SCHOOL II. Students engage in original archaeological research directed by instructor. Methods of archaeological survey and excavation, learned through active participation in archaeological field and lab work. Prerequisites: ANTH 375 and consent of instructor.

586-3 to 6 ADVANCED READING IN ANTHROPOLOGY. Guided readings allowing exploration of interest areas and permitting elimination of special gaps in a student's background in a specific area. May be repeated to a maximum of 6 hours. Prerequisite: graduate standing or consent of instructor.

ART AND DESIGN (ART)

401-3 to 6 RESEARCH IN PAINTING. Advanced problems in painting. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

402-3 to 6 RESEARCH IN SCULPTURE. Exploration of current trends in sculpture making, with emphasis on interaction of technique and idea. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

405-3 SEMINAR. Preparation for career as studio artist and/or artist-teacher at college level. Career analysis, portfolio presentation for graduate school and galleries. Visiting professional lecturers in art and law; grant writing; gallery relations; artists' careers; etc. Prerequisite: junior or senior standing, BA, BFA, or MFA.

408a-c-3 ART EDUCATION FOR ELEMENTARY TEACHERS. (a) Art education for disabled students; (b) Development of motivational and instructional materials; (c) Advanced materials and methods for classroom teachers. Prerequisite: graduate standing or consent of instructor.

410-2 to 6 RESEARCH IN PRINTMAKING. Advanced work in traditional or experimental methods. Portfolio development. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

412-3 RESEARCH IN GRAPHIC DESIGN. Directed practicum in advanced client-based desktop design and publishing. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

413-3 DIGITAL ARTS. Exploration of computer-based image-capture and manipulation focusing on the integration of digital images with traditional studio arts and/or electronic media applications. May be repeated to a maximum of 9 hours. Prerequisite: ART 412 or equivalent or consent of instructor.

414-3 GRAPHIC DESIGN HISTORY THROUGH STUDIO PROJECTS. History of visual communication, including historic movements in Graphic Design, and Advertising. Coursework combines lecture materials, quizzes, readings and research into studio projects. Prerequisites: ART 202i and ART 225a or ART 225b.

415-3 VISUAL IDENTITY: LOGO AND BRANDING DESIGN. The application of advanced problem-solving skills with planning, organization and development of design strategies for logos and branding campaigns addressing institutional, corporate or service industries. Prerequisites: ART 202i, ART 311, and ART 312.

416-3 to 6 GLASSWORKING. Basic methods of forming hot and cold glass. Development of creative ideas related to use of glass as art medium. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

420-3 to 6 ADVANCED CERAMICS. Supervised research in specific ceramic areas of technical and aesthetic interests. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

422-3 RESEARCH IN PHOTOGRAPHY. Advanced theory and practice in one of several topics: alternative non-silver processes, large format camera/zone system, artificial lighting. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

423-3 ADVANCED PHOTOGRAPHY SEMINAR. Advanced seminar exploring personal portfolio development, contemporary theoretical and conceptual issues, as well as developing critical writing skills as they pertain to the photography medium. Prerequisite: ART 302a or ART 302b.

424a,b-3 BAROQUE AND ROCOCO ART. (a) Visual arts of Southern Europe during 17^{th} and 18^{th} centuries; (b) Visual arts of Northern Europe during 17^{th} and 18^{th} centuries. Prerequisite: graduate standing or consent of instructor.

430-3 to 6 STUDIES IN ART I. Advanced work in any studio area. May be repeated to a maximum of 12 hours. Students may enroll for no more than 3 hours per semester without written approval. Prerequisite: graduate standing or consent of instructor.

440-3 ILLUSTRATION. Techniques in the applied art of illustration using both traditional and contemporary techniques. Exploration of editorial, book, advertising, and institutional illustration. Prerequisites: ART 112 a-d; ART 202 d,e; ART 310; ART 311; ART 331.

441-3 to 6 STUDIO IN DRAWING. Advanced research drawing experiences, emphasizing individually realized content through development of compositions. May be repeated to a maximum of 12 hours. Prerequisite: senior or graduate standing (331-3) or consent of instructor.

447a,b-3 ANCIENT ART. Art and architecture from prehistory through Rome. (a) Prehistoric to Greek late archaic; (b) Greek high Classic to Rome. Prerequisite: graduate standing or consent of instructor.

448a,b-3 EARLY CHRISTIAN AND MEDIEVAL ART. (a) Early Christian, Byzantine, and Early Medieval art up to the 10th century; (b) Romanesque and Gothic art. Prerequisite: graduate standing or consent of instructor.

449a,b-3 RENAISSANCE ART. (a) Architecture, sculpture, and painting of the Renaissance and Mannerist periods in Northern Europe; (b) Architecture, sculpture, and

painting of the Renaissance and Mannerist periods in Italy and Southern Europe. Prerequisite: graduate standing or consent of instructor.

450-3 EARLY CHILDHOOD ART EDUCATION. Art education practices in early childhood art education. Methods and materials based on developmental needs. Prerequisite: graduate standing or consent of instructor.

452-3 ART EDUCATION FOR OLDER ADULTS. Physical, artistic, and creative development of older adults. Development of specific instructional approaches for older learners. Prerequisite: graduate standing or consent of instructor.

453-3 MUSEOLOGY. Museum ethics, collections policies, security, administration and organization, public law, sources of funding, grant preparation. Prerequisite: consent of instructor.

454-3 CURATORSHIP: EXHIBITION MANAGEMENT AND DESIGN. Exhibition design, preparation, labeling, security, hanging, display techniques and construction, lighting, traffic flow, docent training. Prerequisite: ART 453 or consent of instructor.

455-3 DOCUMENTATION OF COLLECTIONS. Accessioning and deaccessioning processes, research, collection management, use of computers, narrative, photo documentation. Prerequisite: ART 453 or consent of instructor.

468a,b-3 PRIMITIVE ART: THE AMERICAS. Indigenous art and architecture of the Americas, ancient to 19th century: (a) Precolumbian art; (b) North American Indian art. Prerequisite: consent of instructor.

469a,b-3 PRIMITIVE ART: AFRICA AND OCEANIA. Indigenous art and architecture of sub-Saharan Africa and of Oceania: Polynesia, Micronesia, and Melanesia: (a) Africa; (b) Oceania. Prerequisite: consent of instructor.

470-3 TOPICS IN ART HISTORY. May include: seminars on specific artist or area, investigations of branches of art historical inquiry, major trends and issues in art. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisites: 6 hours of art history; consent of instructor.

473a,b-3 WOMEN IN ART. (a) History of women artists from the Middle ages to World War II; (b) History of women artists from World War II to the present. Prerequisite: graduate standing or consent of instructor.

475-3 HISTORY OF PHOTOGRAPHY. Principle technical and stylistic developments in photography from the early 19th century to the present. Prerequisite: graduate standing or consent of instructor.

476-3 HISTORY OF MODERN ARCHITECTURE AND DESIGN. Principle technical and stylistic developments in architecture and design from the early 19th century to the present. Prerequisite: graduate standing or consent of instructor.

480-3 AMERICAN ART. Survey of the history of art in the U.S. from the colonial period to the present day. Prerequisite: graduate standing or consent of instructor.

481a,b-3 MODERN AND CONTEMPORARY ART. Principle movements and theories of 19th and 20th century art: (a) Modern art from 1800 to 1950; (b) Contemporary art from 1950 to the present. Prerequisite: graduate standing or consent of instructor.

483-3 RESEARCH IN ART HISTORY. Individual research in painting, sculpture, architecture, and related arts of various periods. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisite: graduate standing or consent of instructor.

484-3 to 6 RESEARCH IN FIBERS. Individual exploration of advanced fiber concerns in technique and mixed media approaches. Concepts emphasizing integration of technical and aesthetic idea. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

486-2 to 6 RESEARCH IN METALSMITHING. Concentrated research in advanced metalsmithing techniques and concepts. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

498-3 to 6 INTERNSHIP IN THE ARTS. Involvement in work, study, or research designed and supervised by selected faculty members and cooperating institutions. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing or consent of instructor.

501-2 to 6 GRADUATE PAINTING. Research in specialized areas of personal development of style and technique. May be repeated to a maximum of 12 hours. MFA candidates only. Prerequisite: ART 401 or concurrent enrollment.

502-2 to 6 GRADUATE SCULPTURE. Research in sculpture with emphasis on development of individual three-dimensional art-making styles and studio techniques. May be repeated to a maximum of 12 hours. MFA candidates only. Prerequisite: ART 402 or concurrent enrollment.

503-2 to 6 STUDIO IN PAINTING. Research in specialized areas of personal development of style and technique. May be repeated to a maximum of 18 hours. MFA candidates only. Prerequisite: ART 501 or concurrent enrollment.

504-2 to 6 STUDIO IN SCULPTURE. Research in sculpture with emphasis on development of individual three-dimensional art-making styles and studio techniques.

May be repeated to a maximum of 18 hours. MFA candidates only. Prerequisite: 502 or concurrent enrollment.

505-3 GRADUATE THEORY. Theoretical and critical issues in art and their relationship to student's personal work in the contemporary art world. This course may be repeated to a maximum of 6 hours. Prerequisite: 2nd or 3rd year graduate status.

511-2 to 6 GRADUATE PRINTMAKING. Development of individual form and technique. May be repeated to a maximum of 12 hours. MFA candidates only. Prerequisite: ART 410 or concurrent enrollment.

512-2 to 6 STUDIO IN PRINTMAKING. Continued development of individual form and technique leading towards thesis and graduate exhibition. May be repeated to 12 hours. MFA candidates only. Prerequisite: ART 511 or concurrent enrollment.

513-3 to 6 RESEARCH IN DIGITAL ARTS. Research in computer-based digital fine art techniques at the graduate level, and their application to traditional studio arts and/or electronic media. May be repeated to a maximum of 15 hours. Prerequisite: ART 413 or equivalent or consent of instructor.

514-3 to 6 ADVANCED GRAPHIC DESIGN. Research in computer-based techniques in graphic design at the graduate level in both traditional print media and newly emerging techniques in Internet home-page design. May be repeated to a maximum of 15 hours. Prerequisite: ART 412 or equivalent or consent of instructor.

520-2 to 6 GRADUATE CERAMICS I. Self-directed research in aesthetic and technological aspects of ceramics. Individual development of technique and form in clay. May be repeated to a maximum of 12 hours. MFA candidates only. Prerequisite: ART 420 or concurrent enrollment.

521-2 to 6 GRADUATE CERAMICS II. Self-directed research in aesthetic and technological aspects of ceramics. Individual development of technique and form in clay. May be repeated to a maximum of 18 hours. MFA candidates only. Prerequisite: ART 520 or concurrent enrollment.

522-3 to 6 GRADUATE PHOTOGRAPHY. Intensive study and exploration of photographic techniques, approaches, and aesthetics on the graduate level. May be repeated to a maximum of 18 hours. MFA candidates only. Prerequisite: ART 422 or concurrent enrollment.

523-3 GRADUATE RESEARCH PHOTOGRAPH. In depth study of historical and contemporary issues as they pertain to the photography medium. A wide range of theoretical and conceptual topics will be explored. May be repeated for a maximum of 12 hours as long as no topic is repeated. Prerequisite: ART 423 or concurrent enrollment.

530-2 to 6 STUDIES IN ART II. Advanced work in area of specialization or under supervision of two or more areas. May be repeated to a maximum of 9 hours. MFA candidates only. Prerequisite: consent of instructor(s).

541-2 to 6 GRADUATE DRAWING I. Intensive study with emphasis on concept development and symbolization. May be repeated to a maximum of 12 hours. MFA candidates only. Prerequisite: ART 441.

542-2 to 6 GRADUATE DRAWING II. Continued study with emphasis on various aspects of the medium. May be repeated to a maximum of 12 hours. MFA candidates only. Prerequisite: ART 541.

549-3 SPECIAL TOPICS IN ART THERAPY. Special topics of interest to art therapists. Approaches to therapy not covered in depth in other courses. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisites: ART 550; 552.

550-3 COUNSELING TECHNIQUES IN ART THERAPY. Theoretical foundations and professional skills for using art therapy and counseling techniques with variety of client populations. Practice of active listening, reflection, and empathic skills.

551-3 CREATIVE PROCESS. Creative tools and applications for professional and personal development to expand perception, innovative problem solving and ways of looking at one's creative work.

552-3 ASSESSMENT OF INDIVIDUALS AND FAMILIES. Assessment of individuals and families through standardized tests. Integration of evidence of developmental level, perceptual capacities, psychodynamic processes, and environmental stimuli through formal and informal measures. Prerequisites: graduate standing in art therapy counseling and consent of instructor.

553-3 ART THERAPY WITH CHILDREN AND ADOLESCENTS. Application of art therapy and counseling principles and practice for diverse child and adolescent populations. Development of appropriate interventions for varied DSM-IV diagnoses. Prerequisites: ART 550; 552.

554-3 ART THERAPY WITH ADULTS. Application of art therapy and counseling principles and practice for diverse adult populations. Development of appropriate interventions for varied DSM-IV diagnoses. Prerequisites: ART 550; 552.

555-3 ART THERAPY WITH GROUPS. Theory and application of art therapy techniques for groups in mental health facilities; emphasis on group techniques. Prerequisites: ART 550 and consent of instructor.

556-3 FAMILY ART THERAPY. Principles of family therapy theory; family art assessment and treatment using art therapy interventions. May be repeated to a maximum of 6 hours. Prerequisites: ART 550; 552.

557-3 DEVELOPMENTAL THEORY AND ART THERAPY. Developmental principles and intervention methods as related to object relations and art therapy viewpoint. Prerequisites: Graduate standing in Art Therapy Counseling.
558-3 to 9 INDEPENDENT STUDY IN ART THERAPY. Topical areas in greater depth than regularly titled courses permit. For advanced art therapy students. May be repeated to a maximum of 9 hours. Prerequisites: ART 550; 552.

559-1 to 6 PRACTICUM IN ART THERAPY. Supervised clinical experience with clients or patients in psychiatric, rehabilitation, and education settings with both children and adults; preparation, conferences, record keeping, staffing, supervision. May be repeated to a maximum of 12 hours. Prerequisites: ART 550; 552.

560-3 SEMINAR IN READINGS IN ART EDUCATION. Current issues and trends explored through periodicals, books, and research studies in art education. Prerequisite: baccalaureate degree in art education or art studio or consent of instructor.

561-3 MULTICULTURAL ISSUES IN ART THERAPY. Focus on multicultural issues in art therapy and explore ways for art therapists to work with a wide variety of populations. Prerequisite: graduate standing.

562-3 SEMINAR IN AESTHETIC EDUCATION. Concepts combining art history, art studio, art criticism, and aesthetics as related to teaching art and curriculum design K-12. Prerequisite: baccalaureate degree in art education or art studio.

563-3 TOPICS IN ART EDUCATION. Selected topics: gerontology, related and interdisciplinary arts, special education, art therapy, elementary and secondary school programs. May be repeated to a maximum of 12 hours. Prerequisite: baccalaureate degree in art education or art studio.

566-3 RESEARCH METHODOLOGY IN ART THERAPY. Research methods as applied in art education and art therapy; development of proposal for research project. Prerequisite: classified graduate student in Art Therapy or MS in Education/Art program.

567-3 INDEPENDENT STUDY IN ART EDUCATION. Topical areas in greater depth than regularly included in lecture courses. For advanced art education students. Prerequisite: classified graduate student in MS in Education/Art or consent of instructor.

570-3 RESEARCH IN ART HISTORY. Individual research in painting, sculpture, architecture, and related areas of various periods. May be repeated once for a total of 6 hours. Prerequisites: 9 hours of art history and/or consent of instructor.

571-3 READINGS IN ART HISTORY. Guided readings in painting, sculpture, architecture, and related areas of various periods. May be repeated once for a total of 6 hours. Prerequisites: 9 hours of art history and/or consent of instructor.

573-3 COUNSELING THEORY AND ART THERAPY. Intensive study of the basic theories and principles of counseling as applied in art therapy. Includes psychoanalytic, gestalt, existential, Adlerian, cognitive-behavioral, and brief, solution-focused approaches to therapy. Prerequisite: graduate standing.

574-3 CAREER COUNSELING. Lifelong processes and influences that lead to work values, occupational choice, decision-making styles, patterns of work adjustment, and creation of career plan. Prerequisite: graduate standing.

575-3 PROFESSIONAL ETHICS AND LEGAL ISSUES. Legal issues and responsibilities, professional development, and ethics in art therapy and counseling. Prerequisite: graduate standing.

580-3 MUSEUM STUDIES. (Same as HIST 580) History, theory, structure, organization of museums, planning and interpretation of exhibits, collections management, and ethical and legal concerns.

581-3 MANAGEMENT OF MUSEUM COLLECTIONS. Professional practices in museum collections management including ethical standards, statutory, regulatory, and judicial rules; risk management; conservation; development of integrated information systems. Prerequisite: ART/HIST 580.

582-3 PRACTICUM IN EXHIBITS AND PROGRAM DEVELOPMENT. (Same as HIST 582) Intensive, independent exhibition, educational project, or program related to museum studies. Prerequisites: ART/HIST 580; ART 581, or consent of instructor.

584-2 to 6 RESEARCH IN FIBER/FABRIC. Studio course allowing individual development in fibers/fabrics leading toward development of thesis problem. MFA candidates only. May be repeated to a maximum of 12 hours. Prerequisite: ART 484 or concurrent enrollment.

585-2 to 6 SEMINAR IN FIBER/FABRIC. Group and individual efforts contributing points of view relating to on- and off-loom weaving and textile concepts. Criticism directed toward thesis development. MFA candidates only. May be repeated to a maximum of 18 hours. Prerequisite: ART 584 or concurrent enrollment.

586-2 to 6 GRADUATE METALSMITHING I. Self-directed research in metalsmithing in aesthetic and technical development. Individual development of personal techniques and artistic concepts through metal. Prerequisite: ART 486.

587-2 to 6 GRADUATE METALSMITHING II. Self-directed research in metalsmithing in aesthetic and technical development. Individual development of personal techniques and artistic concepts through metal. Prerequisite: ART 586.

595-3 RESEARCH PROJECTS. Independent research study and seminar participation under graduate art therapy counseling faculty supervision. Prerequisites: graduate standing in Art Therapy; consent of instructor.

599a-3 THESIS. Preparation of thesis statement, bibliography, outline, and initial draft. Prerequisite: consent of graduate adviser.

599b-3 THESIS. Completion of thesis coordinated by candidate's thesis committee. Prerequisites: (MFA candidates) ART 599a and consent of graduate adviser; (MA candidates) consent of graduate adviser.

599c-3 EXHIBITION/THESIS. Exhibition preparation. MFA candidates only. Prerequisites: ART 599a or concurrent enrollment in ART 599b; consent of graduate adviser.

BIOLOGY (BIOL)

415a-3 TECHNIQUES IN CELL AND TISSUE CULTURE. Eukaryotic cell tissue culture; consideration of growth, differentiation, metabolism, and transformation of cells in culture. Theory, techniques of cell culture. One lecture and one laboratory per week. Prerequisites: BIOL 319; consent of instructor.

415b-3 LABORATORY IN CELL AND TISSUE CULTURE. Supervised exercises in techniques, growth, differentiation and metabolism of cells in culture. Prerequisite: BIOL 319.

417-4 QUANTITATIVE METHODS IN EXPERIMENTAL BIOLOGY. Selection and application of statistical techniques appropriate for biological data. Practical experience using spreadsheet and statistical software. Prerequisites: BIOL 120 and BIOL 121 with a grade of C or better or consent of instructor.

421-3 HUMAN GENETICS. Human Mendelian and chromosomal genetic disorders; human genome project; gene therapy; pedigrees, genetic inference and genetic counseling. Prerequisite: BIOL 220.

422a-3 POPULATION GENETICS. Unites the fields of molecular genetics and evolutionary biology to explore processes and mechanisms of evolutionary change; provide a theoretical basis for interpreting molecular variation. Prerequisite: BIOL 220 BIOL 319 and BIOL 327.

422b-1 POPULATION GENETICS LAB. Molecular and analytical techniques commonly employed in basic and applied fields of population genetics. Requires concurrent enrollment in BIOL 422a. Prerequisite: BIOL 220, BIOL 319, and BIOL 327.

425-3 DEVELOPMENTAL BIOLOGY. Embryonic and postembryonic developmental processes in animals. Topics include: fertilization, morphogenesis, pattern formation, and the cellular control of these events. Prerequisites: BIOL 220, BIOL 319.

431-3 CELLULAR AND MOLECULAR BASES OF MEDICINE. Causes, treatment, and detection of human diseases as studies from cellular and molecular levels. Prerequisites: BIOL 319; 430, or equivalent.

441-3 ADVANCED PHYSIOLOGY. Energy procurement and balance, intermediate metabolism, temperature control, advanced topics of cardiovascular and respiratory mechanisms, body fluid regulation, some environmental adaptations. Prerequisites: BIOL 340; CHEM 241.

465-4 AQUATIC ECOSYSTEMS. (Same as ENSC 465) Biogeochemistry and community structure of aquatic systems. Three lectures, one three-hour lab per week. Prerequisites: BIOL 121 and CHEM 121b with grades of C or better.

466-3 TERRESTRIAL ECOSYSTEMS. Energy flow and mineral cycling as they interact with community organization and other processes in terrestrial ecosystems. Three hours lecture per week. Prerequisite: BIOL 120 and BIOL 121 with a grade of C or better or consent of instructor.

468-3 POLLUTION ECOLOGY. Application of biological, ecological, chemical, and physical sciences to understanding the fate and transport of pollutants through ecosystems. Prerequisite: one year of college chemistry or consent of instructor.

470-4 FIELD BIOLOGY. Taxonomy, natural history, and distribution of plants or animals. Students collect from the field, identify, classify, and mount specimens. Two lectures and two laboratories per week. Fee required for field trips. Prerequisite: BIOL 121.

471-4 PLANT SYSTEMATICS. Examination of basic processes in vascular plant evolution. Local flora characteristics and identification. Three lectures and one two-hour lab per week. Prerequisites: BIOL 120; 121; 220; 319.

472-4 TOPICS IN PLANT PHYSIOLOGY. Topics include photosynthesis, mineral nutrition, and water as related to plants, growth and movement of plants. Two lectures and two laboratories per week. Prerequisite: one semester of botany or consent of instructor.

473-4 PLANT ANATOMY. Examination of plant cells, tissues, and morphology. Two lectures and two labs per week. Prerequisites: BIOL 121 with a grade of C or better, or consent of instructor.

474-4 PLANT TAXONOMY. A field-oriented course in which students collect and identify plant specimens using professional taxonomic keys. Prerequisite: BIOL 121 or consent of instructor.

480-3 ANIMAL BEHAVIOR. Examination of mechanisms, evolution, and ecological consequences of animal behavior. Concepts will be introduced through lectures, laboratory and field experiments, and independent projects. Prerequisites: BIOL 120, BIOL 121, and BIOL 220 with a grade of C or better, or consent of instructor.

488-4 MAMMALOGY. Morphology, systematics, natural history, taxonomy, evolution of living and fossil mammals. Two lectures and two laboratories per week. Prerequisites: BIOL 120; consent of instructor.

494-3 METHODS OF TEACHING BIOLOGY IN THE SECONDARY SCHOOL. Methods in biology secondary education. Planning and presenting lectures and laboratories, education software, pertinent teaching materials, and discussion of controversial topics in the classroom. Prerequisites: junior or senior standing, 2.5 G.P.A. in Biological Sciences and consent of instructor.

496-4 RAINFOREST SERVICE LEARNING FOR EDUCATORS. Service learning course for educators investigates sustainable development issues in rainforest preservation through study of culture, language ecology and geography. Prerequisite: consent of instructor.

514-3 MOLECULAR BIOLOGY LABORATORY. Enzyme activity measurements. Purification of biological molecules. Isolation of cell organelles. Centrifugation, chromatography, electrophoresis. Students will present reports written in style suitable for publication. Prerequisite: BIOL 319.

516-3 ENVIRONMENTAL IMPACT ANALYSIS. (Same as ENSC 516 and GEOG 524) Implications and applications of National Environmental Policy Act (NEPA) and related environmental legislation. Methodologies for environmental inventory and environmental impact statement preparation. Prerequisite: consent of instructor.

518a-3 RECOMBINANT DNA. Principles of gene cloning; methods of creating recombinant DNA molecules, transfer of genes into recipient cells, regulation following gene transfer. Term project required. Prerequisites: BIOL 220; 319.

518b-3 RECOMBINANT DNA LABORATORY. Experiments in gene manipulation using genes exempt from federal guidelines concerning Recombinant DNA. Six laboratory hours per week. Term project required. Prerequisite: BIOL 518a with a grade of C or better, or equivalent, or consent of instructor.

525L-1 ANALYSIS OF ENVIRONMENTAL CONTAMINANTS LABORATORY. Laboratory techniques used in the separation, detection identification, and quantitation of

contaminants in environmental and biological samples. Prerequisite: prior completion or concurrent enrollment in ENSC 525.

530a,b-6 (3,3) BIOCHEMISTRY AND MOLECULAR BIOLOGY. (a) Structures and functions of protein, carbohydrates and lipids; (b) control of metabolism, structures and functions of nucleic acids in the control of protein synthesis. Prerequisites: (a) CHEM 241a,b; (b) BIOL 530a.

532-5 ADVANCED CELL BIOLOGY. Analysis of advanced topics in cell biology. Emphasis on group laboratory projects with supporting lectures. Two lectures and two three-hour labs per week. Prerequisites: BIOL 120; 121; 220; 319; CHEM 241a,b; 245.

533-3 BIOMEMBRANES. Structural organization of biological membranes. Dynamic properties as studied by biophysical techniques. Selected topics of membrane functions related to structural organization. Prerequisites: BIOL 319; 332 or 430a,b or CHEM 241a,b or CHEM 451a,b (could be concurrent), or equivalent.

544-3 NEUROPHYSIOLOGY. Mechanisms of information processing and control of behavior. Membrane theory, synaptic pharmacology, neuroanatomy. Current mechanisms of learning, memory, drug actions, motor control. Term project required. Prerequisites: human or animal physiology; calculus or physics.

551-3 MICROBIAL PATHOGENESIS. Analysis of mechanisms of pathogenesis employed by bacteria, fungi, protozoans, and viruses. Transmission, invasion, colonization, virulence factors, pathology, epidemiology, treatment. Prerequisite: BIOL 350 or equivalent.

552-3 MOLECULAR GENETICS. Molecular basis of genetics in both prokaryotes and eukaryotes, including structure and replication of DNA; gene expression; transfer of genetic material between organisms. Prerequisite: BIOL 220 and 319.

555-3 VIROLOGY. Biochemical and physical structure of viruses and their mode of replication in infected cells, including latency and viral oncogenesis. Term project required. Prerequisites: BIOL 319; 332 or 430a, b or CHEM 241a, b or CHEM 451a, b (could be concurrent), or equivalent.

561-4 PLANTS AND ENVIRONMENT. Environmental effects on plant growth, reproduction, and distribution. Adaptive responses to environmental stress examined and measured. Three lecture/laboratories per week for 6 weeks. Course taught only in the summer. Prerequisites: BIOL 121 or consent of instructor.

562-3 BIOGEOGRAPHY. Concepts and principles relating to patterns of plant and animal distribution on local, continental, and worldwide basis. Speciation dispersal and variation. Term project required. Prerequisite: BIOL 365 or consent of instructor.

563-3 ANIMAL PHYSIOLOGICAL ECOLOGY. Examine how an organism's environment affects its physiology. Comparative approach will explore physiological adaptations to a variety of environmental factors. Prerequisite: graduate standing or permission of instructor.

564-3 APPLIED ECOLOGY. (Same as ENSC 550) Examination of the mechanisms, directions, and magnitude of an organism's or ecosystem's response to human perturbation. Prerequisite: BIOL 365 or consent of instructor.

567-3 ENVIRONMENTAL EDUCATION. (Same as ENSC 580) Environmental education history, practices, curriculum, organization, evaluation, project development and research required of successful practitioners in the field. Prerequisite: BIOL 120; 121, or consent of instructor.

569-4 ECOLOGY OF PLANTS. Plant adaptations; population and community ecology of plants; landscape ecology. Focuses on primary literature, scientific communication, data analysis, and natural history of plants. Prerequisites: BIOL 120, BIOL 121, BIOL 220, BIOL 365, or equivalent/consent instructor.

575-3 STATISTICS FOR ENVIRONMENTAL SCIENCES. (Same as ENSC 575) Characterization of the steps, processes, and statistical analysis necessary for a well-planned experiment. Theory and application of experimental design. Prerequisite: statistics through analysis of variance.

583a,b,c-4 (2,1,1) A) ENTOMOLOGY; B) INSECT MORPHOLOGY LABORATORY; C) INSECT COLLECTION LABORATORY. (a) Structure, function, development, evolution and ecology of insects; (b) Dissection of representatives of major insect orders, introduction to insect collecting; (c) Field collection, identification and pinning of insects. Prerequisites: (a) BIOL 120, 121; (b) required with (a); (c) optional concurrent enrollment in (a) or consent of instructor.

585-4 ICHTHYOLOGY. Relationships, ecology, distribution, behavior, and anatomy of fishes. Emphasis on local fauna. Two lectures and two laboratories per week. Saturday field trips required. Prerequisites: BIOL 120 and 121 or consent of instructor.

586-4 HERPETOLOGY. Living and fossil amphibians and reptiles, their evolution, relationships, morphology, and behavior. Two lectures and two laboratories per week. Saturday field trips required. Prerequisite: BIOL 120 or consent of instructor.

590-3 to 5 Topics in Biology. In-depth examination of an area of Biological Sciences. May be repeated to a maximum of 12 hours as long as no topic is repeated. Prerequisite: graduate standing.

591 -1 to 8 READINGS IN BIOLOGY. Supervised readings in specialized areas. May be repeated to a maximum of 8 hours. Prerequisite: consent of instructor.

592(a,b) (c,d)-1 GRADUATE COLLOQUIUM IN BIOLOGY. Participation in colloquium: Ecology, Evolution & Environment (a, Fall Semester; b, Spring Semester) or Cell & Molecular Biology (c, Fall Semester; d, Spring Semester). Students will give an oral research presentation and critique undergraduate senior assessment talks. May be repeated to a maximum of 2 hours. Prerequisite: consent of instructor.

593 -1 to 8 SPECIAL PROBLEMS IN BIOLOGY. Research on biological problems. May be repeated to a maximum of 8 hours. Prerequisite: consent of instructor.
595-2 TOPICS IN CELLULAR AND MOLECULAR BIOLOGY. Examination in depth of topics in cellular and molecular biology by means of seminars, discussions, readings, and papers. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

596-2 TOPICS IN ORGANISMIC BIOLOGY. Examination in depth of topics in organismic biology by means of seminars, discussions, readings, and papers. May be repeated to a maximum of 6 hours, provided no topic is repeated. Prerequisite: consent of instructor.

598 a,b-3,3 INTERNSHIP. Supervised work experience in research or business organization. Requires 150 hours of work time per 3 hours of credit. Written report required. Prerequisite: consent of graduate program director.

599-1 to 6 RESEARCH AND THESIS. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

CHEMISTRY (CHEM)

419-1 to 3 SPECIAL TOPICS IN INORGANIC CHEMISTRY. Selected advanced topics. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: CHEM 361a; consent of instructor.

431-3 INSTRUMENTAL ANALYSIS. Theory and methods of modern instrumental analytical techniques and instrumentation. Three lecture hours per week. Prerequisites: CHEM 361a; concurrent enrollment in CHEM 435.

435-1 INSTRUMENTAL ANALYSIS LABORATORY. Laboratory practice in spectroscopic and other instrumental techniques. One four-hour lab per week. Prerequisite: concurrent enrollment in CHEM 431.

439-1 to 3 SPECIAL TOPICS IN ANALYTICAL CHEMISTRY. Selected advanced topics. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: CHEM 331; 335; 361a; consent of instructor.

441-3 PHYSICAL ORGANIC CHEMISTRY. Chemical equilibria; kinetics; structure-reactivity relationships as methods for determining mechanisms of organic reactions. Prerequisites: CHEM 241b; 361a.

444-3 ORGANIC REACTIONS. Emphasis on monofunctional compounds and synthesis. Topics not covered in elementary courses. Prerequisite: CHEM 241b.

445-2 NMR OPERATION, EXPERIMENTAL DESIGN, AND ANALYSIS. Current practices in the operation, experimental design, and analysis of modern NMR spectroscopy. Prerequisites: CHEM 241b, CHEM 361a, consent of instructor.

446-1 ORGANIC SPECTRAL ANALYSIS. Use of modern spectral techniques to analyze the structure of organic compounds. Various types of spectroscopy (NMR, IR, UV-Vis, MS) along with computer techniques will be employed in a step-wise manner to identify compounds. Prerequisites: CHEM 241b, 361a, consent of instructor.

449-1 to 3 SPECIAL TOPICS IN ORGANIC CHEMISTRY. Selected advanced topics. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: CHEM 241b; 361a; consent of instructor.

451a,b-6 (3,3) BIOCHEMISTRY. Life processes at molecular level. (a) Enzymes and proteins; (b) Intermediary metabolism, transmission of hereditary information. Prerequisite: CHEM 241b.

455-2 EXPERIMENTAL METHODS IN BIOCHEMISTRY. Current practices in biochemistry. Microcomputer-assisted data treatment, graphics, statistical methods, and data acquisition. Two three-hour laboratory periods per week. Prerequisites: CHEM 245b; concurrent enrollment in CHEM 451a.

459-1 to 3 SPECIAL TOPICS IN BIOCHEMISTRY. Selected advanced topics. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: CHEM 361a; consent of instructor.

469-1 to 3 SPECIAL TOPICS IN PHYSICAL CHEMISTRY. Selected advanced topics. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: CHEM 361b; consent of instructor.

471-3 PRINCIPLES OF TOXICOLOGY. Chemical and Biological effects of toxic substances in living organisms at the molecular and cellular level. Topics: routes of entry, mechanism of action, effects, antidotes. Prerequisites: organic chemistry; graduate standing; or consent of instructor.

479-1 to 3 SPECIAL TOPICS IN ENVIRONMENTAL CHEMISTRY. Selected advanced topics. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: CHEM 241b; consent of instructor.

511-3 ADVANCED INORGANIC CHEMISTRY. Modern treatment of recent theoretical and experimental advances in interpretation of bonding and reactivity in inorganic compounds. Prerequisite: consent of instructor.

519-1 to 3 ADVANCED TOPICS IN INORGANIC CHEMISTRY. Topics selected by instructor (magnetic resonance, rare earths, inorganic reaction mechanisms, etc.). May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

531-3 ADVANCED ANALYTICAL CHEMISTRY. Phenomena utilized, acid-base equilibria, activity, nonaqueous solvents, multiple equilibria, complexation, precipitation, electrochemistry, and instrumental methods. Prerequisite: consent of instructor.

539-1 to 3 ADVANCED TOPICS IN ANALYTICAL CHEMISTRY. Topics selected by instructor (chelation, chromatography, electrochemistry and analytical spectroscopy, etc.). May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

541-3 ADVANCED ORGANIC CHEMISTRY. Covalent bonding, structure, stereochemistry, reactions, reaction mechanisms, substituent effects, correlation of physical and chemical properties, physical methods. Prerequisite: consent of instructor.

549-1 to 3 ADVANCED TOPICS IN ORGANIC CHEMISTRY. Topics selected by instructor (photochemistry, heterocyclic chemistry, steroid chemistry, etc.). May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

551-3 ADVANCED BIOCHEMISTRY. Modern treatment of biological chemistry including, but not limited to, three-dimensional structure of enzymes, mechanism of coenzymatic action, allosteric effects, physical methods for studying biological systems. Prerequisite: consent of instructor.

559-1 to 3 ADVANCED TOPICS IN BIOCHEMISTRY. Topics selected by instructor (enzymology, metabolism, nucleic acids, etc.). May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

561-3 ADVANCED PHYSICAL CHEMISTRY. Modern concepts and applications selected from thermodynamics, quantum chemistry, spectroscopy, kinetics, molecular modeling, and macromolecular perspective. Prerequisite: consent of instructor.

569-1 to 3 ADVANCED TOPICS IN PHYSICAL CHEMISTRY. Topics selected by instructor (molecular modeling, phase diagrams, surface chemistry, etc.). May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

575-1 GRADUATE SEMINAR. Two advanced level talks required by all graduate students. Attendance at seminar is required of all full time students. Must be taken twice for credit.

594-3 CHEMISTRY TEACHING METHODS FOR SECONDARY SCHOOL. Current teaching and resource materials. Ways to teach different chemical topics, problem solving techniques, and societal issues. Preparing for inquiry and laboratory activities. Safety concerns. Prerequisites: previous or concurrent enrollment in CI 315a; consent of instructor.

596-1 to 4 ADVANCED CHEMICAL PROBLEMS. Individual study of problem under direction of graduate faculty member. Should be completed in one or two semesters. May be repeated to a maximum of 4 hours. Prerequisite: consent of instructor.

597-1 to 9 CHEMICAL RESEARCH. Directed research on significant problem, normally to extend over more than two semesters. May be repeated without limit, but only 9 hours will be accepted toward minimum 30 required for MS degree. Prerequisite: consent of instructor.

599-1 to 6 THESIS. Directed research to satisfy thesis requirement for MS degree. Graduate Committee must approve topic and thesis adviser. May be repeated to a maximum of 6 hours. Prerequisite: consent of thesis adviser.

CIVIL ENGINEERING (CE)

435-3 PAVEMENT DESIGN. Analysis and design for highway and airports; factors affecting pavement performance and code requirements. Prerequisites: CE 330, 343, 354, or consent of instructor.

441-3 DESIGN OF TIMBER STRUCTURES. Design and analysis of timber structures and timber design code. Prerequisites: CE 343 or concurrent enrollment, or consent of instructor.

443-3 DESIGN OF MASONRY STRUCTURES. Design and analysis of masonry structures and masonry design codes. Prerequisites: CE 343, or concurrent enrollment, or consent of instructor.

445-3 ADVANCED STRUCTURAL ANALYSIS . Analysis of indeterminate two- and three-dimensional trusses and frames, with emphasis on matrix methods, computer techniques. Prerequisite: CE 343 or concurrent enrollment, or consent of instructor.

446-3 ADVANCED CONCRETE DESIGN. Advanced topics in reinforced concrete design, design of pre-stressed concrete beams, code design requirements. Prerequisites: CE 343, 445 or concurrent enrollment, or consent of instructor.

449-3 ADVANCED STEEL DESIGN. Plastic analysis of steel structures. LRFD design. Stability theory applied to structural design. Composite beams and columns. Introduction to seismic design. Code requirements. Prerequisites: CE 342, 445 or concurrent enrollment, or consent of instructor.

455-3 FOUNDATION DESIGN. Design of foundations, retaining walls, cofferdams, and earth embankments. Formulation of design problem statements and specifications. Estimates of bearing capacity, settlements, and slope stability values. Prerequisite: CE 354 or consent of instructor.

460-3 MUNICIPAL INFRASTRUCTURE DESIGN. Municipal infrastructure analysis and design; water distribution networks; wastewater collection; street systems; engineering processes of municipal designs. Prerequisites: CE 315, 376, or consent of instructor.

470-3 STRESS ANALYSIS AND DESIGN. Three-dimensional torsion and bending, stress and strain transformations, yield criteria and plasticity theory, finite element method, case studies and engineering design. Prerequisites: CE 242, ME 370 or equivalent.

473-3 TRANSPORTATION SITE SELECTION. Engineering techniques for transportation site selection, traffic facility capacity, geometric design criteria, traffic engineering controls, and constraints. Prerequisite: CE 376 or consent of instructor.

475-3 URBAN TRANSPORTATION. Covers the basis for transportation planning process, modeling transportation demand and supply, and transportation planning and evaluation for decision making.

476-3 TRAFFIC STUDIES. Acquisition, evaluation, statistical analysis and reporting of traffic engineering data used to design, evaluate and operate transportation systems. Prerequisite: CE 376 or graduate standing.

480-3 ENVIRONMENTAL ANALYSIS. Analytical methods for examining water and wastewater. Source of parameters, laboratory methods and limitations, data analysis, correlation of parameters with environmental effects. Lectures and laboratory. Prerequisites: CE 380, or consent of instructor.

486-3 WASTEWATER TREATMENT DESIGN. Design of wastewater treatment systems including preliminary, primary, and secondary treatment processes and biosolids treatment and disposal. Prerequisites: CE 380 or consent of instructor.

487-3 WATER TREATMENT DESIGN. Design of potable water treatment processes with emphasis on chemical and physical unit operations. Prerequisite: CE 380 or consent of instructor.

488-3 HAZARDOUS WASTE MANAGEMENT. Major aspects of managing hazardous waste including regulation, pollution prevention, treatment, disposal, spill clean up, and site remediation. Prerequisites: CE 380, or consent of instructor.

492-1 to 5 TOPICS IN CIVIL ENGINEERING. Selected topics of special interest. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

501-4 PROJECT MANAGEMENT. (Same as CNST 501) Application of technical principles to modern methods of construction, construction planning, scheduling by critical path method, contract documents, estimating and bidding, and construction materials. Prerequisite: graduate standing.

541-3 BRIDGE ENGINEERING. Major aspects of bridge engineering; analysis, design, detailing, and construction using the AASHTO LRFD Bridge Design Specifications. Prerequisites: CE 342, 343, 445, or consent of instructor.

545-3 STRUCTURAL DYNAMICS. Dynamic response of single and multi-degree of freedom structural systems. Mode superposition. Structural damping. Prerequisites: CE 342, 343, 445, or consent of instructor.

546-3 PLATES AND SHELLS. (Same as ME 546) Membrane theory of shells. Bending of shells and circular and rectangular plates. Indeterminate shell problems. Prerequisites: CE 445, ME 470, or consent of instructor.

547-3 ELASTIC STABILITY. (Same as ME 547) Elastic stability of columns and simple frames. Lateral and torsional buckling of beams. Buckling of plates. Design code considerations of buckling. Prerequisites: CE 445, ME 470, or consent of instructor.

548-3 FINITE ELEMENTS. (Same as ME 548) Rayleigh-Ritz method, piecewise approximation, nodal load calculations, derivation of two- and three-dimensional elements, bending elements. Finite element computer programs. Prerequisites: CE 445 or consent of instructor.

549-3 EARTHQUAKE ENGINEERING. Structural design and detailing for earthquake loads. Lateral load resistant systems. Building and bridge code requirements. Prerequisite: CE 342, 343, 445, 545, or consent of instructor.

574-3 TRANSPORTATION INFRASTRUCTURE SECURITY USING INTELLIGENT TRANSPORTATION SYSTEMS. Protection and recovery from security incidents using the integration outlined in the security areas of the National ITS Architecture and the capabilities of new technologies.

575-3 ADVANCED GEOMETRIC DESIGN OF HIGHWAYS. Proportioning of the physical element of the highways such as horizontal curves, vertical curves, land width, and cross section. Prerequisite: CE 376.

578-3 INTELLIGENT TRANSPORTATION SYSTEMS. ITS is the integrated application of traffic flow principles, advanced sensors, computers, electronics, and communication technologies to improve the safety and efficiency in transportation systems.

579-3 TRANSPORTATION SAFETY SYSTEMS. Implementation, operation and evaluation of transportation safety systems for highway and non-highway modes, crash analysis, remediation strategies, case studies. Prerequisite: CE 473 consent of instructor.

581-3 ADVANCED WASTEWATER TREATMENT. Theory and design of advanced wastewater treatment systems including natural treatment systems, nutrient removal, and other tertiary treatment processes. Prerequisite: CE 486 or consent of instructor.

582-3 WATER QUALITY AND TREATMENT. Study of water quality and advanced drinking water treatment processes, with an emphasis on rationale, fundamentals, and advanced technologies to remove special contaminants. Prerequisite: CE 487 or consent of instructor.

587-3 AIR POLLUTION CONTROL. Study of sources, effects, regulation, monitoring, and control of air pollution. Prerequisite: CE 380 or consent of instructor.

588-3 SOLID WASTE MANAGEMENT. Perspectives, engineering principles, and management issues governing solid waste management. Prerequisite: CE 380 or consent of instructor.

589-3 INDUSTRIAL MATERIALS AND WASTE. Management of hazardous industrial materials and wastes, including regulations, handling, minimization and prevention of waste generation, recycling/reuse, treatment, and disposal. Prerequisite: CE 380 or consent of instructor.

591-1 to 4 INDEPENDENT STUDY. Individual investigation of a topic in civil engineering to be agreed upon with the instructor. May be repeated for a maximum of 6 hours provided no topic is repeated. Prerequisites: consent of instructor and advisory committee.

592-1 to 5 TOPICS IN CIVIL ENGINEERING. Topic of special interest; course schedule will include name of topic. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: consent of instructor.

593-1 RESEARCH PAPER. Independent research for the non-thesis option final research paper.

596-3 SUSTAINABLE ENGINEERING. Concepts and principles of sustainable engineering for infrastructure design and their application to analyze the impact of

engineering design on resources consumption and the environment. Prerequisite: CE 380 or consent of instructor.

599-1 to 6 RESEARCH. Independent research at master's level. May be repeated to a maximum of 6 hours. Prerequisite: consent of advisory committee.

COMPUTER MANAGEMENT AND INFORMATION SYSTEMS (CMIS)

430-3 ADVANCED JAVA PROGRAMMING. Development of applications, applets, and advanced GUI, including advanced object-oriented programming in JAVA, multithreading, files, multimedia, database use, and networking concepts used for applications. Prerequisite: CMIS 230 with a grade of C or better.

460-3 ASP.NET PROGRAMMING.
Advanced event-driven programming, object-oriented programming techniques for on-line Web applications including Web database programming (ADO.NET), security, Web services, and application deployment. Prerequisite: CMIS 142.

462-3 UNIX AND SERVER SYSTEMS. UNIX and Windows server operating systems to include scripting language plus server software installation and configuration. Prerequisite: CMIS 310.

468-3 BUSINESS TELECOMMUNICATIONS. Concepts and terminology dealing with data communication and distributed systems with emphasis on business applications. Prerequisite: CMIS 310.

472-3 END USER SYSTEMS SUPPORT. Application of knowledge, skills, and abilities necessary in the user support industry to include software and hardware support related to small computer environments as a standalone or network setting. Prerequisite: CMIS 342.

520-3 MANAGING TECHNOLOGY. Application of systems models to improve manager's ability to identify, understand, control, evaluate, plan, acquire, and use technology. Prerequisite: CMIS 526.
526-3 INFORMATION SYSTEMS AND TECHNOLOGY. Information systems and state-of-the-art information technology with a middle-level managerial focus.

535-3 PROJECT MANAGEMENT STANDARD PROCESSES. A framework of standard processes based on the Project Management Body of Knowledge and other resources. Includes processes for managing scope, time, quality, cost, human resources, communications, risk, and procurement. Prerequisite: CMIS 540 or consent of instructor.

536-1.5 PROCUREMENT MANAGEMENT IN PROJECTS. Provides in-depth examination of the role of procurement management in projects. Develops understanding

of strategies for successful supplier evaluation, source selection, contract administration, and communication management. Prerequisite: student in MBA or M.S. CMIS program.

537-1.5 PROJECT RISK MANAGEMENT. Provides in-depth examination of risk management in projects. Develops knowledge of risk identification, risk analysis, risk response planning, risk control strategies, and the use of analytical tools for creating risk management plans. Prerequisite: MS 502 or equivalent.

540-3 PROJECT MANAGEMENT FUNDAMENTALS AND BEST PRACTICES. Theory and techniques for managing technology projects within constraints of time, resources, and functionality. Topics include project initiation, planning, executing, controlling, and closing. Prerequisite: admission into any graduate program in business.

557-3 ENTERPRISE RESOURCE PLANNING. The role of Enterprise Resource Planning (ERP) software in the e-Business environment will be explored using SAP. A risk management approach will be emphasized. Prerequisite: ACCT 501.

563-3 SQL-PL/SQL. Query language (SQL) and procedural language-SQL (PL/SQL). Database structures and storing, retrieving, and manipulating data in relational databases. Covers PL/SQL blocks of application code. Prerequisite: CMIS 526 consent of instructor.

564-3 DATABASE DESIGN. Enterprise-wide data modeling. Conceptual database design, entity-relationship, and object-oriented models. Physical database design, relational model, and normalization theory. Prerequisite: CMIS 526 consent of instructor.

565-3 ORACLE DATABASE ADMINISTRATION. Seminar in Oracle Database Administration including database creation, maintenance, backup, recovery, and user account administration. Prerequisite: CMIS 564.

570-3 SOFTWARE SYSTEMS DESIGN. Techniques and tools for information systems analysis and design. Process-oriented modeling and structured design concepts and techniques, re-engineering business processes, quality-assurance and reliability. Prerequisite: CMIS 526 instructor permission.

572-3 RAPID APPLICATION DEVELOPMENT AND PROTOTYPING. Combining software development methods, tools, and management techniques to achieve rapid application development. Emphasizes object oriented analysis and designs to achieve reuse of system components. Prerequisite: CMIS 570.

587- INFORMATION SYSTEMS INTERNSHIP. Industry internship requiring the application of information systems design, development, and/or technical support skills in a structured work environment. Prerequisite: consent of program director.

588-3 SEMINAR IN COMPUTER MANAGEMENT AND INFORMATION SYSTEMS. Current issues; content varies. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisite: consent of instructor.

589-1 FINAL EXAMINATION. Final master's examination assesses the ability to think critically, to apply knowledge gained through the program, to draw and defend conclusions, and to complete work in a creditable manner.

597-1 to 3 INDEPENDENT STUDY IN CMIS. Investigation of special topical area. May be repeated to a maximum of 3 hours. Prerequisite: consent of instructor and chairperson.

COMPUTER SCIENCE (CS)

407-3 ADA PROGRAMMING. Emphasis on features which make language unique, e.g. packages, exception handling, generics, tasking. Previous knowledge of ADA not required. Prerequisite: CS 340 or consent of instructor.

423-3 COMPILER CONSTRUCTION. Translation of programming languages. Emphasis on techniques used in construction of compilers including lexical analysis, syntactical analysis, type checking, code generation. Prerequisite: CS 330.

434-3 DATABASE MANAGEMENT SYSTEMS. Database management system concepts, models, and languages. Entity/relationship, relational, and object oriented data models; relational database design and implementation including SQL; object databases. Prerequisites: CS 240; 275.

438-3 ARTIFICIAL INTELLIGENCE. Principles and programming techniques of artificial intelligence. Intelligent agents, heuristic programming, knowledge representation, expert systems, machine learning. Prerequisite: CS 340.

447-3 NETWORKS AND DATA COMMUNICATIONS. Concepts of networks and data communications. Networking protocols and architecture, data encoding and transmission, network management, and distributed applications. Prerequisites: CS 314 and CS 340.

454-3 THEORY OF COMPUTATION. Theoretical foundations of computer science, including theory of automata, pushdown automata, Turing machines, formal languages. Prerequisite: CS 340.

456-3 ADVANCED ALGORITHMS. Complex algorithms and data structures; basic complexity theory and approximation algorithms for NP- hard problems. Prerequisite: CS 340.

482-3 COMPUTER GRAPHICS. Study of 2D and 3D graphics, graphics hardware, scan conversion, antialiasing, hidden components, transformations, projections, ray tracing, curve and surface modeling, animation. Prerequisites: CS 240, CS 312, and Math 152, all with a minimum grade of C.

490-3 TOPICS IN COMPUTER SCIENCE. Selected topics in computer science. May be repeated once to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

495-3 INDEPENDENT STUDY. Reading and research in specific areas of computer science. May be repeated once to a maximum of 6 hours. Prerequisites: consent of instructor and department chairperson.

500-1 GRADUATE SEMINAR IN COMPUTER SCIENCE. Research topics of faculty; exploration of research facilities and resources; examination of plagiarism and academic integrity. Prerequisite: graduate standing.

501-3 INTENSIVE COMPUTER SCIENCE FUNDAMENTALS. An intensive examination of object oriented design, data structures, algorithm analysis, software engineering, and programming in preparation for graduate study in Computer Science.

514-3 OPERATING SYSTEMS. Concurrent programming; support for distributed systems including transaction processing systems; support for high-volume, high-availability applications; scalable programming; trends. Prerequisite: CS 314.

516-3 COMPUTER ARCHITECTURE. Instruction sets, instruction-level parallelism, memory systems, storage systems, I/O, multiprocessors and multicomputers, trends. Prerequisite: CS 314.

525-3 PRINCIPLES OF SIMULATION. Survey of systems modeling and simulation techniques, data generation and testing, construction of simulation models, Petri nets and applications, model experimentation, and optimization. Prerequisites: CS 240; STAT 380, or consent of instructor.

530-3 SOFTWARE AND SYSTEMS MANAGEMENT**.** Management principles for software engineering and for project and systems development. Includes management of resources and understanding the needs of customers and management. Prerequisite: CS 340 or consent of instructor.

534-3 ADVANCED DATABASE MANAGEMENT SYSTEMS. Study of advanced database management system topics such as programmatic SQL, database administration issues, object databases, distributive databases, semi-structured data and XML, and data warehousing. Prerequisite: CS 340 or consent of instructor.

535-3 SOFTWARE ENGINEERING. Principles for software development: object-oriented methodologies; advanced topics such as formal methods; component-based, client-server, and computer-aided software engineering; web engineering. Prerequisite: CS 325 or consent of instructor.

537-3 INTRODUCTION TO EXPERT SYSTEMS. Design and implementation of expert systems: architecture, knowledge representation, inference methods, uncertainty

handling, knowledge acquisition. Introduction to logic programming and Prolog. Prerequisite: CS 340 or consent of instructor.

547-3 NETWORK PROGRAMMING. Design and implementation of application software for computer networks; includes case studies of existing network applications with emphasis on TCP/IP. Prerequisite: CS 447.

548-3 NETWORK SECURITY. Fundamentals in network security to develop skills for preventing security hazards with focus on practical aspects in network security as well as concepts and theories. Prerequisites: CS 314 and CS 447.

550-3 OBJECT-ORIENTED DESIGN AND PROGRAMMING. Object-oriented programming and design with emphasis on distributed objects. Uses C++ and JAVA, covers middleware platforms such as CORBA. Prerequisites: CS 314 and CS 447.

582-3 ADVANCED COMPUTER GRAPHICS. Advanced rendering techniques, global illumination and radiosity, volume rendering, shadows, reflection models, dynamics and inverse kinematics, collision detection, fractals and particle systems. Prerequisite: 482 with minimum grade of C or consent of the instructor.

583-3 TOPICS IN PROGRAMMING LANGUAGES. Topics including functional programming, semantic theory of programming language, formal language theory, and functional language ML. May be repeated to 6 hours if topics differ. Prerequisite(s): CS 330; CS 314, or consent of instructor.

584-3 TOPICS IN ARTIFICIAL INTELLIGENCE. Selected topics in AI, such as machine learning, model-based reasoning, and intelligent agents. May be repeated up to 6 hours provided no topic is repeated. Prerequisite: CS 438 or consent of the instructor.

587-3 TOPICS IN COMPUTER NETWORKING. Selected topics in computer networking such as high performance and optical computer networks. May be repeated to a maximum of 6 hours provided not topic is repeated. Prerequisite(s): CS 447; ECE 477, or consent of the instructor.

590-3 TOPICS IN COMPUTER SCIENCE. Topics dealing with computer science concepts that are not emphasized in current courses. May be repeated to a maximum of 9 hours if topics differ. Prerequisite: consent of instructor.

595-1 to 3 INDEPENDENT STUDY. Students organize a program of study and obtain approval for supervision of the study from a member of the CS faculty. May be taken for a maximum of 3 hours.

596-3 MASTER'S PROJECT. Special software project, under supervision of the student's project committee. Written and oral project reports are required. Satisfy program exit requirement. Prerequisite: consent of student's project committee.

599-1 to 6 THESIS. Directed research to satisfy thesis requirement. May be repeated for a maximum of 6 hours. Prerequisite: consent of student's research committee.

COMPUTING AND INFORMATION SYSTEMS (CIS)

590-1 to 3 INDEPENDENT STUDY. Selected topics under faculty supervision. May be repeated to a maximum of 3 hours. Prerequisite: consent of instructor.

595-1 to 6 SPECIAL PROJECT. Independent research in computing and information systems, software design project, or combination of both. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

CONSTRUCTION (CNST)

441-3 SITE INVESTIGATION. Field and office investigation techniques necessary for site development. Includes study of information sources, methods of analysis/interpretation, and constructability analysis. Prerequisites: CNST 301; senior or graduate standing.

442-3 BUILDING INFORMATION MODELING. Development of 3-D building models for estimating, scheduling and construction planning. Use of technology for recording 3-D information to monitor construction. Prerequisite: CNST 353 or consent of instructor.

461-3 MATERIALS SAMPLING AND TESTING. Procedures and methods for developing and evaluating sampling and testing programs for construction. Individual projects required. Prerequisite: senior or graduate standing.

462-3 CONSTRUCTION EQUIPMENT. Types of construction equipment with methods for selection and evaluation of performance. Basic principles to determine size and energy requirements. Prerequisite: senior or graduate standing or consent of instructor.

463-3 CONCRETE PROPERTIES. Concrete construction techniques are analyzed. Emphasis will be on how fundamental properties are used to make project decisions. Individual projects required. Prerequisite: senior or graduate standing.

464-3 PROJECT CONTROLS. Job inspection, quality assurance, quality control; time and motion studies, time lapse photographs, progress reports, records, employee relations. Prerequisites: CNST 341; senior standing, or consent of instructor.

501-4 PROJECT MANAGEMENT. (Same as CE 501) Application of technical principles to modern methods of construction, construction planning, scheduling by critical path method, contract documents, estimating and bidding, construction materials. Prerequisite: graduate standing.

510-3 PROGRAM MANAGEMENT OF LARGE PROJECTS. A study of the complexities involved in management of large construction projects. Prerequisite: CNST 501 or consent of instructor.

515-3 FEASIBILITY STUDIES FOR LAND DEVELOPMENT. A study of the site selection process for land development projects, emphasizing the links between construction, government regulation, marketing, finance, and management. Prerequisite: CNST 501 or consent of instructor.

520-3 MANAGEMENT OF CONCRETE PROJECTS. A study of the management of concrete construction including a basic understanding of concrete properties, manufacture, quality control, site management, and safety. Prerequisite: CNST 501 or consent of instructor.

525-3 RISK MANAGEMENT OF CONSTRUCTION. A study of the sources of potential risks in the construction process and developing procedures and strategies for managing the risk. Prerequisite: CNST 501 or consent of instructor.

530-3 LEGAL ASPECTS OF CONSTRUCTION. A perspective on the legal problems and liability issues in the area of construction contracts, torts, and insurance. Prerequisite: CNST 501 or consent of instructor.

535-3 CASE STUDIES IN CONSTRUCTION. A review of current construction management issues; assessment of construction management failures, and current developments in construction safety. Prerequisite: CNST 501 or consent of instructor.

550-3 INDEPENDENT STUDY IN CONSTRUCTION. Independent study on an advanced topic of special interest in construction. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: graduate standing in the MBA program; consent of instructor.

552-3 PROJECT PLANNING STRATEGIES. Critical Path Method (CPM) scheduling methods including deterministic and probabilistic methods. Schedule compression and Monte Carlo simulation techniques. The course involves the application of Primavera to scheduling. Prerequisite: CNST 501 or consent of instructor.

CRIMINAL JUSTICE (CJ)

465-3 THEORIES OF THE JUST SOCIETY. Examines various constructions of the just society and the functions of government. Students consider the role of law and its relationship to justice for citizens. Prerequisite: junior/senior standing.

CURRICULUM AND INSTRUCTION (CI)

407-3 THE MIDDLE AND JUNIOR HIGH SCHOOL. Theoretical background and evolving trends in middle and junior high education, curriculum review, learning theories, methods of practice, and management techniques. Prerequisites: EPFR 415 or EDUC 405 or consent of instructor.

410-3 PRINCIPLES OF EARLY CHILDHOOD EDUCATION. Examination of national and local programs in early childhood education; overview of issues, trends, and research.

414-3 TEACHING MATHEMATICS IN EARLY CHILDHOOD EDUCATION. Mathematical concept development for Pre-K – Grad 3 teachers, emphasizing developmentally appropriate methodology and instructional strategies, and employing problem solving and inquiry-based learning. Prerequisites: CI 301, CI 317, CI 323.

416-3 INFANT AND TODDLER DEVELOPMENT AND EDUCATION. Study of current theories, knowledge, and practice concerning the growth and development of infants and toddlers. Prerequisites: Nine hours of early childhood course work that includes CI 201 or 410, or consent of instructor.

421-3 CHILD, FAMILY AND COMMUNITY RELATIONSHIPS. Parent involvement strategies: insight from community agency personnel pertaining to goals of early childhood and elementary programs. Prerequisite: CI 301 or CI 410.

422-3 HEALTH AND NUTRITION FOR THE YOUNG CHILD. Nutrition principles related to development of the young child; food service selection, integration of nutrition concepts into early childhood curriculum. Prerequisites: CI 201; 410.

424-3 LITERACY STRATEGIES K-3. Literacy instructional strategies to meet the needs of diverse learners in K through grade three. Application of theory and pedagogy during field placement. Prerequisite: CI 323

425-3 READING AND WRITING METHODS FOR MIDDLE AND UPPER GRADES. Techniques for developing increasingly sophisticated linguistic skills. Prerequisite: CI 337, 505, 440, or consent of instructor.

433a-n-3 SELECTED TOPICS IN CURRICULUM AND INSTRUCTION. (a) Curriculum; (b) Language Arts; (c) Science; (d) Reading; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (k) Community College; (l) Adult Education; (m) Environmental Education; (n) Organization and Supervision. Each segment carries 3 credit hours and each segment may be repeated to a maximum of 9 hours. Prerequisite: consent of instructor.

434-3 TEACHING SCIENCE AND SOCIAL STUDIES IN EARLY CHILDHOOD. Instructional strategies for teaching science and social studies in Pre-K through grade 3.

Examination of functions, practices, and problematic issues of science and social studies education. Prerequisite: CI 317.

440-3 TEACHING READING IN THE SECONDARY SCHOOL. Methods for junior and senior high schools, developmental and corrective reading programs, appraisal of reading abilities, methods and materials of instruction.

447-3 READING FOR SPEECH LANGUAGE PATHOLOGISTS. Theories and models of reading as related to instruction, connections between reading and speech difficulties, ways to help children overcome difficulties.

471-3 TEACHING IN THE MULTICULTURAL CLASSROOM. Concepts and strategies for developing positive attitudes; increasing knowledge and selecting appropriate materials for teaching children from culturally diverse backgrounds.

481-3 DRUG USE AND ABUSE. Approaches to drug and alcohol prevention education focusing on identifying the problems of alcohol and drug misuse and abuse in school settings.

490a-n-1 to 6 INDEPENDENT READINGS AND PROJECTS IN CURRICULUM AND INSTRUCTION. (a) Curriculum; (b) Language Arts; (c) Science; (d) Reading; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary School Education; (k) Community College; (l) Adult Education; (m) Environmental Education; (n) Organization and Supervision. Maximum of 6 total credit hours per segment permitted. Prerequisite: consent of instructor.

495-1 to 6 SELECTED TOPICS. Varied content; offered as need exists and as faculty interest and time permit. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

506-3 CLASSROOM CORRECTIVE READING INSTRUCTION. Appraisal of reading texts; establishment of instructional program and operation of teaching prescription for less severe reading disabilities. Prerequisite: CI 505.

508-3 RECENT ISSUES AND TRENDS IN SECONDARY EDUCATION. Popular and professional criticism of American secondary education. Innovations as they affect social organization of the instructional setting. Prerequisites: completion of half or more of the work leading to a master's degree; consent of instructor.

510-3 THE ANALYSIS OF INSTRUCTION. Teaching and relationship between teaching and learning; impact of specific variables upon teacher's role planning in the area of: (a) Curriculum; (b) Language Arts; (c) Science; (d) Reading; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (k) Community College; (l) Adult Education; (m) Environmental Education; (n) Organization and Supervision.

511-3 DIFFERENTIATED INSTRUCTION. Principles and practices of differentiated curriculum, instruction, and assessment to address the needs and interests of all learners, including the integration of technology.

512-3 ISSUES AND TRENDS IN ASSESSMENT. Examination of the multi-faceted role of assessment, issues surrounding assessment practices, including the complexity of evaluating student learning in diverse classrooms.

513-3 LITERATURE ACROSS THE CURRICULUM. Incorporating children's and adolescent literature into content area studies. Prerequisite: CI 413 or consent of instructor.

514-1-3a-g TEACHING, LEARNING, AND ASSESSMENT IN K-8 MATHEMATICS. (a) Addition/Subtraction; (b) Multiplication/Division; (c) Fractions, Decimals, Percents; (d) Alebraic Reasoning; (e) Geometry; (f) Measurement; (g) Data Analysis, Probability, Statistics. Max of 3 credits per segment, 9 credit overall.

515a-e-3 ISSUES AND TRENDS IN ELEMENTARY SCHOOL MATHEMATICS. (a) Computers and mathematical learning; (b) Curriculum development; (c) Problem solving; (d) International approaches to mathematics education; (e) Research on children's mathematical thinking. Up to three segments may be taken to a maximum course total of 9 hours. Segments may be not be repeated. Prerequisite: CI 415 or consent of instructor.

518-1 to 3 SUPERVISION OF STUDENT TEACHERS. Expectations and responsibilities of teachers who supervise student teachers and other clinical experience students. Emphasis given to using clinical supervision model.

519-3 AN ADVENTURE OF THE AMERICAN MIND. Methods and materials designed for use with pre-service and in-service teachers utilizing primary sources and integrating technology. Prerequisite: consent of instructor.

520-3 THEORETICAL FOUNDATIONS IN LITERACY. Provides a foundation in literacy education including historical and theoretical perspectives as they pertain to reading, writing, listening and speaking.

521-3 EMERGENT AND PRIMARY LEVEL LITERACY. Application of theory to appropriate practice for literacy development from birth to the primary level, including assessments, teaching methods, strategies, and instructional materials.

525-3 UPPER ELEMENTARY AND MIDDLE LEVEL LITERACY. Application of theory to appropriate practice for upper and middle level literacy including assessments, teaching methods, strategies, and instructional materials.

530-3 CHILD DEVELOPMENT: CLASSROOMS, FAMILIES, AND COMMUNITIES. Extends prior knowledge of child development and curriculum to

enhance skills in creating appropriate learning environments and effective teaching strategies for young children and families.

531-3 EARLY CHILDHOOD EDUCATION: AN INTERNATIONAL PERSPECTIVE. Comparison of structure and implementation of early childhood education in the United States and other countries focusing on factors affecting similarities and differences. Prerequisite: CI 420 or consent of instructor.

532-1 to 3 READINGS IN EARLY CHILDHOOD EDUCATION. Independent reading; acquaintance with literature and research. Conference periods. May be repeated to maximum of 6 hours. Prerequisite: CI 410 or consent of instructor.

534a-c-3 READINGS IN ELEMENTARY EDUCATION CONTENT AREAS. Independent reading in a specific content area within the Elementary Education curriculum: (a) Language Arts; (b) Science; (c) Social Studies.

535-3 ORGANIZATION AND MANAGEMENT OF EARLY CHILDHOOD CENTERS. Current trends of implementing early childhood education into public school programs; techniques of administration, coordination, and program evaluation. Prerequisite: CI 410 or consent of instructor.

536-3 ADVANCED EARLY CHILDHOOD STUDIES: HISTORICAL PERSPECTIVES AND CURRENT ISSUES AND PRACTICES. Explores the history, philosophy, and current trends, issues, and practices that guide the work of early childhood professionals. Prerequisite: admission to the program or consent of instructor.

537-3 EARLY CHILDHOOD CURRICULUM. Theory, design, organization, interpretation, and evaluation of early childhood curriculum. Prerequisite: admission to the program or consent of instructor.

538-3 ADVANCED ASSESSMENT FOR EARLY CHILDHOOD CLASSROOMS. Prepares reflective, collaborative early educators who integrate theory and practice while making informed decisions related to assessment within the teaching-learning process.

539-3 WORKING WITH CHALLENGING CHILDREN. Instructional strategies for building strong and supportive relationships and environments to foster positive emotional development and reduce challenging behaviors in the early childhood classroom. Prerequisite: admission to graduate program or consent of instructor.

540-3 CONTENT AREA LITERACY. Application of theory to appropriate practice for elementary and secondary content literacy in English, social studies, science, and mathematics including assessments, teaching methods, strategies, and materials.

541-3 ISSUES AND TRENDS IN ELEMENTARY SCHOOL SCIENCE. Significant issues and current trends which affect methodology and subject matter. Prerequisite: CI 442 or consent of instructor.

544-3 ISSUES AND TRENDS IN ELEMENTARY SCHOOL SOCIAL STUDIES. Significant issues and current trends which affect methodology and subject matter. Prerequisite: CI 343 or consent of instructor.

545-3 ISSUES AND TRENDS IN ELEMENTARY SCHOOL LANGUAGE ARTS. Significant issues and current trends which affect methodology and subject matter. Prerequisite: CI 445 or consent of instructor.

546-3 ENVIRONMENTAL EDUCATION. Content and methods of teaching environmental education; integration of environmental problems into each academic discipline.

548-3 STUDY OF CLASSROOM INSTRUCTION. Course in action research methodology as applied to classroom instruction, ethics of classroom research, project planning, and academic research and writing in the area of: (a) Curriculum; (b) Language Arts; (c) Science; (d) Reading; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (k) Community College; (l) Adult Education; (m) Environmental Education; (n) Organization and Supervision.

550-3 to 6 PRACTICUM IN EARLY CHILDHOOD EDUCATION. Teaching experience in early childhood education setting under guidance of experienced teacher. Seminar accompanies classroom experience. Prerequisites: CI 410, 412, 530; consent of instructor.

551-3 COMMUNITY/JUNIOR COLLEGE CURRICULUM AND INSTRUCTION. Evaluation of research relating to and factors bearing on improvement of curriculum and instruction; major emphasis on teaching techniques, competencies, and innovations.

555-3 IMPROVING INSTRUCTION IN THE MIDDLE AND JUNIOR HIGH SCHOOLS. Characteristics of young adolescents; typical middle level content; classroom management; planning instruction and assessment; teaching and learning strategies appropriate for middle level students. Prerequisite: CI 407.

556-3 CLASSROOM LEARNING ENVIRONMENTS. Theories of human development, learning, motivation, group processes, and culturally relevant pedagogy in relation to the development of productive classroom learning environments for diverse students.

557-12 TEACHING IN MIDDLE/SECONDARY SCHOOLS: BLOCK I. Curriculum, pedagogy, assessment, classroom learning environments, educational psychology, special education, literacy in content areas, integration of technology, and foundations of education for middles/secondary schools.
Prerequisite: consent of program director.

558-12 TEACHING IN MIDDLE/SECONDARY SCHOOLS: BLOCK II. Curriculum, pedagogy, assessment, classroom learning environments, educational psychology, special education, literacy in content areas, integration of technology, and foundations of education for middle/secondary schools. Includes participation in middle/secondary schools. Prerequisite: CI 557.

559-12 TEACHING IN MIDDLE/SECONDARY SCHOOLS: BLOCK III. Curriculum, pedagogy, assessment, classroom learning environments, educational psychology, special education, literacy in content areas, integration of technology, and foundations of education for middle/secondary. Includes a semester of student teaching. Prerequisites: CI 557 and CI 558.

561-3 THE ELEMENTARY SCHOOL CURRICULUM. Reorganization, construction, and administration of elementary school curriculum; installation, adaptation, and administration of revised curriculum.

562-3 THE SECONDARY SCHOOL CURRICULUM. Modern curriculum patterns, group processes in curriculum construction, creative project approach to course design in one's major instructional field.

563-3 CURRICULUM MODELS. Curriculum theories and their associated strategic models; alternative concepts underlying curriculum development; practical problems of curriculum planning in the area of: (a) Curriculum; (b) Language Arts; (c) Science; (d) Reading; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (k) Community College; (l) Adult Education; (m) Environmental Education; (n) Organization and Supervision.

564a-3 NBPTS CERTIFICATION SUPPORT. This is the first course of a two-course sequence offered specifically for teachers seeking the National Board for Professional Teaching Standards Certification. Prerequisite: Students must be applying for NBPTS Certification.

564b-3 NBPTS CERTIFICATION SUPPORT. This is the second course in a two-course sequence offered specifically for teachers seeking the National Board for Professional Teaching Standards Certification. Prerequisite: CI 564a.

565-4 BEGINNING TEACHERS SELF ASSESSMENT. Course fulfills the “Course for Self-Assessment” option for beginning teachers seeking to move from Initial to Standard Teaching Certificate. Prerequisites: initial teaching certificate, three years or less teaching experience.

566-3 APPROACHES TO VALUES EDUCATION. Development of professional competencies in helping others with values growth. Study of theory and practice of methodology of alternate approaches.

568-3 SEMINAR ON CURRENT TRENDS OF HUMANISTIC EDUCATION. Recent developments in humanistic or transpersonal education; innovations that educators might implement experimentally in local schools.

571-3 LITERACY DIAGNOSTICS: ASSESSMENT AND INSTRUCTION. Administration and analysis of formal and informal assessments of cognitive, academic, and literacy development, to plan instruction. Prerequisite: CI 520, 521, 525, and 540 and pass the Illinois Content Area Reading Specialist Test (176), or consent of instructor.

572-3 DIAGNOSTIC LITERACY PRACTICUM: ELEMENTARY LEVEL. Supervised clinical practicum for planning and implementing diagnostic lessons linking assessment analysis with appropriate practices to enhance the literacy development of elementary level students. Prerequisite: CI 571.

573-3 DIAGNOSTIC LITERACY PRACTICUM: MIDDLE AND SECONDARY LEVEL. Supervised clinical practicum for planning and implementing diagnostic lessons linking assessment analysis with appropriate practices to enhance the literacy development of middle/secondary level students. Prerequisite: CI 571.

575a-n-1 to 3 INDIVIDUAL RESEARCH. (a) Curriculum; (b) Language Arts; (c) Science; (d) Reading; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (k) Community College; (l) Adult Education; (m) Environmental Education; (n) Organization and Supervision. May be repeated to a maximum of 3 hours provided no topic is repeated.

576-1 to 3 READINGS IN READING. Independent reading; acquaintance with literature; research. Conference periods. May be repeated to a maximum of 3 hours provided no topic is repeated. Prerequisite: CI 505 or consent of instructor.

577-3 to 6 PRACTICUM IN READING. For advanced students. Teaching demonstrations and evaluations. Each student works with group of reading disability cases. Prerequisite: CI 572 or consent of instructor.

578-3 ORGANIZATION AND ADMINISTRATION OF LITERACY PROGRAMS. Managing literacy instruction for a total school population. Leadership of needs assessment, program planning, curriculum construction, organization, assessment, staff development, and program evaluation. Prerequisite: CI 571 or consent of instructor.

581-3 FOUNDATIONS OF TEACHER LEADERSHIP. Examination of the knowledge, skills, and dispositions required of teachers who serve as curriculum and instruction leaders in educational settings.

582-3 BECOMING A TEACHER LEADER: MENTOR AND COACH. Designed for teachers to build and refine knowledge, skills, and dispositions to support teacher development through instructional coaching in content areas. Prerequisite: CI 581.

583-3 LEADERSHIP IN PROFESSIONAL DEVELOPMENT. Examination of the knowledge, skills, and dispositions needed by teacher leaders who plan, implement, and evaluate professional development experiences in content areas. Prerequisite: CI 581.

591-3 ISSUES AND TRENDS IN LITERACY INSTRUCTION. Current issues and trends in instructional approaches, materials, methodologies, assessment techniques, leadership roles, and the impact of political policy on literacy instruction. Prerequisite: CI 571 or consent of instructor.

596-3 to 7 FIELD STUDY IN EARLY CHILDHOOD, ELEMENTARY, AND SECONDARY EDUCATION. Selecting the problem, surveying pertinent literature, recording results, making appropriate summaries and generalizations in the area of: (a) Curriculum; (b) Language Arts; (c) Science; (d) Reading; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (k) Community College; (l) Adult Education; (m) Environmental Education; (n) Organization and Supervision . May be repeated to a maximum of 7 hours.

599-1 to 6 THESIS. May be repeated to a maximum of 6 hours.

ECONOMICS (ECON)

400-3 QUANTITATIVE METHODS FOR ECONOMIC AND BUSINESS ANALYSIS. (Same as FIN 400) Applications of mathematical tools to economic and business analysis; emphasis on using calculus and linear algebra in economic and financial models. Prerequisites: ECON 301 or 302 or consent of the instructor, MS 251 with a grade of "C" or better.

415-3 ECONOMETRICS. (Same as FIN 415) Empirical research methodology and ethics. Hypothesis testing and predicting with OLS regression. Estimation with violations of classical assumptions. Multicollinearity problems; dummy variables; model specification. Prerequisites: ECON 301 and 302 or consent of the instructor, MS 251 with a grade of "C" or better.

417-3 BUSINESS FORECASTING. (Same as FIN 417) Survey of methods to forecast economic and financial conditions and markets for individual products, sectors, or regions. Time series, indicator, judgmental, econometric, and Box-Jenkins techniques. Satisfies research requirement for business programs. Prerequisites: ECON 301 or 302 or consent of the instructor, MS 251 with a grade of "C" or better.

428-3 APPLIED MICROECONOMICS. Applies microeconomic theory to business decision making. Focus is on applications/cases; understanding how to apply economic tools to variety of business problems. Prerequisite: ECON 301 with a grade of C or better.

435-3 COMPETITION AND PUBLIC POLICY. Economic implications of alternative market structures. Impact of concentration, economies of scale, advertising, and conglomerates on business and society. Prerequisite: ECON 301, 528, or consent of instructor.

439-3 ECONOMICS OF SPORTS. Economic analysis applied to issues concerning major professional team sports such as free agency, salary caps, competitive balance, stadium contracts, and franchise relocation.

445-3 ECONOMICS OF THE PUBLIC SECTOR: STATE AND LOCAL. Public expenditure and taxation, intergovernmental fiscal relations, budgeting, grants, public choice. Prerequisites: ECON 111; 112, or consent of instructor.

450-3 INTERNATIONAL FINANCE. (Same as FIN 450) International monetary environment and institutions. Determinants of foreign exchange rates and risk management. Valuation and portfolio analysis of international stocks and bonds. Foreign investment analysis. Prerequisite: FIN 320.

461-3 INTERNATIONAL TRADE THEORY AND POLICY. Theory of causes and composition of trade, comparative advantage, tariff and nontariff barriers to trade, economic integration, commercial policy. Prerequisite: ECON 301, 528, or consent of instructor.

490-1 to 6 INDEPENDENT STUDY IN ECONOMICS. Investigation of topic areas. Individual or small group readings under supervision of faculty member. May be repeated to a maximum of 6 hours. Prerequisites: consent of instructor and department chairperson.

500a-1 to 3 FOUNDATIONS OF ECONOMIC EDUCATION. Economic concepts and methodology; comparison of economic systems. For practicing teachers and graduate students in education or social sciences. Will not be counted toward the MA or MS in Economics and Finance. May be repeated to a maximum of 3 hours. Prerequisite: consent of instructor.

500b-1 to 3 ECONOMIC EDUCATION: APPLICATIONS AND ILLUSTRATIONS. Analysis of selected national economic issues; emphasis on teaching and applying basic economic concepts and methodology. For teachers and education or social science graduate students. May be repeated to a maximum of 12 hours provided no topic is repeated. Will not be counted toward the MA or MS in Economics and Finance. Prerequisite: ECON 500a or consent of instructor.

501-3 ADVANCED MICROECONOMIC THEORY. Theories of consumer behavior, theories of the firm, welfare economics, public choice. Prerequisites: ECON 301; 400, or consent of instructor.

502-3 ADVANCED MACROECONOMIC THEORY. Alternative theories of income, output, and price determination. Domestic and international constraints on macroeconomic policy. Review of relevant empirical research. Prerequisites: ECON 301; 302; 400, or consent of instructor; ECON or FIN 415 strongly recommended.

515-3 EMPIRICAL RESEARCH METHODS IN ECONOMICS AND FINANCE. (Same as FIN 515) Stochastic processes and simulation, optimization, estimation methodologies for maximum likelihood, pooled cross-section time-series, simultaneous equations and discrete/limited dependent variable models, generalized method of moments. Prerequisites: admission to Economics and Finance graduate program.

517-3 TIME-SERIES ANALYSIS. (Same as FIN 517) Modeling time-series behavior of financial and economic variables to offer practical insights and solutions for particular problems faced by firms, governments, and central banks. Prerequisite: ECON 515 or FIN 515, or consent of instructor.

528-3 MANAGERIAL ECONOMICS. Economic analysis of managerial decisions and business strategy, and of government policy and regulation affecting business organizations. Prerequisite: MS 502 or equivalent. Will not count toward the MA or MS in Economics and Finance.

531-3 LABOR ECONOMICS. Economic principles associated with employment relationships, wage theory, labor market, employment and unemployment, economic effect of collective bargaining. Prerequisite: ECON 501 or consent of instructor.

535-3 ECONOMICS OF REGULATION AND ANTITRUST POLICY. Application of microeconomic theory to antitrust and regulation of business. Utility rate design, current antitrust cases, nationalized industries, health and safety. Prerequisite: ECON 501 or consent of instructor; ECON 515 or FIN 515 or recommended.

537-3 BEHAVIORAL ECONOMICS. Theoretical and empirical study of behavioral aspects of economics. Behavioral aspects of firms, households, governments, and international economic agents in alternative market structures; welfare theory. Prerequisite: ECON 501 or consent of instructor.

543-3 MONETARY AND FISCAL POLICY. Foundations of monetary and fiscal policy, domestic and international aspects of policy actions, evaluation of policies to influence economic activity and growth, business cycle analysis. Prerequisite: ECON 502 or consent of instructor; ECON 515 or FIN 515 strongly recommended.

545-3 PUBLIC FINANCE THEORY AND PRACTICE. Developments in public finance theory; application of intermediate micro- and macroeconomic theory to issues in government finance and public policy analysis. Prerequisites: ECON 501, 502, or consent of instructor.

561-3 INTERNATIONAL ECONOMICS AND FINANCE. Recent advances in theory and empirical analysis of international trade and finance. Forward and spot exchange markets, arbitrage, and speculation. Prerequisites: ECON 501, 502, or consent of instructor.

563-3 THEORY AND POLICY OF ECONOMIC DEVELOPMENT AND GROWTH. Recent advances in theory and empirical analysis of economic development and growth. Application of theories and quantitative methods to economic analysis; policy formulation. Prerequisites: ECON 501, 502, or consent of instructor.

581-3 to 6 SEMINAR ON SELECTED ECONOMIC TOPICS. Directed study and analysis of theoretical and policy problems current to frontiers of economic analysis. May be repeated once provided no topic is repeated. Prerequisite: consent of instructor.

593-1 to 6 ECONOMIC READINGS: INDEPENDENT STUDY AND RESEARCH. Economic topics of current interest. Study program planned in consultation with an economics instructor. Prerequisites: ECON 501; 502; at least one course in the area of intended independent study; consent of instructor and chairperson.

599-1 to 6 THESIS. May be repeated to a maximum of 6 hours. Prerequisites: consent of department chairperson and student's thesis committee.

EDUCATION (EDUC)

500-1-3 PROFESSIONAL DEVELOPMENT FOR TEACHERS. Designed for practicing teachers seeking graduate credit to meet the State of Illinois requirements for recertification. Not applicable to any graduate degree program. May be repeated.

EDUCATIONAL ADMINISTRATION (EDAD)

500-3 ORGANIZATION AND ADMINISTRATION OF EDUCATION. Overview of the complex organizational milieu of schools and their administration; federal, state, local issues; administrative tasks, processes, and career orientation.
505-3 COMMUNICATION AND HUMAN RELATIONS. Skills and practices needed by school administrators in working with various constituencies in school environment. Emphasis on communication, listening, assertion, conflict resolution, collaborative decision-making, team building, and reaching consensus. Prerequisite: EDAD 500.

510-3 SCHOOL FINANCE. Structure and financing of public education. Federal, state, and local fiscal policies and principles. Fiscal analysis and management. Lab included. Prerequisite: EDAD 500.

520-3 SCHOOL LAW. Illinois, Missouri, and federal statutes; regulatory rules, legal opinions, and case law as applied to education; understanding relationship of law to operation of schools. Prerequisite: EDAD 500.

525-3 EDUCATIONAL SUPERVISION. Research and theory related to the supervisory role of the administrator. Emphasis on diagnosing educational problems, formative supervision to promote academic achievement and providing supervision, evaluation, and staff development for the school staff. Prerequisite: EDAD 500.

530-3 EDUCATIONAL PLANNING AND EVALUATION. Developing organizational mission, objectives, and attainment strategies. Principles and procedures of educational program evaluation. Prerequisite: EDAD 500.

535-3 PROGRAM DEVELOPMENT. Specialized program analysis and development for primary, intermediate, middle, and high school. Emphasis on curricular requirements, innovations, instructional strategies from an administrative perspective. Prerequisite: EDAD 500.

545-3 THE PRINCIPALSHIP. Theory and research related to leadership role of building principal. Emphasis on effective schools research, participatory leadership, teacher empowerment, planned change and school culture. Prerequisite: EDAD 500.

550-3 APPLIED ADMINISTRATIVE PROCESSES. Emphasis on a Comprehensive Internship supervised by a school administrator and program faculty member. This course must be taken in the last semester of the program. Prerequisite: EDAD 500.

555-3 SUPERINTENDENCY AND DISTRICT ADMINISTRATION. Role and responsibilities of district superintendent and central office personnel in organization; administration of district educational processes.

557-3 ETHICS IN EDUCATIONAL ADMINISTRATION. Ethical dilemmas in educational administration. Consideration of greater public good and rights of individuals as grounds for ethical reasoning and decision-making.

560-3 EDUCATIONAL POLICY MAKING AND GOVERNANCE. Policy formulation at local, state, and federal levels. Analysis at state level is central theme around which local and federal policy formation is analyzed.

563-3 SCHOOL AND COMMUNITY RELATIONS. On communication in educational leadership; study of factors involved in development and maintenance of positive school-community relations programs.

565-3 SCHOOL PERSONNEL ADMINISTRATION. Theories and practices related to public school personnel planning, selection, evaluation, and dismissal. Principles of human motivation and development. Lab included. Prerequisite: consent of instructor.

567-3 COLLECTIVE BARGAINING IN EDUCATION. Labor relations in education, Educational Labor Relations Act and Illinois Labor Relations Board, common law and statutory law governing public school labor relations, negotiating with employee unions.

570-3 LEADERSHIP THEORY AND PRACTICE. Nature of leadership including alternative leadership theories within and outside education. Behavior, functions, styles, relations as they affect planned change in education organizations. Prerequisites: EDAD 555; consent of instructor.

573-3 EDUCATIONAL FACILITIES PLANNING AND MANAGEMENT. Examines the planning, financing, constructing, renovating, and management of school facilities. Enrollment forecasting, passing bond referenda, and working with architects/construction managers are addressed. Prerequisite: admission to Superintendents' program.

575-3 STRATEGIC MANAGEMENT. Creating and implementing a collective vision through strategic planning and situational decision-making.

577-3 COMPARATIVE EDUCATION ADMINISTRATION, ORGANIZATION, AND CONTROL. Education systems of nations throughout the world. Types of control and countries studied are those that exemplify each type of control.

580-3 DISTRICT PROGRAM DEVELOPMENT. This course provides an in-depth study of the change process as it relates to program/curriculum development, organization, implementation, and evaluation from the superintendent's perspective.

582-3 ORGANIZATION AND ADMINISTRATION OF MIDDLE SCHOOLS. Philosophy, organization, and administration of middle schools. Trends and issues related to middle grades education and administration. Prerequisite: consent of instructor.

583-3 ORGANIZATION AND ADMINISTRATION OF HIGHER EDUCATION. Community College and four-year public university and college systems, governance, and programs. Prerequisite: consent of instructor.

585-3 SCHOOL BUSINESS MANAGEMENT. Theory and practice related to principles of purchasing and supply, budgeting and accounting, pupil transportation, food service, and risk management. Lab included. Prerequisite: EDAD 510.

587-3 SCHOOL BUDGETING AND ACCOUNTING. Principles and procedures of school district budgeting and accounting. Lab included. Prerequisite: EDAD 585.

589-3 SCHOOL FISCAL ANALYSIS AND FORECASTING. Conducting analyses of school district receipts and expenditures. Production and use of receipt and expenditure forecasts. Lab included. Prerequisite: EDAD 587.

590-3 INTERNSHIP PRACTICUM/PRINCIPALSHIP. Conducted in clinical setting under direction and supervision of school administrator and department faculty member.

Comprehensive field experience designed to relate theory to practice for those preparing for building-level administration. Emphasis on building-level leadership, management, and school improvement. Prerequisite: consent of adviser.

591-3 INTERNSHIP PRACTICUM/SUPERINTENDENCY. Conducted in clinical setting under direction and supervision of school administrator and department faculty member. Comprehensive field experience designed to relate theory to practice for those preparing for district-level administration. Emphasis on district-level leadership, management, and school improvement. Prerequisite: consent of adviser.

595-3 to 6 FIELD STUDY. Required of candidates for specialist's degree. Report reflects special projects, research, or problems investigated during field experience. Prerequisite: consent of adviser.

597a-i-1 to 3 INDIVIDUAL RESEARCH. Writing of research assignment in one of the following areas: (a) Curriculum; (b) Supervision; (c) Buildings; (d) Finance; (e) School Law; (f) Administration; (g) Elementary Education; (h) School Business Management; (i) Managerial Accounting. May be repeated to a maximum of 6 hours. Prerequisite: consent of adviser and instructor.

598-3 SELECTED TOPICS IN EDUCATIONAL ADMINISTRATION. Current trends and issues related to educational research and practice having immediate implications for practitioners. May be repeated to a maximum of 6 hours provided no topic is repeated.

599-3 to 6 Thesis. Minimum of 3 and maximum of 6 hours to be counted toward the Master's degree. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

EDUCATIONAL PSYCHOLOGY, FOUNDATIONS, AND RESEARCH (EPFR)

415-3 THE MIDDLE SCHOOL LEARNER. Addresses characteristics of young adolescent learners and implications for instruction. Meets Illinois requirements for middle school endorsement, and is designed for pre-service or in-service teachers. Prerequisites: EDUC 305; EPFR 380; 381, or graduate standing.

451-3 GENDER AND EDUCATION. Policies and practices related to sex-role stereotyping, teacher expectations and gender, curricular bias, discrimination, personnel policies, strategies for change.

501-3 RESEARCH METHODS . Analysis of educational research methods. Focus on conceptual, methodological and practical issues addressing both quantitative and qualitative methodologies as related to current educational issues.

510-3 THE SCHOOL AND THE URBAN COMMUNITY. Crises and conflicts in education in urban areas; social stratification which has accompanied development of massive urban areas and schools. Prerequisite: consent of instructor.

515-3 ISSUES IN LEARNING THEORY. Educational implications arising from major theoretical perspectives on learning. Course will take an in-depth look at selected topics in the field.

520-3 ANALYSIS OF EDUCATIONAL ISSUES: PHILOSOPHICAL-HISTORICAL FOUNDATIONS. Selected educational problems and issues. Philosophic-historic perspective.

521-3 ANALYSIS OF EDUCATIONAL ISSUES: SOCIO-CULTURAL FOUNDATIONS. Selected educational problems and issues. Socio-cultural perspectives.

525-3 COMPARATIVE EDUCATION. Cross-cultural analysis of educational dynamics and systems in their social and historical contexts. Emphasis on comparative methodology.

563-2 to 3 SELECTED TOPICS IN FOUNDATIONS OF EDUCATION. Contemporary educational issues or problems from perspectives grounded in social theory or political and social philosophy. May be repeated to a maximum of 6 hours provided no topic is repeated.

575a-e-3 INDIVIDUAL RESEARCH. Research under supervision of graduate faculty member in: (a) Philosophy of education; (b) History of education; (c) Intercultural-comparative education; (d) Sociology of education; (e) Education and politics. Maximum credit accumulation for any combination of 575 a-e is 6 hours provided no topic is repeated. Prerequisite: consent of instructor and adviser.

ELECTRICAL AND COMPUTER ENGINEERING (ECE)

426-3 RADIO-FREQUENCY DESIGN. Circuit design in the radio frequency band with elements of microwave engineering. Amplifiers, oscillators, mixers, impedance matching, harmonic balance analysis, optimetrics and tuning. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 326.

427-3 KNOWLEDGE-BASED SYSTEMS. (Same as CE 427, IME 427, ME 427) Engineering-oriented perspective on artificial intelligence (AI) technology. General AI concepts specifically knowledge-based (expert) systems applied to engineering problem solving. Prerequisites: declared major in an engineering discipline, skills in one of the common programming languages (BASIC, C, ForTran, or Pascal) or consent of instructor.

433-3 FUZZY LOGIC AND APPLICATIONS. (Same as ME 433) Fundamentals of fuzzy sets, basic operations, fuzzy arithmetic, and fuzzy systems. Examples of applications in various fields of engineering and science. Prerequisite: declared major in an engineering discipline.

436-3 DIGITAL SIGNAL PROCESSING. Discrete-time signals and systems, sampling, Z-transforms, discrete Fourier transform, design and implementation of digital filters. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 351.

437-3 DSP DESIGN PROJECTS. DSP design concepts. Overview of DSP processors and development platforms. *TMS320Cxx* architecture and instruction set. Design and implementation of digital filters. Sample applications. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 351.

438-3 IMAGE ANALYSIS & COMPUTER VISION. Image formation, geometrical and topological properties of binary images, image filtering, boundary detection, image segmentation, pattern recognition. Two hours lecture and one laboratory session per week. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 351.

439-3 DIGITAL IMAGE PROCESSING. Fundamentals of human perception, sampling and quantization, image transforms, enhancement, restoration, and coding. Two hours lecture and one laboratory session per week. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 351.

445-3 POWER DISTRIBUTION. Distribution system planning, load characteristics, application of distribution transformers, design of distribution system, voltage-drop and power-loss calculations, voltage regulation, protection and reliability. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 341.

446-3 POWER SYSTEM ANALYSIS. Synchronous machines, power transformers, transmission lines, system modeling, load-flow study, economic operation of power systems, symmetrical components, symmetrical and unsymmetrical faults, power system stability. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 341.

447-3 RADAR SYSTEMS. Principles of radar systems including antenna fundamentals, radar signals and systems, CW radar, FM-CW radar, pulse radar, tracking radar. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 340, ECE 351.

455-3 SYSTEM MODELING AND OPTIMIZATION. Mathematical modeling of engineering systems, dynamic response of electrical and mechanical systems, optimization models in electrical engineering. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 351.

465-3 CONTROL SYSTEMS DESIGN. Root-locus analysis, frequency-response analysis, design and compensation techniques, describing-function analysis of nonlinear control systems, analysis and design by state-space methods. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 365.

466-3 DIGITAL CONTROL. (Same as ME 466) Topics include finite difference equations, z-transforms and state variable representation, analysis and synthesis of linear sampled-data control systems using classical and modern control theory. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 365 or ME 450.

467-3 ROBOTICS-DYNAMICS AND CONTROL. (Same as ME 454) Robotics, robot kinematics and inverse kinematics, trajectory planning, differential motion and virtual work principle, dynamics and control. Prerequisites: declared major in an engineering discipline, consent of instructor.

475-3 COMMUNICATION SYSTEMS. Digital transmission through band-limited channels; optimum receiver principles; symbol synchronization; channel capacity and coding; bandpass digital modulation; case studies of communication systems. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 375.

477-3 NETWORK ENGINEERING. This course provides the principles and practice of network engineering. The ISO-OSI reference model is used as a framework for examining Internet communication issues. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 282.

482-3 MICROPROCESSOR SYSTEMS. Design of microprocessor systems using VLSI building blocks. Several microprocessors and peripheral ICs studied. Laboratory experiments with microprocessor systems using logic analyzers. Three hours lecture and one laboratory session per week. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 282.

483-3 ADVANCED DIGITAL SYSTEMS ENGINEERING. Design of digital systems using a hardware description language, logic synthesis tools, and field programmable gate arrays. Prerequisites: ECE 282.

484-3 VLSI DESIGN. Discussion CMOS circuits, MOS transistor theory, CMOS processing technology, circuit characterization and CMOS circuit and logic design. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 326.

492-2 to 4 TOPICS IN ELECTRICAL AND COMPUTER ENGINEERING. Selected topics of special interest; course schedule will include name of topic. May be repeated to maximum of 6 hours provided no topic is repeated. Prerequisites: ECE and consent of instructor.

510-3 ENGINEERING RESEARCH METHODS. Engineering research methods, experimental design, statistical analysis of experimental results, presentation of results, research tools, and technical writing.

532-3 APPLICATIONS OF DSP. Parametric signal modeling with direct and indirect methods, classical and modern spectral estimation, multi-rate processing of discrete signals, adaptive signal processing, VLSI signal processor applications. Prerequisites: grade of C or better in ECE 352; ECE 436, or consent of instructor.

538-3 IMAGE ANALYSIS & COMPUTER VISION II. Applications of pattern recognition, image analysis, multi-spectral computer vision. Group projects. Prerequisite: grade of C or better in ECE 438.

539-3 DIGITAL IMAGE PROCESSING II. Applications of image enhancement, image restoration, image coding and compression, multi-dimensional image processing. Group projects. Prerequisite: grade of C or better in ECE 439.

545-GENERATOR CONTROL AND PROTECTION. Synchronous generator basics including construction and theory of operation. Types of excitation systems and control architectures. Supplemental controls. Power systems stability. Introduction to generator protection. Prerequisite: grade of C or better in ECE 341, Co-requisite: ECE 465.

547-3 RADAR THEORY. Advanced topics in radar, including matched filtering, ambiguity diagrams, signal encoding, pulse compression, measurement error analysis, non-fluctuating and fluctuating target detection, CFAR, SAR. Prerequisite: grade of C or better in ECE 447 or consent of instructor.

552-3 ADVANCED STOCHASTIC PROCESSES. Intensive review of random variable concepts, emphasizing moments, characteristic functions, large number and convergence concepts. In-depth study of stochastic processes, including Poisson, Gaussian, Markov Processes. Spectral analysis. Kalman filtering, renewal processes. Prerequisite: grade of C or better in ECE 352 or equivalent.

562-3 MODERN CONTROL. Analysis and design of control systems; state-variable description; controllability, observability, non-linearities and perturbation theory; stability, state feedback design, robust control. Prerequisite: grade of C or better in ECE 465 or consent of instructor.

563-3 OPTIMAL CONTROL. (Same as ME 563 and MATH 563) Description of system and evaluation of its performance, dynamic programming, calculus of variations and Pontryagin's minimum principle, iterative numerical techniques. Prerequisite: grade of C or better in ECE 365 or ME 450.

570-3 COMMUNICATION THEORY. Circuit and packet switching, local-area networks, network performance, performance of light-wave, analog and digital

communication systems, detection theory, information theory, error coding. Prerequisite: grade of C or better in ECE 375 or consent of instructor.

572-3 COMMUNICATION NETWORKS. Analysis and design of communication networks. Packet-switched and circuit-switched networks. Network routing, capacity design and flow control multi-access techniques. Prerequisite: grade of C or better in ECE 352 or consent of instructor.

574-3 DIGITAL COMMUNICATIONS. Fundamental blocks in digital communication systems. Channel capacity, source, and channel coding. Detection and estimation. Robust quantization for PCM. Coding speech at low bit rates. Digital modulation techniques. Prerequisite: grade of C or better in ECE 475 or consent of instructor.

575-3 DETECTION AND ESTIMATION. Bayes decision strategy, simple composite hypothesis, Gaussian problem, orthogonal random processes, detection in Gaussian noise, linear estimation using Weiner and Kalman-Bucy filters. Prerequisite: grade of C or better in ECE 475 or 552; or consent of instructor.

577-3 ADVANCED NETWORK ENGINEERING. The principles and practice of network engineering are applied to real systems in a wide variety of environments with emphasis on network technology integration issues. Prerequisite: grade of C or better in ECE 477, or CS 447, or consent of instructor.

580-3 DIGITAL TECHNOLOGY AND ELECTRONIC COMMUNICATION. Discussion of digital circuit technologies, evolution of microprocessors, and wireless communications. Introduction to workstation technology, UNIX, X-Windows, and networking principles.

581-3 HIGH PERFORMANCE ARCHITECTURES I. Advanced computer architectures memory-system design, pipeline design, and parallel processing mechanisms. Design issues and various example machines. Evaluation of performance increases dependency on algorithms. Prerequisite: grade of C or better in ECE 483.

582-3 HIGH PERFORMANCE ARCHITECTURES II. Parallel processing architectures with emphasis on identifying common underlying structure of applications and architectures. Prerequisite: grade of C or better in ECE 483.

584-3 ANALOG CMOS INTEGRATED CIRCUIT DESIGN. Operating principles of CMOS analog integrated circuits, physics of MOS devices, linearized models MOSFETS, and circuit design techniques for realizing CMOS operational amplifiers. Prerequisites: grade of C or better in ECE 327, ECE 484; consent of instructor.

585-3 MIXED-SIGNAL DESIGN AND MODELING. Circuit techniques and design issues for mixed-signal integrated circuits, switched capacitor circuits, digital-to-analog and analog-to-digital converters and an introduction to modeling using VerilogA. Prerequisites: ECE 327, ECE 483, ECE 484, or consent of instructor.

587-3 INTELLIGENT ENGINEERING SYSTEMS. Designing intelligent systems solving complex engineering problems through implementing knowledge-based systems using a hybrid architecture comprising expert systems, artificial neural networks, and optimization approaches. Prerequisite: grade of C or better in ECE 487 or consent of instructor.

591-1 to 6 INDEPENDENT STUDY. Independent investigation of a topic in electrical engineering to be agreed upon with the instructor. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

592-3 TOPICS IN ELECTRICAL ENGINEERING. Topic of special interest; course schedule will define the topic. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisite: consent of instructor.

595-3 MASTER'S PROJECT. Design and development of a graduate-level final project in Electrical Engineering. Prerequisite: consent of instructor.

599-1 to 6 THESIS. Individual research in electrical engineering. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

ENGLISH (ENG)

400-3 PRINCIPLES OF LINGUISTICS. Principles and techniques of linguistic analysis illustrated through survey of major structural components of language. Recommended for those preparing to teach English.

403-3 HISTORY OF THE ENGLISH LANGUAGE. Historical survey of major phonological and grammatical changes in English language from its Indo-European antecedents to the present.

404-3 CHAUCER: CANTERBURY TALES. The Canterbury Tales read in Middle English. Prerequisite: ENG 102.

405-3 PRAGMATICS. Study of principles controlling how implicit levels of meaning are expressed in language and how context influences the interpretation of meaning.

406-3 OLD ENGLISH LANGUAGE. Sounds, grammar, and vocabulary of the Old English Language including readings in Old English poetry and prose.

408-3 PHONOLOGICAL ANALYSIS. Principles of linguistic analysis and interpretation as applied to sound systems of language. Prerequisite: ENG 400 recommended.

409-3 SYNTACTIC ANALYSIS. Principles of syntactic analysis and interpretation as applied to clause and sentence level structures.

416-3 LANGUAGE AND SOCIETY. Relationships among language, society, and culture, and their implications for education and intercultural communication. Topics include language variation, socialization, and ethnography of communication.

432-3 MAJOR AMERICAN WRITERS OF THE 20TH CENTURY. Short prose by authors such as James, Cather, Faulkner, O'Connor, Hemingway, Fitzgerald, and Wright. Prerequisite: ENG 102.

443-3 PROSODY. Students will both study and write metrical poetry. All aspects of versification will be considered. For both literature majors and creative writing minors. Prerequisites: ENG 102.

446-3 STUDIES IN AFRICAN AMERICAN LITERATURE. Examine the fiction, poetry, short stories, and essays of African American writers within the context of scholarship and criticism dedicated to the study of Black diasporie cultures. Prerequisite: ENG 102.

457-3 TOPICS IN POSTCOLONIAL LITERATURE AND CRITICISM. Examination of Postcolonial texts—novels, poems, plays, memoirs, speeches, and critical essays with focus on scholarship and theory in Postcolonial studies. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: ENG 102.

463-3 TOPICS IN LITERARY PERIODS. Reading and analysis of works drawn from one or more specific literary periods; authors and periods vary. May be repeated to a maximum of 9 hours as long as no topic is repeated. Prerequisites: C or better in ENG 102, junior standing or consent of instructor.

464-3 TOPICS IN FORMS AND GENRES. Reading and analysis of works drawn from one or more specific literary forms and genres; authors, forms, and genres vary. May be repeated to a maximum of 9 hours as long as no topic is repeated.

465-3 SPECIAL TOPICS. Special topics in literature, linguistics, rhetoric and composition, and creative writing.

468-3 SECOND LANGUAGE ACQUISITION. Examination of issues and theories applicable to understanding process of second language development. Prerequisite: completion of or concurrent enrollment in ENG 400.

470-3 METHODS AND MATERIALS FOR K-12 ESL TEACHING. Examination of techniques and materials for teaching English as a Second Language in K-12 settings.

471-3 SHAKESPEARE. The in-depth study of the works of Renaissance author William Shakespeare. Topic varies. May be repeated to a maximum of 6 hours so long as topic is not repeated.
Prerequisites: C or better in ENG 102, junior standing or consent of instructor.

472-3 ASSESSMENT AND TESTING IN ESL. Examination of issues and methods for assessing oral and written proficiency in English as a Second Language.

473-3 MILTON. Paradise Lost and other works such as Samson Agonistes, Paradise Regained, “Lycidas,” “Comus,” and selected prose. Prerequisite: ENG 102.

474-3 BILINGUALISM AND BILINGUAL EDUCATION. An introduction to cognitive, linguistic, and social perspectives on bilingualism, and the history and politics of bilingual education in the U.S.

475-3 METHODS OF TEACHING SECONDARY ENGLISH: LITERATURE AND CULTURE. Approaches to and issues in teaching and culture at the secondary level. Prerequisite: must be seeking secondary ELA certification; junior standing; C or better in ENG 102; or consent of the instructor.

477-3 MORRISON. Reading and analysis of the works of major contemporary American author Toni Morrison. Prerequisites: C or better in ENG 102, junior standing or consent of instructor.

476-3 PRACTICUM IN ENGLISH AS A SECOND LANGUAGE. This course is designed for students who need to gain supervised experience teaching ESL for the purposes of the state ESL endorsement. Prerequisite: ENG 470 or ENG 542.

478-3 STUDIES IN WOMEN, LANGUAGE, AND LITERATURE. Relationships among society, gender, language, and literature; ways women are affected by and depicted in language and literature; literature written by women; feminist criticism. Topic varies; may be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: ENG 102.

479-3 MAJOR AUTHORS; SHARED TRADITIONS. Reading and analysis of the works of two to four major authors who sharing an historical period; authors and topic vary. May be repeated up to a maximum of 6 hours so long as authors and topics are not repeated.

480-3 MAJOR AUTHORS: CROSSING BOUNDARIES. Reading and analysis of the works of two to four major authors from different historical periods; authors and topic vary. May be repeated to a maximum of 6 hours as long as no topic is repeated. Prerequisites: C or better in ENG 102, junior standing or consent of instructor.

482-3 TECHNOLOGY AND LITERATURE. Analysis of digital theory and digital literature; short fiction, poetry, and novels created for new media such as CD-ROMs and hypertext. Prerequisite: junior standing or consent of instructor. Prerequisite: ENG 102.

485-3 METHODS OF TEACHING SECONDARY ENGLISH: COMPOSITION AND LANGUAGE. Approaches to and issues in teaching composition and language usage at

the secondary level. Prerequisite: must be seeking secondary ELA certification; junior standing; C or better in ENG 102; or consent of the instructor.

486-3 TEACHING CREATIVE WRITING. Seminar on the teaching of creative writing with an emphasis on poetry and/or fiction. Prerequisite: junior standing or consent of instructor.

487-3 POLITICS OF COMPOSITION PEDAGOGY. Pedagogical politics of the writing classroom, teacher-student power relations, relations between educational institutions and social order, development of alternative perspectives in pedagogical politics. Prerequisite: junior, senior, or graduate standing.

488-3 HISTORY OF RHETORIC. Major figures, texts, and definitions of rhetoric beginning with Classical origins and continuing into Modern era. Designed for students interested in composition, literature, and criticism. Prerequisite: junior standing or consent of instructor.

489-3 STYLE AND INTENTIONALITY. A writing course on the study of style. The aim: to study stylistic conventions and innovations. The course is both theoretical and practical. Prerequisite: junior, senior, or graduate student standing.

490-3 ADVANCED COMPOSITION. Writing sophisticated expository prose. Review of grammatical matters as needed; emphasis on clarity, organization, effectiveness, and flexibility. May be repeated once for credit with permission. Prerequisite: ENG 102.

491-3 TECHNICAL AND BUSINESS WRITING. Technical communication, professional correspondence, reports, proposals, descriptions, evaluations, word processing, and graphics software. For students in English, business, engineering, nursing, the sciences, and the social sciences. No experience with software or computers is required. Prerequisite: ENG 102.

492-3 ADVANCED FICTION WRITING. Advanced seminar in short story writing. Includes readings in fiction and a study of the psychology of creativity, fiction markets, experimental fiction. Workshop format. Prerequisite: ENG 392 or consent of instructor.

493-3 ADVANCED POETRY WRITING. Advanced workshop in writing poetry. Examination of poetic expression. Prerequisite: ENG 393 or consent of instructor.

494-3 LITERARY EDITING. Principles of literary editing, primarily of fiction and poetry. Prerequisite: ENG 102.

495-3 HISTORY OF CRITICAL THEORY. Major critical theories from Plato to the present, including practice in writing criticism. Prerequisite: ENG 102.

496-3 SCHOLARLY AND CRITICAL EDITING. Editorial preparation of copy for scholarly and critical journals in English language and literature. Prerequisite: ENG 102.

499-1 to 3 READINGS IN ENGLISH. Independent study in specific area of interest. Extensive reading. For English students only; may be repeated to a maximum of 6 hours. Prerequisite: approval of department chair and instructor.

501-3 MODERN LITERARY STUDIES. Integrates study of modern literary theory and scholarly editing with instruction in professional research writing and use of electronic data bases. Continuous with ENG 502. Prerequisite: graduate standing.

502-3 MODERN LITERARY THEORY. Continues study of modern literary theory begun in English 501; includes diverse approaches, issues, texts, and thinkers. Prerequisite: ENG 501.

505-3 STUDIES IN OLD AND MIDDLE ENGLISH LITERATURE. Topics such as Beowulf, Chaucer, Middle English lyric, Sir Gawain and the Green Knight, Arthurian literature. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: graduate standing.

506-3 STUDIES IN RENAISSANCE AND 17TH CENTURY LITERATURE. Topics such as Spenser, Shakespeare, Renaissance drama, Milton, Metaphysical poetry. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: graduate standing.

508-3 STUDIES IN RESTORATION AND 18TH CENTURY LITERATURE. Topics such as satire, Pope, Richardson and Fielding, Boswell and Johnson. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: graduate standing.

510-3 STUDIES IN 19TH CENTURY BRITISH LITERATURE. Topics in Romantic and Victorian poetry or prose such as Romantic supernaturalism, gender in Victorian novels, specific focus on one or two writers. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: graduate standing.

515-3 STUDIES IN 20TH CENTURY AMERICAN AND/OR BRITISH LITERATURE. Topics such as Modernism, British drama, American Realism, poetry, Post-war fiction. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: graduate standing.

518-3 STUDIES IN COLONIAL AND 19TH CENTURY AMERICAN WRITERS. Topics such as the Puritan writers, Hawthorne, Melville, Dickinson. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: graduate standing.

521-3 TOPICS IN LITERARY STUDY. Literary topics not included in regular course offerings. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: graduate standing.

526-3 STUDIES IN AFRICAN AMERICAN TEXTS. This course examines African American texts including fiction, poetry, plays, essays, sermons, slave narratives, memories, and speeches, with primary focus on pertinent theory, scholarship, and publications in Black studies. May be repeated to a maximum of 9 hours, provided no topic is repeated. Prerequisite: graduate standing.

540-3 SEMINAR IN SECOND LANGUAGE ACQUISITION. Examination of advanced topics in the acquisition of English as a second language including universal grammar, lexical development, and conversational analysis. Prerequisites: graduate standing and completion of or concurrent in ENG 400.

541-3 DISCOURSE ANALYSIS. Examination of discourse properties of narrative and expository prose through practice in text analysis. Prerequisite: graduate standing and completion of or concurrent enrollment in ENG 400.

542-3 METHODS FOR TEACHING ENGLISH AS A SECOND LANGUAGE. Analysis of models for teaching ESL in various educational settings. Includes classroom observation and evaluation. For TESL students. Prerequisite: graduate standing and ENG 468.

543-3 GRAMMAR PEDAGOGY. Study of problem areas in the structure, acquisition and teaching of English grammar to non-native speakers. Prerequisites: ENG 542 and graduate standing.

544-3 READING AND WRITING PEDAGOGY IN TESL. Examination of reading and writing processes in second language acquisition and approaches to teaching them to non-native speakers. Prerequisite: graduate standing.

552-3 ACADEMIC WRITING AND RESEARCH METHODS IN COMPOSITION STUDIES. Research methods in composition studies, practice using electronic databases, instruction in professional research writing. Required of students in Teaching of Writing MA specialization. Prerequisite: graduate standing.

554-3 COMPOSITION PEDAGOGY. Introduction to teaching writing. Writing-as-process approach: inventive methods, revision techniques, collaborative learning, and workshops. Design and evaluation of assignments. Planning writing courses. Prerequisites: graduate standing; consent of instructor.

556-3 THEORY OF COMPOSITION AND RHETORIC. Study of theories and historical movements underlying and constituting modern composition pedagogy and rhetorical studies. Prerequisite: graduate standing.

558-3 PRACTICUM IN THE TEACHING OF WRITING. Course focuses on teaching techniques for first-year college writing courses. Working with mentor and supervisory instructors students will observe then teach a writing course. Prerequisite: ENG 554 or consent of instructor.

570-3 TEACHING AFRICAN-AMERICAN ORAL AND WRITTEN LITERATURE. Teaching of African-American oral and written literatures; emphasis on methodology, comparative presentation styles, and textual analysis; scope includes ancient Africa and contemporary America. Prerequisite: graduate standing.

572-3 THEORY AND PRACTICE OF TEACHING WRITING WITH COMPUTERS. A study of theoretical principles of computer-mediated composition pedagogy and practical applications of specific technologies in the writing classroom. Prerequisite: graduate standing.

574-3 BASIC AND DEVELOPMENTAL WRITING. Course will focus on theories and practical teaching methods for working in basic and developmental writing courses at the college level. Prerequisite: graduate standing.

576-3 WRITING ACROSS THE CURRICULUM. History, philosophy, pedagogical techniques, and assessment of writing across the curriculum. Prerequisite: graduate standing.

578-3 WOMEN, LANGUAGE, AND PEDAGOGY. Study of recent research into ways gender affects language: speaking, reading, and writing. Prerequisite: graduate standing.

581- 3 TOPICS IN TEACHING WRITING. Workshop or seminar in teaching composition, language, literature, creative writing, and related subjects in education. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: graduate standing.

589-3 INTERNSHIP/PRACTICUM IN TECHNICAL AND SCIENTIFIC WRITING. Involvement in developing workplace communications. Supervised by selected faculty member and cooperating corporate site. May be taken in conjunction with ENG 591. Prerequisite: consent of faculty advisor or program director.

591-3 PROFESSIONAL PORTFOLIO DEVELOPMENT. Preparation of professional portfolio. Restricted to MA candidates within one semester of fulfilling the requirements for the Technical and Scientific Writing specialization. Prerequisite: ENG 589 must be taken prior to or concurrently with ENG 591.

592-3 FICTION WRITING. Emphasis on fiction written by students. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisites: graduate standing and consent of instructor.

593-3 POETRY WRITING. Emphasis on poetry written by students. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisite: graduate standing and consent of instructor.

594-3 CREATIVE NON-FICTION WRITING. Emphasis on creative non-fiction written by students. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisite: graduate standing and consent of instructor.

595-3 PROFESSIONAL DEVELOPMENT SEMINAR. Integrating theory and practice of TESL with supervised teaching, collaborative action research, and preparation of exit papers. Prerequisite: students must be within one semester of fulfilling the MA requirements in the non-thesis option for the TESL specialization.

596-3 PREPARATORY READING/TEACHING OF WRITING. Reading of relevant research and writing of three essays under supervision of committee. Restricted to MA candidates within one semester of fulfilling requirements for Teaching of Writing specialization.

597-3 READINGS IN ENGLISH STUDIES. Individual readings in creative writing, linguistics, literature, TESL, or teaching of writing. May be repeated once for a maximum of 6 hours. Prerequisites: graduate standing; approval of adviser and instructor.

598-3 PREPARATORY READING/ENGLISH AND AMERICAN LITERATURE. Reading of relevant research and writing of three essays under supervision of committee. Restricted to MA candidates within one semester of fulfilling requirements for American and English Literature Specialization.

599-3 to 6 THESIS. May be repeated to a maximum of 6 hours. Prerequisite: graduate standing.

ENVIRONMENTAL SCIENCES (ENSC)

404-3 REGIONAL ENVIRONMENT PLANNING. (Same as GEOG 404) Interrelationships among regions, environments, and planning. Prerequisite: senior standing or consent of instructor.

411-3 HYDROLOGY. (Same as GEOG 411) Hydrologic cycle, major stream systems, uses of water resources, and their relationships to quality and future supplies. Prerequisite: GEOG 111 or consent of instructor.

412-3 GROUNDWATER HYDROLOGY. (Same as CE 412 and GEOG 412) Study of groundwater: occurrence, physical and chemical properties, flow and flow system modeling, relation to rock structure and lithology; contamination of groundwater resources. Prerequisites: GEOG 310; CHEM 113; or equivalents, or consent of instructor.

426-3 ENVIRONMENTAL GEOCHEMISTRY. (Same as GEOG 413) The exogenic environment as a geochemical system; natural circulation of water, sediment, carbon,

sulfur, nitrogen, and phosphorus; assessment of the effects of societal activities on these cycles. Prerequisites: GEOG 310; CHEM 113, or consent of instructor.

445-3 CONSERVATION BIOGEOGRAPHY. (Same as GEOG 416) Analysis of biogeography principles and conservation problems. Assess changes in biosphere distributions and extinction due to human activity. Evaluates strategies to maintain biodiversity. Field Trips. Prerequisite: GEOG 316 or consent of instructor.

465-4 AQUATIC ECOSYSTEMS. (Same as BIOL 465) Biogeochemistry and community structure of aquatic systems. Three lectures, one three-hour lab per week. Prerequisites: BIOL 121 and CHEM 121b with grades of C or better.

466-3 TERRESTRIAL ECOSYSTEMS. Community structure, biogeochemistry, and historical development of terrestrial ecosystems. Two lectures, one three-hour laboratory per week. Weekend field trips may be required. Prerequisite: consent of instructor.

472-4 TOPICS IN PLANT PHYSIOLOGY. (Same as BIOL 472) Topics include photosynthesis, mineral nutrition, water as related to plant growth and movement in plants. Prerequisite: one semester of botany or consent of instructor.

473-3 OCCUPATIONAL HEALTH. Concepts and details regarding occupational health. Prerequisite: minimum one year of college chemistry or consent of instructor.

475-3 CHEMICAL SAFETY MANAGEMENT. Concepts and details regarding safe use and handling of chemicals as recommended by safety professionals. Prerequisite: minimum one year of college chemistry or consent of instructor.

505-1 ENVIRONMENTAL SCIENCES SEMINAR I. Student and faculty research on current environmental issues. Seminar is required to be taken during the first year of the program.

506-1 ENVIRONMENTAL SCIENCES SEMINAR II. Student's seminar on his or her thesis or paper topic. Seminar is required to be taken during or just prior to the semester of students thesis or paper defense.

510-3 ADVANCED ENVIRONMENTAL SCIENCES AND POLICY. Skills used in environmental sciences and policy; coupling of science and policy in the discussion of local, regional, and global environmental concerns.

511-3 ENVIRONMENTAL POLICY. Prevention, control, and remediation of environmental problems through social, political, and legal means. Prerequisite: ENSC 510 or consent of instructor.

512-3 ENVIRONMENTAL LAW. Principle environmental laws and the judicial interpretation of important environmental statues that has developed around the protection of various aspects of the environment.

516-3 ENVIRONMENTAL IMPACT ANALYSIS. (Same as BIOL 516 and GEOG 524) Implications and applications of the National Environmental Policy Act (NEPA) and related environmental legislation. Methodologies for environmental inventory and environmental impact statement preparation.

520-3 ENVIRONMENTAL SAMPLING. Sampling techniques for water, air, soil, biota, and vegetation are covered for sampling activities that will provide representative environmental samples for analysis.

528-3 ANALYSIS OF ENVIRONMENTAL CONTAMINANTS. Theory and application of procedures used in the separation, detection, identification, and quantitation of contaminants in environmental and biological samples.

528L-1 ANALYSIS OF ENVIRONMENTAL CONTAMINANTS LABORATORY. Laboratory techniques used in the separation, detection identification, and quantitation of contaminants in environmental and biological samples. Prerequisite: prior completion or concurrent enrollment in ENSC 528.

531-3 TOXICOLOGY. Chemical and biological effects of toxic substances in living organisms at the molecular and biochemical level. Topics: routes of entry, mechanism of action, effects, antidotes, etc. Prerequisites: organic chemistry; graduate standing, or consent of instructor.

535-3 ECOLOGICAL RISK ASSESSMENT. (Same as BIOL 435) Application of ecology, chemistry, and toxicology to assess present and future pollution risks to populations, communities, ecosystems. Prerequisites: ENSC 531/CHEM 471; or ENSC/BIOL 330' or BIOL 365; or equivalent; or consent of instructor.

540-3 POLLUTION ECOLOGY. The application of biological, ecological, chemical, and physical sciences to understanding the fate and transport of pollutants through ecosystems. Prerequisite: one year of college chemistry.

545-3 TREATMENT WETLANDS AND PHYTOREMEDIATION. Development and use of treatment wetlands and phytoremediation technology to clean up contaminated water, soil, and sediment. Focus on the hydrological, biogeochemical, and ecological processes. Prerequisites: three semesters of both Biology and Chemistry or consent of instructor.

550-3 APPLIED ECOLOGY. (Same as BIOL 564) Examination of the mechanisms, directions, and magnitude of an organism's or ecosystem's response to human perturbation. Prerequisite: BIOL 365 or consent of instructor.

555-3 AGROECOLOGY. Application of ecological concepts and principles to the design and management of agricultural production; theoretical and conceptual framework

for the study and analysis of agroecosystems. Prerequisites: three semesters of both Biology and Chemistry or consent of instructor.

556-2 ADVANCED APPLIED ECOLOGY. Techniques in critical analysis and communication in the field of applied ecology. Prerequisite: ENSC 550 or BIOL 464 or consent of instructor.

561-3 PLANTS AND ENVIRONMENT. (Same as BIOL 561) Environmental effects on plant growth, reproduction, and distribution. Examination and measurements adaptive responses to environmental stress. Two lectures and three laboratory hours per week. Prerequisite: one course in botany or consent of instructor.

570-3 ENVIRONMENTAL TECHNOLOGY AND ASSESSMENT. (Same as CE 570) Techniques used to conceptualize, simulate, and analyze the dynamic nature of environmental systems. Theory and application of environmental modeling.

575-3 STATISTICS FOR ENVIRONMENTAL SCIENCES. (Same as BIOL 575) Characterization of steps, processes, and statistical analysis necessary for a well-planned experiment. Theory and application of experimental design.

580-3 ENVIRONMENTAL EDUCATION. (Same as BIOL 567) Environmental education history, practices, curriculum, organization, evaluation, project development and research required of successful practitioners in the field. Prerequisite: consent of instructor.

590-3 ENVIRONMENTAL INTERNSHIP. Coordinated activities of students with internships in "program relevant positions," as directed by their internship supervisors and faculty adviser. Prerequisites: ENSC 510; consent of faculty adviser and program director.

591-1 to 2 READINGS IN ENVIRONMENTAL SCIENCES. Coordinated readings with faculty in the areas of science, politics, law, education, technology, and other environmental areas. May be repeated to a maximum of 2 hours. Prerequisites: consent of instructor and program director.

593-1 to 2 RESEARCH IN ENVIRONMENTAL SCIENCES. Environmental laboratory, field, computer, and library research on an individual basis under the supervision of a faculty member. May be repeated to a maximum of 2 hours. Prerequisite: consent of instructor and program director.

595-1 to 3 TOPICS IN ENVIRONMENTAL SCIENCES. In-depth examination of components of one specific environmental problem. May be repeated to a maximum of 6 hours provided no topic is repeated.

597-1 to 3 FINAL RESEARCH PAPER. Directed research to satisfy non-thesis paper requirement for MS degree. Graduate degree committee must approve topic. May be

repeated to a maximum of 3 hours. Prerequisite: consent of graduate committee chairperson.

599-1 to 6 THESIS. Directed research to satisfy thesis requirement for MS degree. Graduate degree committee must approve topic. May be repeated to a maximum of 6 hours. Prerequisite: consent of graduate committee chairperson.

FINANCE (FIN)

400-3 QUANTITATIVE METHODS FOR ECONOMIC AND BUSINESS ANALYSIS. (Same as ECON 400) Applications of mathematical tools to economic and business analysis; emphasis on using calculus and linear algebra in economic and financial models. Prerequisites: ECON 301 or 302 or consent of the instructor, MS 251 with a grade of "C" or better.

415-3 ECONOMETRICS. (Same as ECON 415) Empirical research methodology and ethics. Hypothesis testing and predicting with OLS regression. Estimation with violations of classical assumptions. Multicollinearity problems; dummy variables; model specification. Prerequisites: ECON 301 and 302 or consent of the instructor, MS 251 with a grade of "C" or better.

417-3 BUSINESS FORECASTING. (Same as ECON 417) Survey of methods to forecast economic and financial conditions and markets for individual products, sectors, or regions. Time series, indicator, econometric, judgmental, and Box-Jenkins techniques. Satisfies research requirement for business programs. Prerequisites: ECON 301 and 302 or consent of the instructor, MS 251 with a grade of "C" or better.

420-3 PROBLEMS IN CORPORATE FINANCE. In-depth development of analytical decision models; basic and advanced corporate financial theory and application to business and industrial settings. Prerequisite: FIN 320 or ACCT 312.

430-3 PORTFOLIO ANALYSIS. Portfolio theory, equity valuation models, and portfolio performance evaluation; structure of equity markets; effect of taxes and inflation; bond analysis and portfolio immunization; mutual funds. Satisfies research requirement for business programs. Prerequisite: FIN 320 or 420.

431-3 DERIVATIVE SECURITIES. Introduction to derivatives; options, forwards, futures, and swaps; trading of derivatives and the arbitrage relationships; pricing of derivatives on equities, debt, commodities and foreign exchange. Prerequisite: FIN 320 or FIN 527.

435-3 REAL ESTATE FINANCE AND INVESTMENT. Fundamental concepts, investigation and evaluation of real (estate) assets. Single residence, multiple dwellings, and commercial properties. Applications based on financial theory and methodology. Prerequisite: FIN 320.

440-3 FINANCIAL INSTITUTIONS. Financial management of financial institutions: commercial banks, S&L's, insurance companies, and other financial institutions. Asset, liability, and risk management. Prerequisite: FIN 320.

450-3 INTERNATIONAL FINANCE. (Same as ECON 450) International monetary environment and institutions. Determinants of foreign exchange rates and risk management. Valuation and portfolio analysis of international stocks and bonds. Foreign investment analysis. Prerequisite: FIN 320.

460-3 CORPORATE FINANCIAL ANALYSIS AND STRATEGY. In-depth analysis of financial data and stock prices. Study of relationship among financial markets, financial strategy, and welfare of corporate stakeholders. Prerequisite: FIN 420.

470-3 SPORT FINANCIAL MANAGEMENT. Financial issues relevant to sports industry. Applying financial analysis in decision-making.

480-3 CASES AND PROBLEMS IN CORPORATE FINANCE. Use of case analyses to study financial concepts and techniques. Topics include investment decisions, mergers and acquisitions, long-term and short-term financing. Prerequisite: FIN 420.

490-1 to 6 INDEPENDENT STUDY IN FINANCE. Investigation of topic areas through individual or small group readings under supervision of faculty member. May be repeated to a total of 6 hours. Prerequisites: consent of instructor and department chairperson.

513-3 CORPORATE FINANCE. Capital budgeting, financial asset pricing, risk management, investments, dividend policy, cost of capital and long-term performance. Function and role of international and U.S. capital markets. Prerequisites: ACCT 501; 502; MS 502 or equivalent.

515-3 EMPIRICAL RESEARCH METHODS IN ECONOMICS AND FINANCE. (Same as ECON 515) Stochastic processes and simulation; optimization; estimation methodologies for maximum likelihood, pooled cross-section time-series, simultaneous equations, and discrete/limited dependent variable models; generalized method of moments. Prerequisite: admission to Economics and Finance graduate program.

517-3 TIME-SERIES ANALYSIS. (Same as ECON 517) Modeling time-series behavior of financial and economic variables to offer practical insights and solutions for particular problems faced by firms, governments and central banks. Prerequisite: ECON 515 or FIN 515, or consent of instructor.

525-3 FINANCIAL STRATEGY, GROWTH AND CONTROL. Financial strategies and creation of shareholder wealth, value transfer and destruction, role of financial markets in wealth creation, agency theory and business ethics. Prerequisites: FIN 501 and FIN 502.

527-3 CORPORATE FINANCE. Theoretical concepts and analytical tools for solving problems and making corporate investment and financing decisions. Firm valuation, international security markets and foreign investments. Will not count toward MA or MS in Economics and Finance. Prerequisite: ACCT 524.

528-3 SECURITY ANALYSIS AND MODELING. Security analysis for investment and trading; fundamental analysis; economic, industry/company analysis; technical analysis; venture capital, real estate and international diversification; analysis for trading purposes. Prerequisite: FIN 520.

532-3 FINANCIAL INNOVATIONS AND ENGINEERING. Innovating and engineering financial products, relationship between innovation and risk management, value creation through risk management, use of derivatives in risk management. Prerequisite: FIN 502.

541-3 INVESTMENTS. Broad range of financial and real assets, investment analysis, portfolio theory, strategy and timing concepts. Not a personal investments course. Prerequisite: FIN 527.

542-3 FINANCIAL MARKETS AND INSTITUTIONS. Survey of debt and equity markets and major institutions involved. Theory of financial intermediation. Risk management. Prerequisite: FIN 501 or FIN 527.

543-3 CAPITAL RESOURCE ALLOCATION. Theory and applications of large scale capital expenditures. Emphasis on selection and use of models and effects on firm value. Prerequisite: FIN 527.

544-3 HEALTH CARE FINANCIAL MANAGEMENT. Study of major financial management concepts and issues involved with current and proposed methods of third party reimbursement of health care providers. Prerequisite: FIN 527.

550-3 MULTINATIONAL CORPORATE FINANCE. Multinational corporate finance: investment decision, financial policy, and cost of capital. Foreign exchange rates, risk, and hedging. International diversification. Portfolio theories. Mergers and acquisitions. Prerequisite: FIN 527.

596-3 RESEARCH IN FINANCE. Empirical research in financial modeling and methodological issues. Includes issues from corporate finance, investments, derivatives and pricing models. Prerequisites: ECON 515 or FIN 515 FIN 501 and FIN 502; or consent of instructor.

597-3 INDEPENDENT STUDY IN FINANCE. Topics not considered in current offerings and in greater depth than regularly titled courses permit. Empirical investigations are encouraged. Prerequisites: consent of instructor and chairperson.

599-3-6 THESIS IN FINANCE. Independent research and study on approved topic. Requires a three-member committee with a thesis chairperson. Prerequisite: consent of committee and chairperson.

FOREIGN LANGUAGE AND LITERATURE (FL)

486-3 LANGUAGE LEARNING AND THE TEACHING OF FOREIGN LANGUAGES. Practical study of second language acquisition, cognitive variations, instructional methodologies, and student testing in the foreign language classroom. Required for state certification of all majors intending to teach foreign languages in secondary schools. Prerequisite: FR/GER/SPAN 301 or consent of instructor.

491-3 to 6 CULTURAL AND LANGUAGE WORKSHOP. Comparative or contrastive linguistics, advanced methodology and techniques. In-depth study of foreign cultures, travel-study abroad. Supervised projects in foreign studies. May be repeated to a maximum of 6 hours provided no topic is repeated. Not for French, German, or Spanish only for other languages taught by the department. Prerequisite: advanced or graduate standing.

FRENCH (FR)

454-3 to 6 SEMINAR. Selected topics in literature or literary criticism. May be repeated to a maximum of 6 hours provided no topic is repeated.

455-3 FRENCH DRAMA. Major and representative works.

456-3 SEMINAR ON WOMEN WRITERS. Fiction, non-fiction, drama, and poetry. Taught in English. For credit in FL, term paper written in French.

457-3 AFRICAN AND CARIBBEAN LITERATURE OF FRENCH EXPRESSION. Literature of various French-speaking nations. Taught in English. For credit in FL, term paper written in French.

461-3 FRENCH STYLISTICS. Writing style: application of stylistics to development of skill in written expression. Advanced work in principles of grammar and composition. Prerequisite: 6 hours of FR 300-level courses.

491-3 to 6 CULTURAL AND LANGUAGE WORKSHOP. Comparative or contrastive linguistics, advanced methodology and techniques. In-depth study of foreign cultures, travel-study abroad. Supervised projects in foreign studies. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: advanced or graduate standing.

499-3 READINGS IN FRENCH. Selected areas of language, literature, and culture. Individual work or small groups supervised by one or more members of French faculty. Prerequisite: senior standing and consent of instructor.

551-3 SEMINAR ON A SELECTED FRENCH AUTHOR. Intensive study of one author. May be repeated once for a total of 6 hours provided authors vary. Prerequisite: graduate standing.

552-3 FRENCH NOVEL OF THE TWENTIETH CENTURY. Representative works by authors such as Gide, Proust, Mauriac, Camus, Malraux, and Beauvoir. Prerequisite: graduate standing.

553-3 ROMANTICISM. Representative works by such authors as Lamartine, Hugo, Flaubert, and Stendhal. Prerequisite: graduate standing.

554-3 REALISM. Representative works of 19th century authors such as Balzac, Zola. Prerequisite: graduate standing.

555-3 MEDIEVAL FRENCH LITERATURE. *Chanson de Roland,* epics, romances, *fabliaux*; lyric poetry, drama. Prerequisite: graduate standing.

556-3 FRENCH LITERATURE OF THE SEVENTEENTH CENTURY. The Age of Classicism. Prerequisite: graduate standing.

GENERAL BUSINESS ADMINISTRATION (GBA)

489-0 to 15 STUDY ABROAD. Participation in School of Business exchange programs. Credit earned by completion of an approved plan of study at an exchange institution. Graduate students may repeat to a maximum of 15 hours with approval of Program Director. Prerequisites: appropriate language competency; approval by Director of International Programs, and School of Business.

GEOGRAPHY (GEOG)

400-3 URBAN GEOGRAPHY. Cultural and physical factors related to distribution, interrelations, and internal spatial organization of cities. Prerequisite: GEOG 301 or equivalent or consent of instructor.

401-3 GEOGRAPHY OF DEVELOPMENT. Analysis of development in world regions including More Developed Countries and Less Developed Countries. Emphasis on theories of development and issues associated with various levels of development.

402-3 CULTURAL LANDSCAPE. Identification and analysis, both objective and subjective, of the earth as transformed by human action with emphasis on the

contemporary situation. Field trip. Prerequisite: GEOG 205 with a grade of “C” or better or consent of instructor.

405-3 GEOGRAPHY OF FOOD. Examination of food production and distribution; the relationship between food and culture from a geographic perspective. Prerequisite: GEOG 205 or consent of instructor.

406-3 POLITICAL GEOGRAPHY. Principles of geopolitics, geostrategic theory, electoral geography, and their application to the United States and other major world regions.

408-3 SNOW AND ICE PROCESSES. This course (1) focuses on the properties, processes and distribution of seasonal and perennial snow; (2) provides an overview of glaciers; (3) and studies snow and ice climatology. Prerequisites: GEOG 211 and GEOG 314 both with a grade of “C” or better or consent of instructor.

410-3 SOILS. Formation processes, classification, distribution, use, and problems associated with earth surface materials. Field trip. Prerequisite: GEOG 210 with a grade of “C” or better.

411-3 HYDROLOGY. (Same as ENSC 411) Hydrologic cycle, major stream systems, uses of water resources and their relationship to quality and future supplies. Prerequisite: college algebra or consent of instructor. MATH 12 with a grade of “C” or better or consent of instructor.

412-3 GROUNDWATER HYDROLOGY. (Same as CE 412 and ENSC 412) Study of groundwater: occurrence, physical and chemical properties, flow and flow system modeling, relation to rock structure and lithology, contamination of groundwater resources. Prerequisites: MATH 12 with a grade of “C” or better or consent of instructor.

413-3 ENVIRONMENTAL GEOCHEMISTRY. (Same as ENSC 426) The exogenic environment as a geochemical system; natural circulation of water, sediment, carbon, sulfur, nitrogen, and phosphorus; assessment of human activities on these cycles. Prerequisite: CHEM 113 or consent of instructor.

415-3 ANIMAL GEOGRAPHY. Principles of biogeography as applied to animals, focusing on past and present distribution patterns considering environmental circumstances and animal capabilities. Field trips. Prerequisite: GEOG 316 or consent of instructor.

416-3 CONSERVATION BIOGEOGRAPHY. Analysis of biogeography principles and conservation problems. Assess changes in biosphere distributions and extinctions due to human activity. Evaluates strategies to maintain biodiversity. Field trips. Prerequisite: GEOG 316 with a grade of “C” or better or consent of instructor.

418-3 GEOGRAPHIC INFORMATION SYSTEMS. Concepts, basic theory, and principles of GIS using both raster and vector data models in a PC environment. Prerequisite: consent of instructor.

419-3 THEMATIC CARTOGRAPHY. In-depth analysis of cartographic techniques, theories, and their application to the design of maps. Prerequisite: GEOG 320 with a grade of "C" or better or consent of instructor.

420-3 INTERACTIVE AND ANIMATED CARTOGRAPHY. Investigates and develop alternatives such as interactive maps and map animation to traditional map representations such as static paper maps. Prerequisite: GEOG 320.

421-3 DIGITAL ELEVATION MODELING. Processing of digital elevation models and the generation of 3D renderings with digital orthophotos, satellite imagery, digital raster graphics, and/or other 3D features. Prerequisite: GEOG 418.

422-3 REMOTE SENSING AND DIGITAL IMAGE PROCESSING. Concepts of remote sensing including air-photo interpretation, digital image preprocessing, and classification of satellite-based imagery. Prerequisite: consent of instructor.

423-3 COMPUTER MAPPING. Cartographic design techniques related to computer aided conversion, analysis, and presentation of data. Includes use of arc view, symbol perception, and map design. Prerequisite: consent of instructor.

424-3 VECTOR BASED GEOGRAPHIC INFORMATION SYSTEMS (GIS). Examination of vector topology, digital map transformation, manipulation, analysis, and composition. Prerequisite: GEOG 418 with a grade of "C" or better or consent of instructor.

425-3 RASTER BASED GEOGRAPHIC INFORMATION SYSTEMS (GIS). In-depth study of cell-based (raster) GIS concepts. Includes the development of cell based GIS models for addressing environmentally related issues. Prerequisite: consent of instructor.

426-1 to 6 FIELD STUDY. Field investigation of physical and cultural features of the environment. May be repeated to a maximum 6 hours. Prerequisite: consent of instructor.

427-1 to 6 INTERNSHIP. Work experiences in public or private agencies. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

428-1 to 6 TRAVEL STUDY COURSE. Enrichment through travel, supervised study, and readings on areas visited. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor .

429-3 STORM CHASING AND ASSESSMENT FIELD COURSE. Exposes students to the unique environments and hazards associated with local thunderstorms. Students will

benefit from lecture and participation in event assessment. Prerequisites: GEOG 211 and GEOG 314 both with a grade of "C" or better and instructor consent.

440-3 TEACHING OF GEOGRAPHY. Methods and techniques of teaching geography in elementary and secondary classroom situations. Emphasis on teaching devices, illustrative materials, literature, and use of maps in the classroom.

450-3 TOPICS IN GEOGRAPHY. Specific topics based upon faculty expertise. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: junior or senior standing or consent of instructor.

470-2 to 4 ADVANCED PHYSICAL GEOGRAPHY LABORATORY. Application of field and laboratory methods, from study design to data collection and analysis, used to study the earth's features and processes. May be repeated to 4 credit hours. Prerequisite: consent of instructor.

490-1 to 3 TUTORIAL IN GEOGRAPHY. Individual and small group conferences with faculty to examine geographic topics. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: consent of adviser and instructor.

500-3 SEMINAR IN CULTURAL GEOGRAPHY. Selected topics in human-environment interactions. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

510-3 SEMINAR IN PHYSICAL GEOGRAPHY. Selected topics as related to various aspects of physical environments and patterns of human occupancy. Topics vary. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

520-3 RESEARCH METHODS IN GEOGRAPHY. Examination of geographic research. Preparation of a research proposal. Execution of a brief geographic study.

521-3 CONTEMPORARY PHILOSOPHY AND EXPLANATIONS IN GEOGRAPHY. Compares positivist, humanist, and structuralist modes of explanation in geography.

522-3 TECHNIQUES IN GEOGRAPHY. Introduces qualitative and quantitative techniques in geographic research. Exposes students to data collection, analysis, and display methods. Prerequisite: GEOG 321 or consent of instructor.

523-3 ENVIRONMENTAL ASSESSMENT AND EVALUATION METHODS. Methods and techniques used to determine and analyze environmental effects as related to public and private entities. Prerequisite: consent of instructor.

524-3 ENVIRONMENTAL IMPACT ANALYSIS. (Same as ENSC and BIOL 516) Implications and applications of National Environmental Policy Act (NEPA) and related

environmental legislation. Methodologies for environmental inventory and environmental impact statement preparation. Prerequisite: consent of instructor.

525-3 SEMINAR IN GEOGRAPHIC INFORMATION SYSTEMS (GIS). Selected topics dealing with application of GIS. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: GEOG 424 or 425; consent of instructor.

526-3 SEMINAR IN CARTOGRAPHY. Selected topics in cartography. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

530-3 SEMINAR IN REGIONAL GEOGRAPHY. Application of regional concepts and methods to geographical problems in selected regions. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

570-3 SIUE WEATHER STATION. This course focuses on meteorological instruments and measurement techniques; formal weather observations and reporting; and community outreach. Prerequisites: graduate standing and instructor approval.

571-3 PREPARATORY READINGS FOR THE WEATHER OBSERVER EXAM. Focuses on preparatory readings and practice examinations for weather observers. Prerequisites: graduate standing and instructor approval.

590-1 to 6 INDEPENDENT STUDY. May be repeated to a maximum of 6 hours. Prerequisites: consent of instructor and adviser.

597-3 PREPARATORY READING. Restricted to MS candidates choosing the comprehensive written examination which will be based on current MS geography reading list and the student's chosen specialty area. Prerequisite: graduate standing.

599-3 to 6 THESIS. May be repeated to a maximum of 6 hours. Prerequisites: consent of thesis committee chairperson and adviser. Faculty committee must be formed before student registers.

GERMAN (GER)

411-3 GERMAN CIVILIZATION. German speaking areas of the world; anthropological and social aspects of various cultures. Prerequisite: senior standing in German

452-3 FAUST. Goethe's masterpiece, its background, meaning and impact on world literature; life and times of Goethe. Prerequisite: GER 301 or consent of instructor.

454-3 to 6 SEMINAR. Critical and analytical study of selected topics of German literature or literary criticism. May be repeated to a maximum of 6 hours provided no topic is repeated.

491-3 to 6 CULTURAL AND LANGUAGE WORKSHOP. Comparative or contrastive linguistics, advanced methodology and techniques. In-depth study of foreign cultures, travel-study abroad. Supervised projects in foreign studies. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: advanced or graduate standing.

499-3 to 6 READINGS IN GERMAN. Selected areas of German language, literature, and culture. Individual or small group work supervised by one or more members of German faculty. May be repeated once for a total of 6 hours provided no topic is repeated. Prerequisite: senior standing and consent of instructor.

551-3 SEMINAR ON A SELECTED AUTHOR. Intensive study of one author. May be repeated once for a total of 6 hours provided authors vary. Prerequisite: graduate standing.

552-3 GERMAN LYRIC POETRY. Various forms including the ballad. Prerequisite: graduate standing.

553-3 AUSTRIA'S ROLE IN GERMAN LITERATURE. Selected works. Prerequisite: graduate standing.

554-3 ROMANTICISM I. Authors of the early period and the "Berlin School." Prerequisite: graduate standing.

555-3 ROMANTICISM II. Selected authors of the patriotic and late periods: Kleist, Arndt, Koerner, Uhland, Eichendorff, Lenau, Grillparzer, Heine, and Moerike. Prerequisite: graduate standing.

556-3 NINETEENTH CENTURY GERMAN NOVEL. From the decline of Romanticism to the end of the century. Representative authors: Keller, Fontane, and Raabe. Prerequisite: graduate standing.

557-3 TWENTIETH CENTURY GERMAN NOVEL. Representative authors of various movements. Prerequisite: graduate standing.

558-3 SEMINAR IN FOLKLORE. German folk literature emphasizing tales, chapbooks, songs, and drama. Prerequisite: graduate standing.

559-3 GERMAN LITERATURE OF THE MIDDLE AGES. From the fall of Rome through the courtly age. *Nibelungenlied*. Prerequisite: graduate standing.

GERONTOLOGY (GRN)

587-3 INTERDISCIPLINARY SEMINAR IN GERONTOLOGY. Aspects of aging from both disciplinary and professional perspectives including anthropology, biology, economics, political science, business, dentistry, medicine, nursing. Prerequisite: PSYC 487 or consent of instructor.

588-3 PROGRAMS, SERVICES, AND RESOURCES IN AGING. Covers major federal, state, and local programs serving older adults; Older American Act and titles of the Act and grant proposal writing. Prerequisite: GRN 587 or consent of instructor.

598-1 to 12 PRACTICUM IN GERONTOLOGY. Professional training provided by gerontological specialists in aging network, business, social service, and health care industries. Field placement dependent upon student's discipline or profession. Minimum of 3 hours of practicum required for Interdisciplinary Graduate Sequence in Gerontology Certificate of Completion. May be repeated to a maximum of 12 hours. Prerequisites: GRN 587 or 588; consent of practicum coordinator.

GREEK (GRK)

499a-f-4 READINGS IN ANCIENT GREEK. (a) Development of lexical and structural competence; (b) Continuation of a; (c) Selected masterpieces of literature; (d) History; (e) Poetry; (f) Philosophy. A, b, c must be taken in sequence and are prerequisites to d, e, or f which may be taken out of sequence with consent of instructor. Individual segments may not be repeated for credit. Prerequisite: for a, b, c, consent of instructor.

HEALTH EDUCATION (HED)

462-1 to 3 SPECIAL TOPICS IN HEALTH EDUCATION. Relevant health issues; topic and credit hours announced. May be repeated to a maximum of 6 hours provided no topic is repeated. For either health education majors and minors only or kinesiology majors only. Prerequisite: HED 201 or consent of instructor.

HISTORY (HIST)

400-3 TOPICS IN HISTORY. Selected topics such as biography of a major figure, recent theme in world history, etc. May be repeated to a maximum of 9 hours provided no topic is repeated.

404a,b-6 (3,3) TOPICS IN MEDIEVAL SOCIAL, RELIGIOUS AND INTELLECTUAL HISTORY. Historiographical problems in the evaluation of medieval society, culture and ritual: (a) 400-1000 C.E.; (b) 1000-1500 C.E.

408a-c-9 (3,3,3) HISTORY OF ENGLAND: 1509 TO PRESENT. (a) Reformation and Revolution, 1509-1714; (b) Birth and growth of Industrial England, 1714-1867; (c) Birth and growth of the Welfare State 1867 to present.

412-3 THE FRENCH REVOLUTION. Examination of the origins of the revolution, its subsequent outbreak development, radicalization, and collapse focusing especially on intellectual and cultural dimensions of the revolutionary experience.

413-3 HISTORY OF MODERN FRANCE. Nineteenth and twentieth Century France: ongoing revolutions, politics and culture of Third Republic, efforts to construct 'French-Ness,' Vichy, Imperial adventures, and leadership in European integration.

415-3 MODERN GERMAN HISTORY. German history from 1871 to present including Germany under Bismarck, World War I, the Nazi period, World War II, division and reunification. Prerequisite: HIST 111b.

416-3 WORLD WAR I AND ITS AFTERMATH: 1914-1921. War's origins, course, and results; military action as well as political, social, economic, and cultural effect on home fronts; war and world revolution, 1917-1921.

418-3 WORLD WAR II. Survey of causes and multiple aspects of the Second World War; emphasis on military operations.

420a,b-6 (3,3) EUROPEAN SOCIAL, CULTURAL AND INTELLECTUAL HISTORY. (a) Renaissance to French Revolution; (b) French Revolution to present.

422a-c-9 (3,3,3) LATE MODERN EUROPE. (a) Vienna Congress to the Great War; (b) World War I through World War II; (c) Europe Since World War II. Prerequisites: (a) HIST 111a or consent of instructor; (b) HIST 111b or consent of instructor; (c) HIST 111b or consent of instructor.

423 a, b-6 (3,3) NATIVE AMERICANS BEFORE 1492 TO THE PRESENT. The investigation of disparate cultures in contact with a blend of historical and anthropological methods and materials with emphasis on Native American worldviews. (a) before 1492 to 1840 (b) 1840 to present. Prerequisite: HIST 200 or consent of instructor.

427-3 HISTORY OF SOUTH AFRICA. Course will familiarize students with the major themes in the history of South Africa largely focusing on the period of sustained western contact from 1652-present. Prerequisite: HIST 301.

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428-3 TOPICS IN EUROPEAN WOMEN'S HISTORY. Selected topics in women's history. Course varies from semester to semester. May be repeated to a maximum of 9 hours provided no topic is repeated.

430-3 AMERICAN COLONIAL HISTORY. Founding of colonies in British America and their development to 1763.

431-3 AMERICAN REVOLUTION AND CONSTITUTION. Conflicting forces and events that led to the American Revolution and to the Constitution.

434a,b-6 (3,3) TWENTIETH CENTURY AMERICAN HISTORY. Politics, culture and economics in an urban industrial society: (a) 1870-1939; (b) 1940 to present. Prerequisites: (a) HIST 201 or consent of instructor; (b) HIST 201 or consent of instructor.

440-3 WOMEN IN AMERICAN SOCIAL HISTORY. Women from various social classes, ethnic and racial groups, and geographic regions. Social institutions: family, church, schools, etc. Colonial era to present.

442-3 THE BLACK URBAN EXPERIENCE. Social, economic, and political history. Emphasizes a community life and development, as well as race relation.

443-3 ORIGINS OF THE AMERICAN CIVIL WAR. An examination of the origins of the sectional crisis and the causes of the American Civil War.

444-3 WAR AND RECONSTRUCTION. An examination of the American Civil War and Reconstruction, 1861 to 1877.

445-3 AMERICAN MASCULINITY. American Masculinity is a gender history that explores the different manifestations of manhood as it has been constructed by Americans from the seventeenth century to the present.

447-3 APPROACHES TO ORAL HISTORY. The methodology, preservation, and use of topical and life history interviews in historical research.

460-3 HISTORY OF MEXICO. Mexican history from the winning of independence to present. Special attention will be devoted to relations with the U.S.

461-3 HISTORY OF CUBA. The history of Cuba since 1800, with special emphasis on the political, economic, and cultural development of the island.

462-3 HISTORY OF BRAZIL. The history of Brazil since 1800 with a focus on the political, economic, and cultural development of the nation.

470-3 PRESERVING THE AMERICAN PAST. The presentation of history in public arenas including museums, monuments, cemeteries, and historic buildings.

490-3 to 6 INTERNSHIP IN HISTORY. Professional experience in aspects of historical research, preservation, exhibition, and interpretation. May be repeated to a maximum of 6 hours. Prerequisite: by permission only.

500a-d-12 (3,3,3,3) HISTORY SEMINAR. (a) American; (b) European; (c) Latin American; (d) World/Comparative. Any part or combination of parts may be repeated to a maximum of 12 hours provided no topic is repeated.

510-1 to 3 READINGS IN HISTORY. Supervised reading for students with sufficient background. May be repeated to a maximum of 6 hours. Prerequisites: minimum 3.0 average in history; consent of instructor.

514-3 STUDIES IN ASIAN HISTORY AND POLITICS. Selected themes on Asian history and politics. Prerequisites: HIST 356; 358, or consent of instructor.

515-3 PROBLEMS IN 20TH CENTURY UNITED STATES HISTORY. Lectures, discussions, and readings on significant issues and interpretations concerning them.

554-3 PROBLEMS IN 19TH CENTURY AMERICA. Lectures, discussions, and readings on significant issues and interpretations concerning them.

555a-3 GRADUATE CORE SEMINAR IN HISTORY AND THEORY. Theory in historical practice focusing on major theorists, the structure of their thought, and its application. Required for all history graduate students.

555b-3 GRADUATE CORE SEMINAR IN HISTORY AND THEORY. Theory in historical practice, focusing on major theorists, the structure of their thought, and its application. Required for all history graduate students. Prerequisite: grade of “B” or better in HIST 555a.

556a-1 HISTORY COLLOQUIUM. The dimensions of the discipline of history: research, pedagogy, and community. Required for all history graduate students.

556b-1 HISTORY COLLOQUIUM. The dimensions of the discipline of history: research, pedagogy, and community. Required for all history graduate students. Prerequisite: HIST 556a.

580-3 MUSEUM STUDIES. (Same as ART 580) History, theory, structure, organization of museums, planning and interpretation of exhibits, collections management, ethical and legal concerns.

582-3 PRACTICUM IN EXHIBITS AND PROGRAM DEVELOPMENT. (Same as ART 582) Intensive, independent exhibition, educational project, or program related to museum studies. Prerequisites: ART/HIST 580; ART 581, or consent of instructor.

590-3 INTERNSHIP IN MUSEOLOGY. Professional experience in aspects of museum work, including exhibition, interpretation, or administration. Prerequisite: permission of instructor.

599-3 to 6 THESIS. Directed research to satisfy thesis requirement for MA degree. May be repeated to a maximum of 6 hours. Prerequisites: consent of graduate adviser and thesis committee chairperson.

INDUSTRIAL AND MANUFACTURING ENGINEERING (IME)

415-3 DETERMINISTIC MODELS. (Same as OR 440) Linear programming, problem formulation, simplex algorithm, transportation and network problems, duality theory, sensitivity theory. Prerequisites: knowledge of computer programming; MATH 249 or 250, or consent of instructor.

427-3 KNOWLEDGE-BASED SYSTEMS. (Same as CE, ECE, and ME 427) Engineering-oriented perspective on artificial intelligence (AI) technology. General AI concepts and specifically knowledge-based (expert) systems applied to engineering problem solving. Prerequisite: knowledge of one of the familiar computer programming languages (BASIC, C, FORTRAN or Pascal) or consent of instructor.

430-3 MANAGING ENGINEERING AND TECHNOLOGY. Management functions of planning, organizing, motivating and controlling, and analysis of application of these functions in engineering research, design, production, technical marketing, and project management. Prerequisite: junior or senior standing in Industrial or Manufacturing Engineering.

451-3 METHODS DESIGN AND WORK MEASUREMENTS. Design of work systems. Methods and techniques employed in measuring work. Current philosophy underlying improvement in work methods and procedures used to measure work perform. (2 hours lecture; 2 hours laboratory.) Prerequisite: IME 365 or equivalent, or consent of instructor.

458-3 HUMAN FACTORS ENGINEERING. Analysis of the limitations of humans in man-machine systems to increase productivity and meet physiological needs of system participants. Principles are applied through design problems. Prerequisite: IME 451 or consent of instructor.

461-3 STOCHASTIC MODELS. (Same as OR 441) Probabilistic models, elementary queuing theory with single or multiple servers, Markov processes and models, decision theory. Prerequisite: STAT 380 or 480a.

463-3 RELIABILITY ENGINEERING. (Same as STAT 484) Probabilistic models for the reliability of coherent systems. Statistical models for lifetimes of components and repairable systems. Reliability estimation and prediction. MIL standards. Prerequisite: IME 365 or STAT 480a, b.

466-3 ENGINEERING METROLOGY. Exposes the student to the principals associated with dimensional measurement, inspection, measurement systems analysis, and geometric dimensioning and tolerancing. Prerequisite: IME 370 or graduate standing.

465-3 DESIGN AND CONTROL OF QUALITY SYSTEMS. (Same as STAT 488). Quality design by experimental design, determination of process capability, quality control using statistical control charts, acceptance sampling. Prerequisite: IME 365 or STAT 380 or consent of instructor.

467-3 TOTAL QUALITY AND TAGUCHI METHODS. Apply concepts and methods of quality improvement including total quality, quality function deployment, design of experiments, quality loss function, etc. Case studies and software tools. Prerequisites: STAT 380; IME 365, or consent of instructor.

468-3 SIMULATION. (Same as OR 442) Design of simulation models using a high-level simulation programming language. Applications in production, inventory, queuing, other models. Prerequisites: computer programming skills; IME 365.

470-3 MANUFACTURING SYSTEMS. Design and analysis of manufacturing systems including automated flow lines, assembly systems, material handling systems. Group technology, fundamentals of CAD/CAM/CAPP, numerical control, steady state optimal control. Prerequisites: IME 365, 370, 375, and upper-division standing in industrial or manufacturing engineering or consent of instructor.

475-3 COMPUTER AIDED DESIGN, MANUFACTURING AND ENGINEERING. Associative and Parametric Modeling for computer-aided product design process in Computer Integrated Design and Manufacturing environments, Assembly Modeling, Sketching, Design for Manufacture and Assembly. Prerequisite: IME 375 or consent of instructor.

476-3 PLANTWIDE PROCESS CONTROL. A treatment of techniques in automated control. Digital, analog, open and closed loop control are discussed. Students gain experience with PC data acquisition and control. Prerequisites: CS 145 with C or better; ECE 210 with C or better.

477-3 COMPUTER INTEGRATED MANUFACTURING SYSTEMS. (2 hours lecture, 2 hours laboratory) Application of robot theory integrated with automated manufacturing systems. Emphasis on design laboratory exercises. Prerequisites: IME 470, IME 476, CS 144 or equivalent, senior standing in industrial and manufacturing engineering or consent of instructor.

480-3 TOOL ENGINEERING. Covers topics including locating/orientation principles, clamping, positioning, and concepts required to design and fabricate tooling for machining, joining, and bulk deformation processes. Prerequisites: IME 370; IME 345.

482-3 MANUFACTURING ENGINEERING DESIGN. Topics include tolerancing, material selection, cost estimation, process planning, product fabrication, and activities required to bring product from conceptual design through manufacture. Prerequisites: IME 345 or concurrent, 370, or consent of instructor.

483-3 PRODUCTION PLANNING AND CONTROL. Development and applications of models and techniques for designing integrated production systems to manage material, service, and information flows in response to flucuating market demands. (2 hours lecture, 2 hours laboratory) Prerequisite: senior standing in industrial or manufacturing engineering, or consent of instructor.

484-3 FACILITIES PLANNING. Theory and methods of facilities layout and planning emphasizing activity relationships, space requirements, materials handling and storage, plant layout, and facility location problems. Prerequisite: IME 415, 451, and upper-division standing in industrial or manufacturing engineering or consent of instructor.

490-3 INTEGRATED ENGINEERING DESIGN. Individual/group laboratory or industrial projects of a research, design, or development nature which may apply to engineering systems. Prerequisite: senior standing in industrial or manufacturing engineering or consent of instructor.

492-1 to 6 SPECIAL TOPICS IN INDUSTRIAL AND MANUFACTURING ENGINEERING. Selected topics of current interest in industrial or manufacturing engineering and related fields. May include individual research projects for students with honors standing. Prerequisite: senior standing in industrial or manufacturing engineering or consent of instructor.

515-3 ENGINEERING OPTIMIZATION MODELS. Linear and nonlinear optimization for IME. Taxonomy, modeling, formulation, convex optimization, duality, unconstrained, constrained optimization. Computational Complexity and NP-completeness. Engineering applications. Prerequisite: consent of instructor.

527-3 INTELLIGENT ENGINEERING SYSTEMS. Designing intelligent engineering systems, solving complex problems through knowledge-based design using hybrid architecture comprising expert systems, artificial neural networks, and optimization. Prerequisite: IME 427 or equivalent or consent of instructor.

530-3 ENGINEERING AND TECHNOLOGY MANAGEMENT. Applied management principles in manufacturing and high-tech environments. Planning and forecasting, motivating technical people, product life style, concurrent engineering. Prerequisite: consent of instructor.

531-3 ENGINEERING PROJECT MANAGEMENT. Applying IME skills to industry-based, team-oriented problems involving cost estimating, planning, scheduling, implementation using advanced techniques such as CPM, PERT, GERT. Prerequisite: consent of instructor.

557-3 VALUE ENGINEERING. Effective techniques to improve overall performance highlighting value methodology, lean production management, strategic planning, and everyday business decisions in private industry. Prerequisite: IME 345, IME 451, IME 470 or equivalents or consent of instructor.

568-3 ADVANCED COMPUTER SIMULATION. Advanced techniques of computer simulation and their applications for real world projects in production, manufacturing, service industries, discrete-event, continuous simulation, simulation optimization, output analysis. Prerequisite: IME 468 or equivalent or consent of instructor.

570-3 ASSEMBLY ENGINEERING. Statistical and traditional tolerancing methods, cost/tolerance relationship, design for assembly, part count reduction techniques, assembly tooling, and inspection for assembly components. Prerequisite: IME 428 or equivalent or consent of instructor.

575-3 ADVANCED CAD/CAM/CAE. Advanced techniques of CAD/CAM/CAE and their applications to real-world projects and to other state-of-are information technologies used for product life-cycle management. Prerequisite: IME 475 or equivalent or consent of instructor.

576-3 ADVANCED COMPUTER INTEGRATED MANUFACTURING SYSTEMS. Advanced topics in system integration, optimization, data collection, device monitoring, and software development for automated systems. Prerequisite: IME 476 or equivalent or consent of instructor.

577-3 ADVANCED ENGINEERING MATERIALS. Examination of Engineering Materials with emphasis on selection, application, fabrication, and testing of materials in industrial applications. Prerequisite: IME 370 or equivalent or consent of instructor.

580-3 ADVANCED MEASUREMENT SYSTEMS. Advanced topics associated with dimensional measurement, inspection, measurement system analysis, and measurement of other physical parameters. Emphasis on automated and precision measurement techniques. Prerequisite: IME 466 or equivalent or consent of instructor.

583-3 SUPPLY CHAIN LOGISTICS SYSTEMS. Design of integrated production systems based on supply chain logistics, enterprise-wide performance measurement, distribution planning, vehicle routing, demand management, replenishment management, real-time control.

584-3 DESIGN & EVALUATION OF MATERIAL HANDLING SYSTEMS. Material handling, automatic storage and retrieval systems. Vehicle alternatives, sorting, distribution, warehousing, order picking, pallet storage, receiving, bar-coding, benchmarking, case picking, RFID, cross-docking. Prerequisite: IME 484 or equivalent or consent of instructor.

591-1-4 INDEPENDENT STUDY. Individual Investigation of a topic in Industrial Engineering to be agreed upon with the instructor. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

595-1-5 SPECIAL PROJECT. Independent study in focus area. May be used as a paper for MS degree in Industrial Engineering. Prerequisite: consent of research adviser.

599-1-6 THESIS. Directed research on a specific industrial engineering topic to satisfy thesis requirement. May be repeated to a maximum of 6 hours. Prerequisite: written consent of research adviser.

INSTRUCTIONAL TECHNOLOGY (IT)

430-3 COMPUTER-BASED PUBLISHING AND INSTRUCTION. Opportunities to work with various computer hardware and software systems to prepare instructional materials. Emphasis is placed on design and production of effective instructional materials.

435-3 PRODUCING INSTRUCTIONAL MATERIALS. Development of instructional products which integrate various digital media. Emphasis on production, visual communication, graphics, authoring environments, and evaluation of instructional software.

450-3 USING VIDEO FOR INSTRUCTION. Instructional television as medium for learning. Emphasis on delivery systems including commercial, public, and satellite programs; teacher produced instructional sequences.

481-3 COMPUTERS IN EDUCATION: THEORY AND PRACTICE. Research on and effective methods for using computers in an educational setting and a systematic framework for integrating computers into the curriculum.

486-3 WEB DESIGN FOR INSTRUCTION. Web design concepts for educational settings, including usability concepts, web style criteria, interaction and instructional strategies, and legal/ethical issues related to web development.

490-1 to 6 SPECIAL TOPICS. Varied content. Topics of immediate concern in instructional technology field. May be repeated to a maximum of 6 hours.

500-3 PRINCIPLES OF INSTRUCTIONAL TECHNOLOGY. Major concepts, critical issues, and research in instructional technology including historical perspectives, design models, media, development, and evaluation.

510-3 INSTRUCTIONAL SYSTEMS DESIGN. Concepts and procedures related to systematic design, development, implementation, and evaluation of instruction.

520-3 PERFORMANCE TECHNOLOGY. Assessment and analysis of training and educational needs; procedures for performing instructional analysis; consultation strategies.

530-3 MANAGING INSTRUCTIONAL DEVELOPMENT. Systematic procedures for design, development, and evaluation of learning systems. Emphasis on consultation skills, analysis procedures, development and implementation issues, project management, and evaluation models.

540-3 DISTANCE EDUCATION. Examination of theories and applications of distance education in educational and training settings in a variety of instructional modalities.

550-3 EMERGING TECHNOLOGIES IN EDUCATION. Current and emerging technologies in the field of education. Software and accessories will be utilized in a variety of instructional settings. Prerequisites: IT 500.

560-3 LEADERSHIP IN EDUCATIONAL TECHNOLOGY. Issues related to the integration of technology in educational institutions are explored. Emphasis is given to leadership, management, professional development, planning models and integration strategies. Prerequisites: IT 481.

565-3 MANAGING TECHNOLOGY RESOURCES FOR EDUCATION. Installation, maintenance and troubleshooting of a variety of operating systems, data networks and distance learning systems in educational contexts. Focus on management, support, and delivery options. Prerequisites: IT 481, IT 560.

571-1 FIELD EXPERIENCES I. Field experiences in area schools focusing on situational analysis and planning for effective technology integration practices. Prerequisite: IT 481.

572-2 FIELD EXPERIENCES II. Field experiences in area schools focusing on the design of technology-based integration strategies and the evaluation of technology-based learning experiences. Prerequisite: IT 571.

573-3 FIELD EXPERIENCES III. Field experiences in area schools focusing on technology support, management, administration, and leadership. Prerequisite: IT 572.

580-3 DESIGN OF INTERACTIVE LEARNING ENVIRONMENTS. Instructional theories and strategies for designing digital multimedia learning environments. Emphasis on design methods, interactivity, and usability issues.

582-3 DEVELOPMENT OF INTERACTIVE LEARNING ENVIRONMENTS. Principles and techniques for developing interactive learning environments using advanced authoring and production tools. Prerequisite: IT 486.

590-3 SEMINAR IN INSTRUCTIONAL TECHNOLOGY. Topics in instructional technology. May be repeated once for a total of 6 hours. Prerequisite: consent of instructor.

592-1 to 6 FIELD STUDY. Supervised study in instructional technology. Work will closely match student's educational and professional objectives. May be repeated to a maximum of 6 hours.

595-1 to 6 PROBLEMS IN INSTRUCTIONAL TECHNOLOGY. Individual study of selected problems in instructional technology. May be repeated to a maximum of 6 hours. Prerequisite: consent of adviser.

596-1 DESIGN STUDIO I. Field-based experiences in the design of learning activities and utilization of appropriate tools for computer-based instructional development, including graphics, multimedia, and software authoring. Prerequisites: IT 486 and IT 500.

597-2 DESIGN STUDIO II. Field-based experience in the design and production of interactive multimedia, electronic performance support systems, internet resources, and other forms of technology-enhanced learning environments. Prerequisites: IT 510 or IT 580, and 15 hours of course work in Instructional Technology.

598-3 FINAL PROJECT. Design, development, and testing of instructional product. Proposal and defense required. Prerequisites: 30 hours toward completion of degree; consent of instructor.

599-1 to 6 THESIS. Supervised research on approved topic. Proposal and defense required. May be repeated to a maximum of 6 hours. Prerequisites: consent of instructor and adviser.

KINESIOLOGY (KIN)

410-3 EXERCISE FOR SPECIAL POPULATIONS. Designing exercise programs for children, youth, adults, and the aged. ACSM recommendations will guide this course.

412-3 BODY COMPOSITION. An overview of the theories and application of body composition assessment. Prerequisite: KIN 420.

414-3 EXERCISE ADHERENCE. Behavior management in the fitness/rehabilitation/physical education setting. Major determinants/consequences of exercise adherence and its impact on public health.

418-3 PHYSICAL ACTIVITY AND PUBLIC HEALTH. Impact of physical activity on individuals with chronic disease and those with disabilities. Prerequisite: KIN 410.

420-3 PHYSIOLOGICAL EFFECTS OF MOTOR ACTIVITY. Function and regulation of major human systems and response of these systems to physical activity. Two-hour lecture and two hour laboratory per week. Prerequisite: KIN 315.

480-1 to 4 INDEPENDENT STUDY. Individual investigation of topic. May be repeated to a maximum of 4 hours provided no topic is repeated. Prerequisite: consent of instructor.

490-1 to 4 SELECTED TOPICS IN APPLIED KINESIOLOGY. Theory and practice in topical areas such as exercise physiology, biomechanics, sport and exercise psychology, adapted physical education, and pedagogy. May be repeated to maximum of 6 hours provided no topic is repeated.

499-1 to 4 INDIVIDUAL RESEARCH. Selection, investigation, and writing of research paper under supervision of instructor. May be repeated to a maximum of 4 hours. Prerequisite: consent of instructor.

500-3 BEHAVIORAL ANALYSIS OF SPORT. Psychological variables influencing participation patterns and performance in sport, and effects of sport upon psychological responses.

505-3 ADVANCED PHYSIOLOGY OF MOTOR ACTIVITY. Metabolic changes that occur during physical exercise. Prerequisite: KIN 420 or consent of instructor.

510-3 HISTORICAL, CURRENT, AND COMPARATIVE ISSUES IN KINESIOLOGY. Study of significant events in education, sport, and physical education that have led to current practices in kinesiology.

513-3 EXERCISE, EPIDEMIOLOGY, AND CHRONIC DISEASE. Principles and concepts of epidemiology and influence of exercise on prevalent chronic diseases in America.

514-3 APPLIED EXERCISE PHYSIOLOGY. Investigates the human physiological systems' response to rest and exercise, and the stimuli during rest and exercise that can affect these responses. Prerequisite: KIN 510.

515-3 RESEARCH METHODS IN KINESIOLOGY. Research designs appropriate for studies in human performance, analysis of representative studies, application of methodology in selecting and defining problems, overview of statistics.

520-3 PEDAGOGY IN SPECIAL PHYSICAL EDUCATION. Selection of appropriate intervention strategies for individuals with disabilities. Includes instructional strategies and curriculums.

525-3 PRINCIPLES OF ASSESSMENT IN SPECIAL PHYSICAL EDUCATION. Selection and presentation of appropriate assessment tools for individuals with varying degrees of disability and age.

530-3 ADVANCED MOTOR LEARNING. Theoretical and practical aspects of motor skills acquisition related to physical education and sport performance including retention, motivation, transfer, and practice effects. Prerequisite: KIN 320.

532-3 RESEARCH METHODS IN SPORT MANAGEMENT. Analysis of Qualitative Research Methods studying multiple sport management research streams. Case studies, content analysis, ethnography, policy analysis, and legal research are included.

533-3 ISSUES IN ATHLETICS AND EDUCATION. Current topics analysis, through principles of management, strategy, sociology, law, and other disciplines.

534-3 STRATEGIC MANAGEMENT IN THE SPORT INDUSTRY. Firms in the sport industry, attainment of competitive advantage, analytical tools studying corporate environment, culture, change, planning, and implementation.

535-3 ADMINISTRATIVE THEORY AND PRACTICE IN KINESIOLOGY. Administrative and supervisory functions in physical education, fitness/wellness, and sport organizations including organizational policies and procedures for instructional programs.

536-3 SPORT FACILITY DESIGN AND MANAGEMENT. Principles of design, construction, maintenance and management of sport centers.

537-3 DEVELOPMENT AND GOVERANCE OF INTERNATIONAL SPORTS. Cultural influences affecting the emergence, governance and organization of selected international sports.

538-3 SPECIAL TOPICS IN SPORT MANAGEMENT. Human Resource Management – Risk Management – Sport Communication – Interscholastic, Intercollegiate, and/or Professional Sport Administration – Coaching Theory and Administration.

539-3 AQUATICS, SPORTS, AND RECREATION. Techniques and methods of instruction in aquatic programs for individuals with disabilities will be presented. Disability sport and recreation programs will be examined.

540-3 EXERCISE ASSESSMENT AND PRESCRIPTION. Theoretical and practical aspects of assessment tools and their protocols, and application of techniques of exercise. Prerequisite: KIN 420.

545-3 BIOMECHANICS OF HUMAN MOVEMENT. Application of mechanical principles to development of motor skills from both theoretical and experimental aspects. Prerequisite: KIN 316.

550-3-12 SELECTED TOPICS IN KINESIOLOGY. Analysis of reports, current problems, trends, and research in kinesiology. Repeatable up to 12 hours at discretion of advisor; provided no topic is repeated. Prerequisite: consent of instructor.

552-3 BEHAVIORAL ANALYSIS OF EXERCISE. Relationship between psychosocial factors and exercise/rehabilitative behavior.

555-3 INTERNSHIP IN KINESIOLOGY. Individualized planned experience in agency, organization, or institution appropriate to student's area of professional interest. Prerequisite: consent of instructor.

560-3 CARDIOVASCULAR AND NEUROMUSCULAR FUNCTIONS OF EXERCISE. Advanced principles and concepts of the cardiovascular, pulmonary, nervous, and muscular systems and their responses to exercise.

580-1 to 4 READINGS IN KINESIOLOGY. Supervised reading on selected topics. May be repeated to a maximum of 4 hours.

599-1 to 6 THESIS IN KINESIOLOGY. Students selecting thesis track must earn minimum of 3 credit hours. May be repeated to a maximum of 6 hours. Prerequisite: KIN 515.

LATIN (LAT)

499a-f-4 READINGS IN LATIN. (a) Learning language through selections from Classical, Medieval, and Renaissance Latin; (b) Continuation of a; (c) Continuation of b; (d-f) Second-year level. Content varies with instructor. A, b, c must be taken in sequence and are prerequisite to d, e, or f which may be taken out of sequence with consent of instructor. Individual segments may not be repeated for credit. Prerequisite: for LAT a, b, c: consent of instructor.

MANAGEMENT (MGMT)

430-3 HUMAN RESOURCE MANAGEMENT. Theory, practice, and trends in effective utilization of human resources in organizations. Prerequisite: MGMT 340 or consent of instructor.

431-3 RECRUITING, SELECTING, AND HIRING EMPLOYEES. Principles, practices, and issues relevant to staffing work organizations. Topics include employee recruitment approaches; selection procedure development; work force headcount planning; and employment regulations. Prerequisite: MGMT 430.

432-3 TRAINING ANDDEVELOPING EMPLOYEES. Principles, practices, and factors that contribute to employees' job competence, performance, and growth, and contribution to organizational performance. Topics include training assessment, development, and delivery. Prerequisite: MGMT 430.

433-3 EMPLOYEE COMPENSATION AND BENEFITS. Employee compensation principles, practices, and issues. Topics include job analysis, job evaluation, wage structures, equity, competitiveness, benefits, variable incentive compensation and regulatory influences on compensation. Prerequisite: MGMT 430.

451-3 MANAGING ORGANIZATIONAL CHANGE AND INNOVATION. Study of organizational change with emphasis on diagnostic skills necessary for effective management of planned organizational change. Individual and group leadership approaches to increase effectiveness. Prerequisite: MGMT 341 or consent of instructor.

461-3 MANAGING IN THE GLOBAL ECONOMY/INTERNATIONAL MANAGEMENT. Management of business in other countries and in global economy. Interaction of political, cultural, social, legal, and economic forces in international business context. Prerequisite: MGMT 341 or consent of instructor.

475-3 ENTREPRENEURSHIP AND SMALL BUSINESS MANAGEMENT. Formation of new enterprises and management of small business. Focus on identifying opportunities, starting a new enterprise, and operational and organizational aspects of small business management. Prerequisite: MGMT 341 or consent of instructor.

485-3 MANAGING QUALITY AND PERFORMANCE. Current topics in management, with special emphasis on designs, programs, and techniques for managing quality and performance improvements. Advanced readings and cases on innovative business practices. Prerequisite: MGMT 341 or consent of instructor.

495-3 SPECIAL TOPICS IN MANAGEMENT. Advanced and specialized topics of current concern to field of management. Depending on topic, chairperson can approve course as a substitute for a BSBA specialization course. Prerequisites: MGMT 341; consent of instructor.

535-3 PROJECT MANAGEMENT STANDARD PROCESSES. A framework of standard processes based on the Project Management Body of Knowledge and other resources. Includes processes for managing scope, time, quality, cost, human resources, communications, risk, and procurement. Prerequisite: CMIS 540 or consent of instructor.

536-1.5 PROCUREMENT MANAGEMENT IN PROJECTS. Provides in-depth examination of the role of procurement management in projects. Develops understanding of strategies for successful supplier evaluation, source selection, contract administration, and communication management. Prerequisite: student in MBA or M.S. CMIS program.

537-1.5 PROJECT RISK MANAGEMENT. Provides in-depth examination of risk management in projects. Develops knowledge of risk identification, risk analysis, risk response planning, risk control strategies, and the use of analytical tools for creating risk management plans. Prerequisite: MS 502 or equivalent.

541-3 HEALTH CARE LAW. Patient rights, provider rights, and the legal implications of the denial of treatment. Examination of current case law and the U. S. health care system.

551-3 MANAGING ORGANIZATIONAL CHANGE AND INNOVATION. Knowledge and skills of organizational change with emphasis on diagnostic skills necessary for effective management of planned organizational change. Individual and group leadership approaches. Prerequisite: MBA 523.

553-3 SEMINAR IN QUALITY AND PERFORMANCE MANAGEMENT. Current topics in management, with special emphasis on designs, programs and techniques for managing quality and performance improvements. Advanced readings and cases on innovative business practices. Prerequisite: MBA 523.

558-3 CYBERLAW. Addresses legal issues presented by cyberspace and related technology. Students learn legal issues, law, and application of law by case method. Prerequisite: ACCT 340 or MBA 522.

561-3 INTERNATIONAL BUSINESS. Management of business in other countries and in global economy. Interaction of political, cultural, social, legal and economic forces in international business context. Prerequisite: MBA 523.

570-3 SEMINAR IN HUMAN RESOURCE MANAGEMENT. Theory and practice of human resource management. Balanced attention on strategic use of HR in organizations and HR tools to achieve effectiveness and efficiency. Prerequisite: MBA 523.

575-3 ENTREPRENEURSHIP AND SMALL BUSINESS MANAGEMENT. Formation of new enterprises and management of small business. Focus on identifying opportunities, starting a new enterprise, and operational and organizational aspects of small business management. Prerequisite: MKGT 525, FIN 527.

580-3 EMPLOYMENT LAW FOR MANAGERS. Selected areas impacting business managers. Topics include affirmative action, drugs, safety, and discrimination based on sex, race, pregnancy, and age. Prerequisite: ACCT 340 or MBA 522.

595-3 SEMINAR IN MANAGEMENT. Interpretations and discussions of current developments in management. Topics vary with faculty interest and changes in the field. Emphasis on analysis of current developments. Prerequisite: MBA 523 or consent of instructor.

597-1 to 3 INDEPENDENT STUDY IN MANAGEMENT. Investigation of focused, topical areas. Individual or small group projects. May be repeated to a maximum of 3 hours. Prerequisite: detailed proposal approved by supervising faculty member and chairperson.

MANAGEMENT SCIENCE (MS)

502-3 QUANTITATIVE METHODS. Methods of quantitative data presentation and analysis. Probability theory; parameter estimation; hypothesis testing; fundamentals of linear regression, correlation, and chi-square analysis. Prerequisite: admission to any graduate program in business. Will not be counted toward the MBA, MSA or MMR degrees.

MARKETING (MKTG)

466-3 MARKETING ON THE INTERNET. Focus on marketing issues surrounding commercialization of World Wide Web and other emerging electronic media. Examines impact of digital technology on strategic marketing planning. Prerequisite: MKTG 300.

470-3 SPORT MARKETING. Sport marketing mix decisions from perspective of organizations that offer sports-related products and those that use sport to promote other products and services. Prerequisite: MKTG 300 or consent of instructor.

471-3 ADVERTISING POLICY AND MANAGEMENT. Strategic role of persuasive communication. Concepts and methods necessary to develop advertising programs. Advertising planning and budgeting in the context of achieving marketing objectives. Prerequisite: MKTG 300.

472-3 SALES POLICY AND MANAGEMENT. Organization and operational functions of salespeople and sales managers. Selling skills, forecasting, recruiting, selection, training, territory design and assignment, supervision, compensation, motivation, and performance appraisal. Prerequisite: MKTG 300.

474-3 RETAIL POLICY AND MANAGEMENT. Functions, organization, management of retail enterprises. Impact of recent and contemporary forces. Systems for merchandising and promotional activities. Retailing careers and appropriate preparation. Prerequisite: MKTG 300.

475-3 CONSUMER BEHAVIOR. Consumer motivation, buying behavior, group influence, cultural forces, information processing, product diffusion. Explanatory theories and product development. Prerequisite: MKTG 300.

476-3 INTERNATIONAL MARKETING. Impact of tariffs, cultural/social restrictions, economic political environments, legal restrictions. International distribution pricing,

multinational product planning, communications decisions, international marketing research. Prerequisite: MKTG 300.

478-3 INTERMEDIATE MARKETING RESEARCH. Marketing research project planning and development. Emphasizes design and execution of custom research projects, data analysis, report preparation and presentation. Prerequisite: MKTG 377.

479-3 SPECIAL TOPICS IN MARKETING. Contemporary issues/problems in marketing. Topic varies when offered. Examples: service marketing, industrial marketing, non-profit marketing, and other significant topics. May repeat once for a maximum of 6 hours provided no topic is repeated. Prerequisites: MKTG 300; consent of instructor.

480-3 ADVANCED MARKETING MANAGEMENT. Market structure and behavior. Researching and selecting marketing opportunities, developing marketing strategies; planning marketing tactics, implementing and controlling marketing efforts. Prerequisites: senior standing; MKTG 377 or equivalent.

490-1 to 3 INDEPENDENT STUDY IN MARKETING. Topical areas in greater depth are unavailable in regular courses. Individual or small group readings and/or research projects. May be repeated by permission to a maximum of 6 hours as topic varies. Prerequisites: consent of instructor and department chairperson.

525-3 MARKETING ANALYSIS AND APPLICATIONS FOR MANAGERIAL DECISION MAKING. Decision-oriented overview of marketing management in creating value by analyzing customer responses for designing products, prices, channel and communication strategies for planning marketing effort.

530-3 MARKETING PLANNING AND STRATEGY. Analytical tools and decision paradigms for marketing planning and strategy. Emphasizes integration of information, segmentation and elements of marketing plan to achieve competitive advantage. Prerequisite: MKTG 525.

532-3 SERVICES MARKETING. Service systems and service management with emphases in services quality and satisfaction, service strategy, service recovery, marketing differentiation and positioning in services industries. Prerequisite: MKTG 525.

540-3 BUYER BEHAVIOR. Organizational and consumer behavior models; internal/external factors influencing choice processes; attitudes, intentions, and information processing; measurement and research; applies behavioral theories to marketing decisions. Prerequisites: MKTG 525.

541-3 PRODUCT MANAGEMENT. Theoretical and pragmatic issues for developing new products and services and managing ongoing products and services. Analytical

decision making applied to product design, positioning, research, adoption and diffusion. Prerequisites: MBA 521, MKTG 525.

542-3 PROMOTION MANAGEMENT. Communications from marketer to market using advertising, personal selling, publicity, and sales promotion. Managerial analysis strategy programming, evaluation emphasized. Prerequisites: MKTG 525.

543-3 CHANNEL MANAGEMENT. Development and management of channel and distribution systems in restrictive, dynamic environments. Communication, control, performance, customer service. Prerequisite: MKTG 525.

544-3 MARKETING INFORMATION AND RESEARCH. Marketing management information needs. Data collection and interpretation for decision-making. Research design, survey methods, sampling, questionnaire and experimental designs, data analysis. Prerequisites: MBA 521, MKTG 525.

545-3 HEALTH CARE MARKETING. Application of marketing strategies and techniques to health care of organizations. Focus on identifying appropriate client-oriented marketing programs. Prerequisite: MKTG 525.

546-3 RESEARCH DESIGN AND DATA COLLECTION PROCEDURES. Advanced consideration of management of marketing research process, research designs, sources of marketing data, qualitative and quantitative data collection procedures, measurement, scaling, questionnaire design. Prerequisite: MKTG 544.

548-3 MARKETING RESEARCH METHODOLOGY AND DATA ANALYSIS. Comprehensive and practical considerations of research methodology, data characteristics and processing, multivariate data analysis approaches (statistical considerations and applications), communication of marketing research results. Prerequisite: MKTG 546.

550-3 MARKETING RESEARCH PROJECT AND STRATEGY. Integration of all aspects of marketing research into comprehensive plans and courses of action. Project planning, design, and execution including client service and management. Prerequisites: MKTG 530; 548.

560-3 SPECIAL TOPICS IN MARKETING RESEARCH. Advanced issues such as research ethics, promotion research, international research, online data collection and reporting. Depending on topic instructor's approval may be needed. May be repeated once for a total of 6 hours provided no topic is repeated. Prerequisite: MKTG 525.

561-3 DATABASE MARKETING. Applications of database technology to implementation of marketing strategies. Focus on use of databases in relationship marketing and customer-satisfaction management. Prerequisite: MKTG 525.

562-3 SYNDICATED DATA ANALYSIS. Identification of the marketing uses of information from syndicated scanner data. Experience with the principle syndicated data technologies and supplies. Prerequisite: MKTG 525.

595-1 to 3 SEMINAR IN MARKETING. Interpretation and discussion of current developments. Impact and analysis of current issues. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: MKTG 525.

597-1 to 3 INDEPENDENT STUDY IN MARKETING. Topical areas in greater depth are unavailable in regular courses. Individual readings and/or research projects. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor and chairperson.

MASS COMMUNICATIONS (MC)

401-3 MEDIA LAW & POLICY. U.S. Constitution, federal, state law related to mass media. Congressional and public policy. Research paper/case study required.

402-3 MEDIA MANAGEMENT. Management responsibilities, challenges, and expectations in the professional environment, i.e. promotions, ratings, programming. Research paper required. Prerequisite: upper class standing in mass communications major or consent of instructor.

421-3 ADVERTISING CAMPAIGNS. Creation and production of advertising campaigns using print and electronic media. Prerequisite: MC 326 or MC 334.

422-3 WRITING FOR THE CORPORATE AND INSTITUTIONAL MARKET. Reporting, writing, editing information, opinion, other presentations for publicity, publication, annual reports, public relations in general. Study of corporate publications. Prerequisite: MC 202 or consent of instructor. For MC majors only.

423a,b-6 (3,3) ADVANCED TOPICS IN WRITING FOR THE MEDIA. Advanced theory and practice of writing for the print and visual media. a) Dramatic Writing, b) Other topics.

424-3 THE LITERATURE OF JOURNALISM. Study of magazine articles, nonfiction books by Crane, Hemingway, Agee, New Journalists, Herr, others. Study of history to determine journalism's contributions to literature.

433-3 ADVANCED VIDEO DIRECTING AND PRODUCING. Advanced theory and practice in television directing and producing. Students work as senior producers for the cable program SIUE Global Village, plus other assignments. Prerequisites: graduate students or undergraduate seniors. Consent of instructor.

440-3 VISUAL MEDIA ANALYSIS. Evaluation of illustration and photography for publication and for motion imagery. Values, language, philosophy, style and standards based on artistic vision, audience expectations, and distribution constraints.

441-3 MULTIMEDIA USE IN MASS MEDIA. Applications of computer and electronic media/technology systems to design multimedia products integrating text, audio, graphic, video, animation and other information for cross-platform delivery. Prerequisite: MC 327 or consent of instructor.

449-3 MEDIA PSYCHOLOGY. Media's short term and long term psychological effects; socialization of children and adults; persuasion and social perception in politics, health communication and consumer behavior. Prerequisite: senior standing or consent of instructor.

451-3 RESEARCH METHODS IN MASS MEDIA. Examination of traditional and emerging concepts of research. Extensive use of research instruments, evaluation, and special applications to mass media. Individual and group research projects required. Prerequisite: consent of instructor.

452-3 NEW MEDIA AND TECHNOLOGY. Technological changes in the mass media. New media forms, audience fragmentation, economic, regulatory, and social issues. Patterns of adoption and diffusion. Prerequisite: senior standing.

453-3 TRANSNATIONAL MEDIA. Focus on media ownership, content flow, cultural values, political power, and technological impact in history, industrialization, economics, and current processes of globalization.

454-3 DOCUMENTARY MEDIA. Historical, cultural and artistic evolution of documentary film and video making, aesthetic developments (roots of documentary filmmaking, direct cinema, cinema verite, ethnography, TV documentaries, "rocumentary"). Prerequisite: MC 204.

475-3 ADVANCED MULTIMEDIA. Digital media production techniques for 2D & 3D modeling and character animation, video compositing, and high-resolution image processing; advanced design techniques for other interactive multimedia systems. Prerequisite: MC 441.

491-3 ADVANCED PRACTICES. Independent study in areas in which student has completed all formal course work. Included are studies in news, advertising, writing, and/or production-direction. Prerequisite: consent of instructor.

495-1 to 4 READINGS IN MASS MEDIA. Selected readings in depth with member of graduate faculty. Contemporary books and periodicals. May be repeated to a maximum of 4 hours. Prerequisite: consent of instructor.

500-3 MASS COMMUNICATION THEORY. Interrelationships of mass communications institutions in society including government, marketing, management and audience research, technological realities and future development. Prerequisite: enrollment in mass communications graduate program or consent of graduate program adviser.

501-3 RESEARCH METHODS FOR MASS COMMUNICATIONS. Research methods and methodology for mass media and the social sciences. Methodologies include quantitative, qualitative, legal, historical, and muti-method. Prerequisite: enrollment in mass communications graduate program or consent of graduate program adviser.

502-3 MEDIA CAMPAIGNS. Seminar on theoretical and practical dimensions of media campaigns; exposure to campaign-related scholarship; case studies of public relations, advertising, political campaigns and campaign management.

503-3 MEDIA CRITICAL THEORY. Cultural impact of electronic, print, and new media technologies; critical analysis of information and entertainment production and distribution; development and application of evaluation standards; ethical concerns.

504-3 SPECIAL TOPICS IN MASS COMMUNICATIONS. Varied content. Offered as student need exists and faculty time permits. May be repeated once to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of graduate program adviser.

505-3 SEMINAR IN PROPAGANDA. Students learn propaganda principles and theories, examine propaganda campaigns, present papers on theoretical and practical dimensions of propaganda, and develop critical skills for further study. Prerequisite: MC 500.

520a-1 JOURNALISM TEACHERS' ORGANIZATIONAL ROLE. Legal, business, and teaching aspects of being an adviser with an emphasis on improving students' punctuation skills. Prerequisite: consent of program director.

520b-1 JOURNALISM TEACHERS' APPROACH TO NEWS GATHERING. Provides secondary school newspaper advisers and journalism teachers the necessary background to successfully supervise, coach, and evaluate their students. Prerequisite: consent of program director.

520c-1 JOURNALISM TEACHERS' APPROACH TO DESIGN. Design theory and digital production techniques applicable to student publications. Prerequisite: consent of program director.

520d-1 JOURNALISM TEACHERS' LEGAL, ETHICAL ROLES. Provides secondary school newspaper and journalism teachers the necessary background to successfully supervise, coach, and evaluate their students in law ethics and issues. Prerequisite: consent of program director.

590-3 INDEPENDENT STUDY IN MASS COMMUNICATIONS. Investigation of special topic area. Individual research projects that may include field experience and operations analysis. Prerequisite: consent of graduate program adviser.

595-1 to 3 READINGS IN MASS COMMUNICATIONS. Readings in depth on tutorial basis with member of graduate faculty. Special attention to contemporary books and periodicals. Prerequisite: consent of graduate program adviser.

598-1 to 6 FINAL PROJECT. Culminating project. Individual approaches to message production for problem resolution. Effectiveness of different media in dealing with problem areas. Prerequisite: consent of graduate program adviser.

599-1 to 6 THESIS. Prerequisite: consent of graduate program adviser.

MASTER OF BUSINESS ADMINISTRATION (MBA)

521-3 QUANTITATIVE ANALYSIS. Problem solving and fundamental quantitative methods to formulate and solve problems to support business decision making. Analysis of complex situations and communication of results. Prerequisite: MS 251 or equivalent.

522-3 DECISION MAKING IN ORGANIZATIONS. Examines the individual and group level dynamics of decision making focusing on non-quantitative issues surrounding managerial decisions and dilemmas. Prerequisite: MBA 521; must be taken in first 12 hours of MBA program.

523-3 NEGOTIATION AND INTERPERSONAL SKILLS FOR MANAGERS. Within the framework of negotiation, this course is designed to develop individual skills needed to manage effectively including: conflict management, negotiation, and crisis/change management. Prerequisite: MBA 522.

531-3 EXTERNAL ENVIRONMENT OF BUSINESS. Analysis of the external environment in which business function. Focus on ethical, social, legal, and economic environments as they affect managerial responsibility and organizational performance. Prerequisites: MGMT 514; consent of program director.

532-3 INTERNATIONAL BUSINESS ENVIRONMENT. International issues of markets, power, and culture under condition of global interdependence. Analytical framework and global perspectives needed to manage a firm's interaction with its international environment. Prerequisites: ECON 528; FIN 527; MBA 522; MKTG 5252.

533-3 LEADERSHIP, INFLUENCE AND MANAGERIAL EFFECTIVENESS. Focus on diagnostic, conceptual, analytic, and interpersonal competencies needed in leadership roles; power, politics, and influence in organizations; corporate culture and leadership style; leadership and ethical decision-making. Prerequisites: MGMT 514; consent of program director.

534-3 STRATEGIC MANAGEMENT. Analysis, formulation, and implementation of firm's strategy studied from a general management perspective. Interrelationships between the firm and its external environment are emphasized. Prerequisites: completion of all program courses or consent of program director.

595-1-3 CONTEMPORARY ISSUES IN BUSINESS. Seminar focusing on interdisciplinary issues in business; emphasis is on contemporary issues facing practicing business professionals that cut across traditional disciplinary boundaries. May be repeated for a total of 6 hours. Prerequisite: consent of instructor.

MATHEMATICS (MATH)

400-3 DEVELOPMENT OF MODERN MATHEMATICS. The development of mathematics since the discovery of calculus. Prerequisites: MATH 152; 223.

416a-i 1 to 3 each MATHEMATICS TOPICS FOR TEACHERS. (a) Analysis; (b) Algebra; (c) Number theory; (d) Probability and statistics; (e) Mathematical concepts; (f) Geometry; (g) History of mathematics; (h) Applied mathematics; (i) Logic and foundations. Students may earn a maximum of 6 hours in each section provided no topic is repeated. Does not count toward a concentration or minor in mathematics. Prerequisite: consent of instructor.

420-3 ABSTRACT ALGEBRA. Standard algebraic structures and properties. Groups: subgroups, normality and quotients, isomorphism theorems, special groups. Rings: ideals, quotient rings, special rings. Fields: extensions, finite fields, geometric constructions. Prerequisite: MATH 320 or consent of instructor.

421-3 LINEAR ALGEBRA II. Advanced study of vector spaces: Cayley-Hamilton Theorem, minimal and characteristic polynomials, eigenspaces, canonical forms, Lagrange-Sylvester Theorem, applications. Prerequisite: MATH 321 or consent of instructor.

423-3 COMBINATORICS AND GRAPH THEORY. Solving discrete problems. Counting techniques, combinatorial reasoning and modeling, generating functions and recurrence relations. Graphs: definitions, examples, basic properties, applications, and algorithms. Prerequisites: MATH 223; some knowledge of programming recommended.

435-3 FOUNDATIONS FOR EUCLIDEAN AND NON-EUCLIDEAN GEOMETRY. Points, lines, planes, space, separations, congruence, parallelism and similarity, non-Euclidean geometries, independence of the parallel axiom. Riemannian and Bolyai-Lobachevskian geometries. Prerequisites: MATH 250; 321; MATH 320 or 350, consent of instructor.

437-3 DIFFERENTIAL GEOMETRY. Curves and surfaces in Euclidean 3- space from the perspective of classical differential geometry. Topics include: Frenet frames, fundamental surface forms, geodesics, and the Gauss-Bonnet theorem. Prerequisites: MATH 250 and 321.

450-3 REAL ANALYSIS I. Differentiation and Riemann integration of functions of one variable. Taylor series. Improper integrals. Lebesgue measure and integration. Prerequisite: MATH 350.

451-3 INTRODUCTION TO COMPLEX ANALYSIS. Analytic functions, Cauchy-Riemann equations, harmonic functions, elements of conformal mapping, line integrals, Cauchy-Goursat theorem, Cauchy integral formula, power series, the residue theorem and applications. Prerequisites: MATH 223; 250.

462-3 ENGINEERING NUMERICAL ANALYSIS. Polynomial interpolation and approximations, numerical integration, differentiation, direct and iterative methods for linear systems. Numerical solutions for ODE's and PDE's. MATLAB programming required. Prerequisites: MATH 250; 305; CS 140 or 141, or consent of instructor. Not for MATH majors.

464-3 PARTIAL DIFFERENTIAL EQUATIONS . Partial differential equations; Fourier series and integrals; wave equation; heat equation; Laplace equation; and Sturm-Liouville theory. Prerequisites: MATH 250, 305, and 321.

465-3 NUMERICAL ANALYSIS. Error analysis, solution of nonlinear equations, interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations, solution of linear systems of equations. Prerequisites: MATH 305; CS 140 or 141.

466-3 NUMERICAL LINEAR ALGEBRA WITH APPLICATIONS. Direct and iterative methods for linear systems, approximation of eigenvalues, solution of nonlinear systems, numerical solution of ODE and PDE boundary value problems, function approximation. Prerequisites: MATH 305; 321; CS 140 or 141.

495a-g 1 to 3 each INDEPENDENT STUDY. Research and reading in specified area of interest. (a) Algebra; (b) Geometry; (c) Analysis; (d) Mathematics education; (e) Logic and foundations; (f) Topology; (g) Numerical analysis. May be repeated to a maximum of 9 hours provided no topic is repeated and not more than 3 hours are accumulated in a single segment nor more than 6 hours in one semester. Prerequisites: written consent of adviser and instructor.

501-3 DIFFERENTIAL EQUATIONS AND THE FOURIER ANALYSIS. Brief review of ODE. Legendre and Bessel functions. Fourier series, integrals, and transforms. Wave equation, heat equation, Laplace equation. Not for MATH majors. Prerequisite: MATH 250, MATH 305, or consent of instructor.

502-3 ADVANCED CALCULUS FOR ENGINEERS. Review of vector calculus, Green's theorem, Gauss' theorem, and Stokes' theorem. Complex analysis up to contour integrals and residue theorem. Not for MATH majors. Prerequisite: MATH 250 or consent of instructor.

520-3 TOPICS IN ALGEBRA. Advanced topics in algebra. Groups: Sylow theorems; simple groups. Fields: automorphisms, elementary Galois theory. Rings: noncommutative rings, Dedekind domains. Content may vary from year to year. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: MATH 420.

545-3 REAL ANALYSIS II. Riemann, Riemann-Stieltjes, and Lebesgue integrals. Differentiation of functions of n variables. Multiple integrals. Measure and probability. Differential forms, Stokes' Theorem. Prerequisites: MATH 321 and 450.

550-3 TOPICS IN ANALYSIS. Advanced topics in analysis. Metric and topological spaces; completeness; compactness; connectedness; Hilbert and Banach spaces; measure theory and integration; probability theory. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: MATH 545.

551-3 TOPICS IN COMPLEX ANALYSIS. Riemann mapping theorem, analytic continuation, theorems of Weierstrass and Mittag-Leffler. Content may vary from year to year. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: MATH 450b; 451.

552-3 THEORY OF ORDINARY DIFFERENTIAL EQUATIONS. Existence and uniqueness theorem, dynamical systems, stability, bifurcation theory, boundary value problems. Prerequisites: MATH 350; 421.

555-3 FUNCTIONAL ANALYSIS WITH APPLICATIONS. Normed and Banach spaces, inner product and Hilbert spaces, Open Mapping and Closed Graph Theorem, Hahn-Banach Theorem, dual spaces and weak topology. Prerequisite: MATH 421, 450.

563-3 OPTIMAL CONTROL THEORY. (Same as ECE 563 and ME 563) Description of system and evaluation of its performance; dynamic programming, calculus of variations and Pontryagin's minimum principle; iterative numerical techniques. Prerequisite: MATH 305 or ECE 365 or ME 450.

565-3 ADVANCED NUMERICAL ANALYSIS. Rigorous treatment of topics in numerical analysis including function approximation, numerical solutions to ordinary and partial differential equations. Convergence and stability of finite difference methods. Prerequisites: MATH 321; 350; 465; 466.

567-3 TOPICS IN APPLIED MATHEMATICAL ANALYSIS. Topics from the following areas: Fourier theory and applications, applied functional analysis, asymptotic analysis, perturbation theory, control theory, theory of equilibrium, partial differential

equations. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisites: MATH 421;
450a; b; 451, or consent of instructor.

590a-g 1 to 3 SEMINAR. Intensive study of selected mathematical topics. (a) Algebra; (b) Geometry; (c) Analysis; (d) Mathematics education; (e) Logic and foundations; (f) Topology; (g) Numerical analysis. Each segment may be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: written consent of adviser and instructor.

595a-g 1 to 3 SPECIAL PROJECT. Intensive study that may be used to satisfy research paper requirements for MS degree in mathematics. (a) Algebra; (b) Geometry; (c) Analysis; (d) Mathematics education; (e) Logic and foundations; (f) Topology; (g) Numerical analysis. May be repeated to a maximum of 7 hours. Prerequisite: written consent of research adviser.

599-1 to 6 THESIS. Directed research to satisfy thesis requirement. May be repeated to a maximum of 6 hours. Prerequisite: written consent of thesis adviser.

MECHANICAL ENGINEERING (ME)

414-3 GAS DYNAMICS. Basic equations of compressible flow, isentropic flow of perfect gas; normal shock waves, oblique shock waves: flow with friction and heat loss, applications. Prerequisite: ME 315.

427-3 KNOWLEDGE-BASED SYSTEMS. (Same as ECE and IME 427) Engineering-oriented perspective on artificial intelligence (AI) technology. General AI concepts and specifically knowledge-based (expert) systems applied to engineering problem solving. Prerequisite: knowledge of one of the familiar computer programming languages (BASIC, C, FORTRANor Pascal) or consent of instructor.

433-3 FUZZY LOGIC AND APPLICATIONS. (Same as ECE 433) Fundamentals of fuzzy sets, basic operations, fuzzy arithmetic, and fuzzy systems. Examples of applications in various fields of engineering and science. Prerequisite: consent of instructor.

450-3 AUTOMATIC CONTROL. Modeling of dynamical systems, linearizations, stability and feedback control, Routh-Hurwitz criteria, time domain and frequency domain response, Root Locus, feedback compensator design. Prerequisite: ME 356.

452-3 VIBRATIONS. Vibration of single and multi-degree of freedom systems, natural frequencies and modes, vibration isolation, structural response to ground excitation. Prerequisites: ME 262; MATH 305.

454-3 ROBOTICS-DYNAMICS AND CONTROL. (Same as ECE 467) Robotics, robot kinematics and inverse kinematics, trajectory planning, differential motion and virtual work principle, dynamics and control. Prerequisite: consent of instructor.

458-3 MECHATRONICS. Dynamic response; fundamentals of electronic and logic circuits; sensors and instrumentation for strains, movements and fluid flow; actuators and power transmission devices; feedback control. Prerequisites: ME 262; 310; ECE 210.

460-3 NONDESTRUCTIVE EVALUATION METHODS. (same as CE 460) Nondestructive evaluations methods for engineering materials. Ultrasonic inspection for defect detection, weld inspection plus methods of dye penetrate, acoustic emissions, and eddy currents are studied.

466-3 DIGITAL CONTROL. (Same as ECE 466) Topics include finite difference equations, z-transforms and state variable representation, analysis and synthesis of linear sampled-data control systems using classical and modern control theory. Prerequisite: ME 450 or ECE 365.

470-3 STRESS ANALYSIS AND DESIGN. Three-dimensional torsion and bending, stress and strain transformations, yield criteria and plasticity theory, finite element method, case studies and engineering design. Prerequisite: CE 242.

530-3 ADVANCED DYNAMICS. Kinematics and dynamics of particles in three dimensions, Virtual Work Principle, nonholonomic constraints, Lagrange's equations, three-dimensional rigid body kinematics and dynamics.

532-3 ADVANCED MECHANISMS AND SYNTHESIS. Kinematics of two- and three-dimensional mechanisms. Synthesis of four and six bar mechanisms using three or more precision points. Balancing of rotating mechanisms. Prerequisite: consent of instructor.

540-3 CONTINUUM MECHANICS. Equations for continuous media for both solid and fluid systems. General equations of motion including equilibrium, compatibility, and boundary conditions. Prerequisite: consent of instructor.

544-3 THEORY OF ELASTICITY. Elastic equations and boundary conditions. Variational development of equations. Solutions for stress around a hole and beams on an elastic foundation. Prerequisite: consent of instructor.

546-3 PLATES AND SHELLS. (Same as CE 546) Membrane theory of shells. Bending of shells and circular and rectangular plates. Indeterminate shell problems. Prerequisites: CE 445; ME 470, or consent of instructor.

547-3 ELASTIC STABILITY. (Same as CE 547) Elastic stability of columns and simple frames. Lateral and torsional buckling of beams. Buckling of plates. Design code considerations of buckling. Prerequisites: CE 445; ME 470, or consent of instructor.

548-3 FINITE ELEMENTS. (Same as CE 548) Rayleigh-Ritz method, piecewise approximation, nodal load calculations, derivation of two- and three-dimensional elements, bending elements. Finite element computer programs. Practice with actual programs. Prerequisites: CE 445; ME 470, or consent of instructor.

550-3 MODERN CONTROL. Analysis and design of control systems; state-variable description; controllability, observability, non-linearity and perturbation theory; stability, state feedback design, robust control. Prerequisite: ME 450.

560-3 ADVANCED VIBRATION WITH APPLICATIONS. Lagrange equations, vibration of continuous systems, finite elements, component-mode synthesis and other approximation methods, introduction to random and nonlinear vibration. Prerequisite: ME 452 or equivalent.

563-3 OPTIMAL CONTROL. (Same as ECE 563) Description of system and evaluation of its performance, dynamic programming, calculus of variations and Pontryagin's minimum principle, iterative numerical techniques. Prerequisites: ME 450; ECE 365.

573-3 ADVANCED THERMODYNAMICS. Fundamental concepts, thermodynamic relations, topics from statistical thermodynamics including Bose-Einstein and Fermi-Dirac quantum statistics, partition functions. Prerequisite: consent of instructor.

575-3 ADVANCED FLUID MECHANICS. Incompressible fluids; potential flows; viscous flows; solution of Navier-Stokes equations; low and high Reynolds number flows; laminar and turbulent boundary layers. Prerequisite: ME 315.

580-3 COMPUTATIONAL FLUID DYNAMICS. Model equations, finite differences and finite volume methods, diffusion problems, convection-diffusion problems, solution algorithm, unsteady flows, turbulence modeling. Prerequisite: ME 410; CS 145, or equivalent.

585-3 CONVECTIVE HEAT TRANSFER. Conservation principles for mass, momentum, and energy; differential equations of laminar and turbulent boundary layers; forced and natural convections. Prerequisite: consent of instructor.

587-3 INTELLIGENT ENGINEERING SYSTEMS. Designing intelligent systems solving complex engineering problems through implementing knowledge-based systems using a hybrid architecture comprising expert systems, artificial neural networks, and optimization approaches. Prerequisites: graduate standing; ME 427, or consent of instructor.

588-3 EQUILIBRIUM DYNAMICS. Energy exchanges among systems with emphasis on conservation laws. Conditions for equilibrium and consequences of energy exchanges are included using the methodology of classical thermodynamics. Prerequisite: consent of instructor.

589-3 RADIATION HEAT TRANSFER. Radiation from a blackbody, properties of nonblack surfaces, radiative properties of real materials, radiation in enclosures, radiative behavior of windows and semi-transparent solids. Prerequisite: consent of instructor.

591-1 to 4 INDEPENDENT STUDY. Individual investigation of a topic in Mechanical Engineering to be agreed upon with the instructor. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

592-1 to 5 TOPICS IN MECHANICAL ENGINEERING. Topic of special interest; course schedule will include name of topic. May be repeated to a maximum of 9 hours provided no topic is repeated. Prerequisite: consent of instructor.

599-1 to 6 THESIS. May be repeated to a maximum of 6 hours. Prerequisite: consent of adviser.

MUSIC (MUS)

401-2 PSYCHOPHYSIOLOGY OF MUSIC. Human capacities and acoustical foundations of music as they relate to musical behavior, potential, and development. Prerequisite: consent of instructor.

412a,b-3,3 COMPOSITION. Original composition in larger forms for various media. Must be taken in sequence. Prerequisite: a) MUS 312b or consent of instructor; b) MUS 412a.

413a,b-2,2 PIANO LITERATURE. (a) Baroque to early Romantic; (b) Romantic and Contemporary. Prerequisite: MUS 357b or consent of instructor.

415-2 CLASS APPLIED VOICE. Singing, diction, and voice pedagogy for music majors with minimal vocal experience.

420-1 MUSIC EDUCATION PRACTICUM. Shop laboratory course. Selection, adjustments, maintenance, repair of musical instruments.

426a-2 ADVANCED MUSIC THEORY: MUSIC SINCE 1900. This music theory course will focus on understanding and analyzing music of the modern (post-tonal) era. Learning will involve written, aural and compositional experiences.

436-2 JAZZ EDUCATION. Teaching jazz at elementary, secondary, and college levels. Group and individual instruction. Prerequisite: consent of instructor.

439-2 RECORDING TECHNIQUES. Technical understanding of equipment used in basic digital recording studios: microphones, equalization, mixing. Hard disk recording and 24 track recording formats. Prerequisite: consent of instructor.

440a-x-2 or 4 PRIVATE APPLIED MUSIC.

a. Violin	g. Clarinet	m. Trumpet	s. Harpsichord
b. Viola	h. Bassoon	n. Trombone	t. Harp
c. Violoncello	i. Saxophone	o. Tuba	u. Classical Guitar
d. String Bass	j. Percussion	p. Euphonium	v. Guitar
e. Flute	k. Piano	q. Voice	w. Conducting
f. Oboe	l. French Horn	r. Organ	x. Accompanying

Applied music for graduate credit offered at the 400 and 500 levels in the areas listed above. Credit is given at 2 or 4 hours per semester on each level. May be repeated each semester of graduate study. Performance majors usually take 4 hours per semester on the 500 level. Music education majors usually take 2 hours per semester on the 500 level; all students studying a secondary instrument or voice do so for 2 hours credit on the 400 level. Prerequisites: audition; consent of instructor.

441d-u-2 or 4 PRIVATE JAZZ.

d. bass	j. percussion	m. trumpet	q. voice
i. saxophone	k. piano	n. trombone	u. guitar

Individual instruction in performance of various jazz styles. Offered at the 400 and 500 levels in the areas listed. Credit is given at 2 or 4 hours at each level. Consult with adviser for details of credit requirements. May be repeated for two semesters. Students with concentration in performance usually take 4 hours. Concentration in music education and all secondary concentrations usually take 2 hours. Prerequisites: audition; consent of instructor.

442a, b-3,3 COUNTERPOINT. (a) Renaissance and Baroque; (b) Modern contrapuntal techniques. Prerequisite: MUS 225b or consent of instructor.

460a,b-2,2 OPERA WORKSHOP. Skills, techniques, and literature used in performance and production of operatic scenes, operas, operettas. May be repeated to a maximum of 4 hours.

461a,b-3,3 PIANO TEACHING TECHNIQUES AND MATERIALS. (a) Methods; (b) Materials. Problems of private studio teaching and college-level teaching. Must be taken in sequence. Prerequisite: MUS 340k.

465-2 DEVELOPMENT AND TEACHING OF STRINGS. String education in elementary and secondary schools with emphasis on Suzuki philosophy and methods. Techniques of heterogeneous and homogeneous string teaching. Resource aids. May be repeated to a maximum of 8 hours. Prerequisite: consent of instructor.

472a,b-3,3 ARRANGING. (a) Instrumental; (b) Choral. Skills of arranging for large ensembles. Writing project required. May be repeated so long as topic is different. Prerequisite: MUS 309a with a grade of B or better, or permit required.

481-1 to 3 READINGS IN MUSIC THEORY. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

482-1 to 3 READINGS IN MUSIC HISTORY/LITERATURE. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

483-1 to 3 READINGS IN MUSIC EDUCATION. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

487-2 COMPUTER MUSIC WORKSHOP FOR TEACHERS. Designed for in-service teachers of music wishing to explore hardware and software currently available for use in schools. A hands-on, project oriented approach is utilized. Limited enrollment. Prerequisite: consent of instructor.

499-1 to 3 INDEPENDENT STUDY. Independent research under the supervision of a faculty specialist. May be repeated to maximum of 6 hours. Prerequisite: consent of instructor.

500a-2 GRADUATE MUSIC THEORY REVIEW. Review of music theory and analysis. Credit earned in this course does not apply toward graduation. Prerequisite: graduate standing or consent of instructor.

500b-2 GRADUATE MUSIC HISTORY/LITERATURE REVIEW. Review of main developments, periods, composers, styles, and works in the history of Western Music. Credit earned in this course does not apply toward graduation. Prerequisite: graduate standing or consent of instructor.

501-2 INTRODUCTION TO GRADUATE STUDY IN MUSIC. Basic bibliography and research techniques in music theory, literature, and education.

502-2 HISTORY AND ANALYSIS OF MUSICAL STYLE. Representative works chosen from the Baroque, Classical, Romantic, and Modern eras.

511a-f-2 each MUSIC LITERATURE. (a) Symphonic; (b) Choral; (c) Chamber; (d) Opera; (e) Special Areas (f) Vocal. Study of period, composer, style, or medium. Each segment may be repeated to a maximum of 6 hours provided no topic is repeated.

513a,b-2,2 PIANO LITERATURE. Survey of piano literature: a) Baroque to early Romantic; b) Romantic and Twentieth Century. Prerequisite: Permission of instructor.

519a-2 VOCAL PEDAGOGY – SCIENCE, PHYSIOLOGY, AND TECHNIQUE. Physiology of the human voice as it applies to singing technique. Prerequisite: graduate standing in the music program.

519b-2 VOCAL PEDAGOGY – METHODOLOGY AND MATERIALS. A comparative study of various pedagogical vocal methods. Examination of appropriate materials and repertoire for singers of all ages and abilities. Prerequisite: MUS 519a.

520-2 FOUNDATIONS OF MUSIC EDUCATION. Examination of philosophical, psychological, and pedagogical notions about music education from early civilization through present to determine how societal developments influenced them. Prerequisites: MUS 501.

525-2 RESEARCH IN MUSIC EDUCATION. Students use their research and writing skills and their understanding of music teaching and learning to formulate, implement, and assess music education research. Prerequisites: MUS 501.

530-2 APPLIED THEORY AND EAR TRAINING. This course refines students' audiation skills and emphasizes practical applications of music theory.

535-2 PRINCIPLES OF MUSIC CURRICULUM & INSTRUCTION. Principles of learning and human musical development as they relate to understanding, designing, and implementing music curricula and instruction. Prerequisite: MUS 520.

539-2 ADVANCED DICTION. Use of the International Phoetic Alphabet as it applies to vocal repertoire. Specifically designed for teachers who are preparing students for public performances and competitions. Prerequisite: MUS 139 a and b or permission of instructor.

540a-x-2 or 4 PRIVATE APPLIED MUSIC. (see MUS 440a-x)

541d-u-2 or 4 PRIVATE JAZZ.

d. bass	j. percussion	m. trumpet	q. voice
i. saxophone	k. piano	n. trombone	u. guitar

Individual instruction in performance of various jazz styles. Offered at the 400 and 500 levels in the areas listed. Credit is given at 2 or 4 hours at each level. Consult with adviser for details of credit requirements. May be repeated for three semesters. Students with concentration in performance usually take 4 hours. Concentrations in music education and all secondary concentrations usually take 2 hours. MUS 566 required for each semester of applied lesson. Prerequisites: audition; consent of instructor.

545-2 COMPUTER APPLICATIONS IN MUSIC. Use of computer-based music and multi-media hardware, peripherals, and applications software as mediating instruments to enhance music learning. Prerequisite: MUS 535 or consent of instructor.

550-2 ORGANIZATION AND ADMINISTRATION OF THE SCHOOL MUSIC PROGRAM. This course defines skills and processes that are required for organizing, administering, and assessing school music programs effectively.

553a,b,c-2,2,2 SEMINAR IN MATERIALS AND TECHNIQUES. (a) Choral; (b) Instrumental; (c) Piano. May be repeated to a maximum of 6 hours provided no topic is repeated.

560-2 SEMINAR IN MUSIC EDUCATION. Trends, practices, philosophies. May be repeated to a maximum of 4 hours provided no topic is repeated. Prerequisite: MUS 501 or consent of instructor.

561a,b-2,2 PIANO PEDAGOGY. An extensive survey of methods and materials in teaching piano at (a) elementary to early intermediate; (b) late intermediate to advanced levels. Supervised student teaching is required. Prerequisite: permission of instructor.

565-2 ADVANCED PIANO ENSEMBLE-ACCOMPANYING AND CHAMBER MUSIC. Study and performance of literature for the piano in collaboration with vocalists and instrumentalists, and in piano duos. May be repeated to a maximum of 4 hours.

566-1 or 2 INSTRUMENTAL ENSEMBLE. Participation in a chamber or large ensemble to study and perform literature in the field of the major instrument. May be repeated to a maximum of 4 hours.

567-1 or 2 VOCAL ENSEMBLE. Participation in a chamber or large ensemble to study and perform vocal ensemble literature. May be repeated to a maximum of 4 hours.

590-1 to 4 GRADUATE RECITAL (PERFORMANCE SPECIALIZATION). Public recital by candidates for major in performance. Accompanying majors will perform three recitals of ensemble music, including both vocal and instrumental repertoire. May be repeated to a maximum of 4 hours. Prerequisites: MUS 501; 502; 540-8 or 541-8.

591-1 to 4 GRADUATE RECITAL (MUSIC EDUCATION SPECIALIZATION). Public recital and preparation of supporting document by candidates for the concentration in music education in lieu of thesis. Candidates must be approved through jury audition. May be repeated to a maximum of 4 hours. Prerequisites: MUS 501; 502; or 540-4 or 541-4.

593-2 PRACTICUM IN VOCAL PEDAGOGY. Studio voice instruction and advanced study in the field of applied vocal pedagogy under faculty supervision, to be taken concurrently with Music 519b. Prerequisite: MUS 519a.

599-1 to 4 THESIS. Minimum of 4 hours required; may be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

NURSING (NURS)

416-3 ADVANCED NURSING LEADERSHIP ROLE. Integration of selected leadership skills (interpersonal, finance, health care economics, and health care

informatics) in advanced nursing roles within a variety of health care organizations. Prerequisite: admission to graduate CNL program in nursing or consent of instructor.

491-3 FOUNDATIONS OF NURSING MANAGEMENT. Provides an overview of healthcare organizations and roles of nurse managers. Major principles of nursing management are examined. Population-based approach explores community healthcare services. Prerequisite: consent of instructor.

493-3 HUMAN RESOURCE MANAGEMENT FOR NURSE LEADERS. Examines the knowledge and skills for effective human resource management. Content covers recruitment, hiring, retention, performance appraisals, professional development, conflict management, negotiation and labor relations. Prerequisite: NURS 491 with a grade of "C" or higher.

500-3 THEORETICAL FOUNDATIONS OF NURSING. Systematic and critical analysis of nursing related concepts, models, and theories as a basis for Advanced Nursing Practice.

504-3 RESEARCH IN ADVANCED NURSING PRACTICE.
Analyze, evaluate and synthesize health-related research and evidence-based practice reviews for the improvement of nursing practice. Prerequisite or Co-requisites: NURS 500, PAPA 412, PAPA 420, or approval of Assistant Dean for the graduate program.

505-3 HEALTH POLICY AND ADVANCED NURSING PRACTICE.
Focus on the dynamics of health policy and nursing's role in complex health care systems. Prerequisite: graduate standing.

507-3 EMERGING ROLE IN ADVANCED NURSING PRACTICE. Foster the emergence of the Advanced Nursing Practice role with exploration of legal, organizational, regulatory, professional, ethical, cultural, and social issues relevant to health care. Prerequisite: graduate standing.

513-3-4 ADVANCED HEALTH ASSESSMENT AND PRACTICUM. Advanced health assessment knowledge and skills with emphasis on the development of a foundation from which assessment data can be used for future clinical decision-making. Prerequisites or Co-requisite: NURS 515 and NURS 516 or approval of the Assistant Dean for the graduate program.

514-4 ADVANCED HUMAN PHYSIOLOGY. An organ-system approach is used to examine physiological processes across the life span. Prerequisite: graduate standing.

515-4 ADVANCED HUMAN PATHOPHYSIOLOGY. Focus on pathophysiologic processes that result in altered function in selected organ systems across the life- span. Prerequisite or Co-requisites: NURS 514 or approval of the Assistant Dean for the graduate program.

516-3 PHARMACOLOGY FOR ADVANCED NURSING PRACTICE. Pharmacokinetics, pharmacodynamics, and pharmacotherapeutics of multiple drug categories. Emphasis on drug interactions within the context of pathophysiology processes, age, developmental state, and ethnicity. Prerequisite or Co-requisites: NURS 515 or approval of the Assistant Dean for the graduate program.

517-3 APPLICATIONS OF EPIDEMIOLOGY IN ADVANCED NURSING PRACTICE. The application of epidemiologic principles, methods, and research to issues in advanced nursing practice. Prerequisite: PAPA 412 and PAPA 420 or approval of the Assistant Dean for graduate program.

518-2 HUMAN DIVERSITY AND HEALTH PROMOTION FOR ADVANCED PRACTICE NURSING. Presentation of a multi-dimensional framework to explore specific care constructs pertinent to cultural diversity and health promotion for advanced practice nurses. Prerequisite: graduate standing.

519-3 HEALTH PROMOTION AND DISEASE PREVENTION IN URBAN AND RURAL SETTINGS. Analysis of contemporary issues in urban and rural health. Populations will be compared for overlapping and divergent factors that affect health and the delivery of care. Prerequisite: graduate standing.

520-3 DIAGNOSTIC TESTS AND INTERPRETATION, AND PROCEDURES FOR NURSE PRACTITIONERS. Select and interpret laboratory and diagnostic tests, and perform interventions based on the health care needs of patients across the lifespan. Prerequisite: admission to the Family Nurse Practitioner specialization.

521-3 EPIDEMIOLOGY OF CANCER. Examines the physiologic and genetic aspects of cancer prevention, epidemiology, diagnosis, and staging. Required for nurse practitioner students, highly recommended for all others.

522-3 PSYCHOSOCIAL DIMENSIONS OF ONCOLOGY CARE. Explores current knowledge and research in the psychological, social, and spiritual dimensions of cancer care, along a continuum from diagnosis to death. Prerequisite: NURS 521 or approval of the Assistant Dean for the graduate program.

523-3 SYMPTOM MANAGEMENT IN ACUTE, CHRONIC, AND EMERGENT ONCOLOGICAL CONDITIONS. Examines evidenced based nursing care for symptoms management in patients receiving cancer treatment. Prerequisite: NURS 521 or approval of the Assistant Dean for the graduate program.

524-3 TREATMENT MODALITIES IN ONCOLOGY. Examines cancer treatment options including surgery, chemotherapy, biotherapy, radiation therapy, complimentary/alternative therapy and related clinical trials. Prerequisite: NURS 521 or approval of the Assistant Dean for the graduate program.

529-2 ORIENTATION TO NURSE ANESTHESIA PRACTICUM. Orientation to the Certified Registered Nurse Anesthetist role, developing basic skills for safe entry into practice through discussion, laboratory simulation, and mentored clinical experience. Prerequisites: admission to the Nurse Anesthesia Specialization and completion of NURS 564.

534-3 FOUNDATIONS OF PAIN MANAGEMENT NURSING. Explores the physiological, theoretical, epidemiological, cultural legal and ethical aspects of pain management nursing. Prerequisite: approval of the Assistant Dean of the graduate program.

535-3 CLINICAL APPLICATIONS OF PAIN MANAGEMENT. Advanced concepts in holistic assessment, pharmacological and non-pharmacological interventions, and therapy evaluation in acute and chronic pain syndromes. Prerequisite: NURS 534 or approval of the Assistant Dean for the graduate program.

536-3 ROLE DEVELOPMENT OF THE PAIN MANAGEMENT NURSE. Explores the nurse's role as care provider, coach, educator, researcher and advocate in pain management. Focuses on analysis of clinical, institutional, or legislative issues. Prerequisite: NURS 534 or approval of the Assistant Dean for the graduate program.

537-3 PALLIATIVE CARE AND PAIN MANAGEMENT AT END OF LIFE. Examines the social, cultural, psychological, physiological, spiritual, and ethical dimensions of palliative care and pain management at the end of life. Prerequisite: NURS 534 or approval of the Assistant Dean for the graduate program.

555-3 TOPICS IN HEALTH CARE. Special health-related topics not covered in regular course offerings. Content varies, depending on student interest and availability of faculty. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: graduate standing.

563-3 PHARMACOLOGY RELATED TO ANESTHESIA. Pharmacological properties and therapeutic and clinical uses of anesthesia drugs and their interactions with other common therapeutic agents. Prerequisite or Co-requisites: NURS 529 and NURS 565a and b.

564-3 CHEMISTRY AND PHYSICS APPLIED TO ANESTHESIA. Integration of chemistry, biochemistry, and physics principles into anesthesia care. Prerequisites: admission to the Nurse Anesthesia Specialization and completion of undergraduate courses in organic/biochemistry and physics.

565a-5 THEORETICAL FOUNDATIONS OF ANESTHESIA NURSE I. Integration of basic anesthesia principles, anatomy, physiology, pathophysiology, pharmacology, chemistry, physics, and nursing theory into nurse anesthesia role. Prerequisites: admission to the Nurse Anesthesia Specialization and completion of NURS 529Co-requisites: NURS 563 and NURS 565b.

565b-1 CLINICAL PRACTICUM IN NURSE ANESTHESIA I. Application of theoretical principles to care, providing anesthesia to patients while under the supervison of CRNA and /or Anesthesiologist preceptors. Prerequisites: admission to the Nurse Anesthesia Specialization and completion of NURS 529 Co-requisites: NURS 563 and NURS 565a.

566a-5 THEORETICAL FOUNDATIONS OF ANESTHESIA NURSING II. Integration of advanced of anesthesia principles natural sciences, nursing theory, and pharmacology into nurse anesthesia care of specialty patient populations. Prerequisites or Co-requisites: admission to the Nurse Anesthesia Specialization and completion of NURS 565a and 565b, and current enrollment in NURS 566b.

566b-1 CLINICAL PRACTICUM IN NURSE ANESTHESIA II. Application of theoretical principles to care, providing anesthesia to specialty patients populations while under the supervision of CRNA and/or Anesthesiologist preceptors. Prerequisites or Co-requisites: admission to the Nurse Anesthesia Specialization and completion of NURS 565a and 565b and current enrollment in NURS 566a.

567a-5 THEORETICAL FOUNDATIONS OF NURSE ANESTHESIA III. Integration of advanced anesthesia principles, natural sciences, nursing theory, and pharmacology into nurse anesthesia care of complex patient. Prerequisites or Co-requisites: admission to the Nurse Anesthesia Specialization and completion of NURS 566a and 566b and current enrollment in NURS 567b.

567b-1 CLINICAL PRACTICUM IN NURSE ANESTHESIA III. Application of theoretical principles into care, providing anesthesia to complex patients while under the supervision of CRNA and/or Anesthesiologist preceptors. Prerequisites or Co-requisites: admission to the Nurse Anesthesia Specialization and completion of NURS 566a and 566b and current enrollment in NURS 567a.

568a-2 THEORETICAL FOUNDATIONS OF NURSE ANESTHESIA IV: CLINICAL CORRELATIONS. Advanced theoretical principles of anesthesia providing classroom and laboratory integration of basic sciences, theory, and pharmacology in caring for selected subspecialty patient populations. Prerequisites: NURS 567a; 567b. Co-requisite: NURS 568b.

568b-4 CLINICAL PRACTICUM IN NURSE ANESTHESIA IV. Application of advanced theoretical principles into nurse anesthesia care of critically ill or complex while under the supervision of CRNA and/or anesthesiologist preceptors. Prerequisites or Co-requisites: admission to the Nurse Anesthesia Specialization and completion of NURS 567a and 567b and current enrollment in NURS 568a.

569a-3 THEORETICAL FOUNDATIONS OF NURSE ANESTHESIA V: CLINICAL CORRELATIONS. Correlation and synthesis of theoretical principles and multiple dimensions practice. Analysis of historical, legal, ethical, and political aspects of the

CRNA role. Prerequisites or Co-requisites: admission to the Nurse Anesthesia Specialization and completion of NURS 568a and 568b and current enrollment in NURS 569b.

569b-6 CLINICAL PRACTICUM IN NURSE ANESTHESIA V. Application of advanced practice nursing role care of critically ill or complex patients while under the supervision of CRNA and/or Anesthesiologist preceptors. Prerequisites or Co-requisites: admission to the Nurse Anesthesia Specialization and completion of NURS 568a and 568b and current enrollment in 569a.

571-4 CLINICAL MANAGEMENT OF ADULTS IN PRIMARY HEALTH CARE I AND PRACTICUM. Assessment and management of ambulatory adults with acute and chronic conditions of the respiratory, cardiovascular, gastrointestinal, musculoskeletal, and hematological systems. Prerequisites: NURS 513 and NURS 520.

572-4 CLINICAL MANAGEMENT OF ADULTS IN PRIMARY HEALTH CARE II AND PRACTICUM. Assessment and management of ambulatory adults with acute and chronic conditions of the respiratory, cardiovascular, gastrointestinal, musculoskeletal, and hematological systems. Prerequisite: NURS 571.

573-3 ADVANCED MANAGEMENT OF WOMEN'S HEALTH AND PRACTICUM. Management of the health of women across the lifespan including family support and adjustment through the maturational process of the expanding family. Prerequisites or Co-requisites: NURS 571 and NURS 572

574a-1 to 2 ADULTS IN PRIMARY HEALTH CARE III. Advanced management of adults with concentration on those with complex and multisystem conditions. Prerequisites: NURS 572;. Co-requisite: NURS 574b.

574b-1 ADULTS IN PRIMARY HEALTH CARE III: PRACTICUM. Advanced clinical practice in the primary care of adults with concentration on those with complex and multisystem conditions. Prerequisites: NURS 572;. Co-requisite: NURS 574a.

576-3 ADVANCED MANAGEMENT OF THE PEDIATRIC CLIENT AND PRACTICUM. Assessment and management of health for neonates, infants, and children with emphasis on growth and development and family dynamics from infancy through adolescence. Prerequisites: NURS 571, NURS 572, and NURS 573 .

577- 3 ADVANCED NURSE PRACTICUM AND ROLE SYNTHESIS. Intensive clinical experience focused on synthesis and application of previous theory and clinical courses and development of autonomous advanced nursing practice role. Prerequisites or Co-requisites: NURS 571, NURS 572, NURS 573, and NURS 576.

581-3 CURRICULUM DEVELOPMENT FOR NURSING. Essential components of curriculum development will be used. Roles of external accrediting agencies and State Board of Nursing in curriculum development will be discussed. Prerequisite: NURS 500.

582-2 TESTING AND EVALUATION IN NURSING EDUCATION. Evaluation strategies for teaching nursing will be analyzed. Includes summative and formative evaluation, the use of standardized examinations and written and oral exams. Prerequisites: NURS 504 and NURS 581.

583-3 CONTEMPORARY ISSUES IN NURSING EDUCATION. Includes review of contemporary issues impacting nursing education. Topics that might be included are faculty preparation, scarcity of clinical agencies, changes in the learner, workload issues, etc. Prerequisite: NURS 505 or consent of program director.

584-3 TEACHING STRATEGIES FOR DIVERSE POPULATIONS IN NURSING. Teaching methods will be analyzed for use in diverse nurse/health populations. Approaches reviewed will include clinical supervision, appropriateness of clinical agencies and use of technology. Prerequisite: NURS 581, 582. Co-requisite: NURS 583.

585a-3 SYNTHESIS OF TEACHING IN NURSING. Includes comprehensive implementation and evaluation of teaching models in classroom and clinical settings. Roles and responsibilities of faculty in teaching, research and service will be reviewed. Prerequisites: NURS 581, NURS 582 and NURS 586. Co-requisite: NURS 585b.

585b-2 SYNTHESIS OF TEACHING IN NURSING: PRACTICUM. Students will co-teach with masters or doctoral prepared faculty member. The practicum will include both didactic and clinical teaching. Prerequisites: NURS 581, NURS 582 and NURS 586. Co-requisite: NURS 585a.

586-3 ADVANCED NURSING CARE SEMINAR: MEDICAL SURGICAL NURSING. Advanced theoretical knowledge related to the advanced practice nurse role and adult medical-surgical disturbances. Prerequisites: NURS 513, NURS 515, NURS 516, NURS 581, and NURS 582.

590-3 ORGANIZATIONAL THEORY AND BEHAVIOR IN NURSING. Examines organizational and management theories incorporated in nursing administration. Explores healthcare models, structure, and design. Includes research, quality management, selection, evaluation, and marketing healthcare services.

591-3 FOUNDATIONS FOR THE ADVANCED LEADERSHIP ROLE IN HEALTH CARE AND NURSING ADMINISTRATION. Integration and application of knowledge about management process and systems to the role of nurse leaders in a variety of health care situations. Prerequisite or Co-requisite: NURS 590.

592-3 FINANCE, BUDGETING, AND INFORMATICS IN HEALTH CARE ADMINISTRATION IN NURSING. Explores selected aspects of finance and budgeting related to health care/administration. Integrates informatics into the role of the nurse administrator. Prerequisite or Co-requisite: NURS 590.

593-3 MANAGEMENT OF DIVERSE HUMAN RESOURCES IN HEALTH CARE AND NURSING. Emphasizes management of diverse human resources in health care. Selected topics include professional growth, performance appraisal, recruitment, retention, promotion, conflict management, collective bargaining, and diversity. Prerequisite or Co-requisite: NURS 590.

594-4 SYNTHESIS OF HEALTH CARE AND NURSING ADMINISTRATION AND PRACTICUM. Examination of selected current topics in of health care and nursing administration and the role of the nurse administrator. Includes practicum. Prerequisites: NURS 590, NURS 591, NURS 592, and NURS 593.

595-3 NURSING PROJECT (NON-THESIS OPTION). Development of a terminal project related to clinical nursing problems within a client health and illness framework. Prerequisites: consent of instructor.

598-1 to 3 INDEPENDENT STUDY. Guided study in nursing topics; organized to meet objectives of individuals or small groups of graduate students in a particular area of interest. Total earned hours may not exceed 3. Prerequisites: consent of instructor.

599-1 to 6 THESIS. Systematic investigation of a nursing problem utilizing an appropriate research design and analysis in addition to written documentation carried out under guidance of thesis committee. Prerequisites: consent of instructor.

OPERATIONS RESEARCH (OR)

440-3 DETERMINISTIC MODELS. (Same as IME 415) Linear programming, problem formulation, simplex algorithm, transportation and network problems, duality theory, sensitivity theory. Prerequisite: knowledge of a programming language, MATH 250 or consent of instructor.

441-3 STOCHASTIC MODELS. (Same as IME 461) Probabilistic models, elementary queuing theory with single or multiple servers, Markov processes and models, decision theory. Prerequisite: STAT 380 or 480a.

442-3 SIMULATION. (Same as IME 468) Design of simulation models using a high-level simulation programming language. Applications in production, inventory, queuing, other models. Prerequisite: OR 441 or IME 365, knowledge of a programming language.

495-3 INDEPENDENT STUDY. Research in subjects such as mathematical programming, dynamic programming, simulation, queuing, Markov processes and production topics. May be repeated to a maximum of 9 hours. Prerequisites: written consent of adviser and instructor.

585-3 SIMULATION THEORY. Theory and techniques of simulation: generation of random variables, selection of distributions, output analysis, and variance reduction. Prerequisites: OR 441; STAT 480b.

586-3 SIMULATION MODELING AND LANGUAGES. GPSS simulations: clock mechanisms, data structures, output analysis, sample applications in queuing and production. Prerequisites: OR 585; STAT 480b.

587a,b-3,3 MATHEMATICAL PROGRAMMING. (a) Theory, methods, and applications of linear and network programming; (b) Theory, methods, and applications of integer, dynamic, and nonlinear programming. Prerequisites: (a) OR 440; MATH 321. (b) OR 587a.

590-1 to 3 SEMINAR. Intensive study of selected topics: mathematical programming, dynamic programming, simulation, queuing, stochastic processes, Markov processes, and production. May be repeated to a maximum of 18 hours provided no topic is repeated. Prerequisites: written consent of adviser and instructor.

595-1 to 3 SPECIAL PROJECT. Independent study in mathematical programming, simulation, queuing, Markov processes, or production. May be used to satisfy research paper requirement for MS degree in mathematics. May be repeated to a maximum of 7 hours. Prerequisite: consent of research adviser.

599-1 to 6 THESIS. Directed research to satisfy thesis requirement. May be repeated to a maximum of 6 hours. Prerequisite: written consent of thesis adviser.

PHILOSOPHY (PHIL)

415-3 PHILOSOPHY OF LANGUAGE. A study of philosophical problems concerning language. Includes topics such as meaning, reference, truth, semantic puzzles, speech acts, and metaphor. Prerequisite: junior or graduate standing, or consent of instructor.

481-3 MEDIA ETHICS. Critical examination and analysis of main values, issues, and arguments associated with media functions, performance, business practices, and with public perceptions of the media.

PHYSICS (PHYS)

405a,b-3,3 ELECTROMAGNETIC FIELD THEORY. Vector treatment of the theory: a) Electrostatics in vacuum and in matter; steady currents. (b) Magnetism, magnetic materials, electromagnetic radiation. Prerequisites: (a) MATH 305; PHYS 308; (b) PHYS 405a.

410-3 OPTICS. Nature of light; photometric quantities; geometrical optics; interference and diffraction; polarization; introduction to lasers; optical properties of materials. May include laboratory component. Prerequisites: PHYS 302 and MATH 250.

415a,b-3,3 WAVE MECHANICS AND ATOMIC PHYSICS. a) Quantum mechanics: wave functions, expectation values, operators, Schroedinger equation, simple applications including step potentials and harmonic oscillator, perturbation theory. (b) Topics pertinent to atomic and molecular systems: angular momentum, hydrogen atom, electron spin, atomic transitions and spectra, exclusion principle, multi-electron atoms, molecular structure. Prerequisites: (a) PHYS 302; MATH 305; (b) PHYS 415a.

416-4 PRINCIPLES OF QUANTUM MECHANICS. Wave functions, packets, probabilities, operators, uncertainty relations. Schroedinger equation, square wells, harmonic oscillator, barrier penetration, angular momentum, Hydrogen atom, spin, exclusion principle, multielectron atoms, and molecules. Prerequisites: PHYS 304 and PHYS 321 or PHYS 323 and MATH 321 or MATH 355. A grade of C or better is required in all prerequisites.

419-4 THEORETICAL PHYSICS. Mathematical techniques: vectors, tensors, matrices, differential equations, special functions, boundary value problems, other selected topics. Prerequisites: PHYS 302; MATH 305.

431-3 INSTRUCTIONAL STRATEGIES FOR PARTICLE AND RIGID BODY MOTION. Pedagogical innovations, assessments, and inquiry-based activities will be developed for particle and rigid body motion. Addresses Illinois Professional Teaching Physics-Designation Standard #2. Prerequisites: PHYS 211a and CI 200, or certified K-12 teacher, or physics graduate status.

432-3 INSTRUCTIONAL STRATEGIES FOR PHYSICAL WAVES AND THERMODYNAMICS. Pedagogical innovations, assessments, and inquiry-based activities will be developed for physical waves and thermodynamics. Addresses Illinois Professional Teaching Physics-Designation Standard #3 and #4. Prerequisites: PHYS 303 and CI 200, or certified K-12 teacher, or physics graduate status.

433-3 INSTRUCTIONAL STRATEGIES FOR ELECTRICITY AND MAGNETISM. Pedagogical innovations, assessments, and inquiry-based activities will be developed for particle and rigid body motion. Addresses Illinois Professional Teaching Physics-Designation Standard #2. Prerequisites: PHYS 211b and CI 200, or certified K-12 teacher, or physics graduate status.

434-3 INSTRUCTIONAL STRATEGIES FOR ASTRONOMY. Pedagogical innovations, assessments, and inquiry-based activities will be developed for astronomy. Addresses Illinois Professional Teaching Earth and Space Science Standards #3 and #4. Prerequisites: PHYS 356 and CI 200, or certified K-12 teacher, or physics graduate status.

438-1 PHYSICS AND ASTRONOMY EDUCATION RESEARCH SEMINAR. Seminar discussing current issues in Physics and Astronomy Education Research. May be repeated for a maximum of 4 hours provided no topic is repeated.

439-1 to 3 PHYSICS PROJECT FOR EDUCATORS. Physics curriculum development project with the topic and educational level decided in consultation with the instructor. Not for physic undergraduate majors. Prerequisite: teaching certificate or instructor permission.

450-3 SOLID STATE PHYSICS. Crystal structures and binding, lattice vibrations, electronic states, band theory of solids, semiconductors, optical properties of solids, other selected topics. Prerequisite: PHYS 323 and concurrent enrollment in PHYS 416. A grade of C or better is required in all prerequisites.

480-2 or 3 SELECTED TOPICS IN PHYSICS. Classroom instruction in a topic of special interest not covered in other courses. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

497-2 or 3 SENIOR EXPERIMENTAL PROJECT. Individual experimental investigation of a topic to be agreed upon with an instructor. May be repeated to a maximum of 6 hours provided no experiment is repeated. Prerequisites: PHYS 308; consent of instructor.

498-2 or 3 SENIOR THEORETICAL PROJECT. Investigation of a topic under the guidance of faculty using mathematical techniques, often involving systematic library research and computer use. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisites: PHYS 308; consent of instructor.

501-3 ADVANCED ELECTRONIC INSTRUMENTATION. Operation principles for analog and digital oscilloscopes, lock-in amplifiers, gated integrators, spectrum analyzers. Computer programming for data acquisition. Advanced computer interfacing. Prerequisite: graduate standing in Physics or consent of instructor.

502-3 VACUUM TECHNIQUES AND MATERIALS CHARACTERIZATION METHODS. Vacuum system behavior and components, microscopy, electron beam instruments, diffraction and scattering, electron emission spectroscopies, ion scattering techniques, mass spectroscopy. Prerequisite: graduate standing in Physics or consent of instructor.

503-3 EXPERIMENTAL METHODS IN OPTICAL SPECTROSCOPY. Maxwell's equations at interfaces, optical properties, transition probabilities and selection rules in quantum systems, vibrational spectra, sources, detectors, spectrometers, interferometers, absorption, emission, excitation, reflectance spectra. Prerequisite: graduate standing in Physics or consent of instructor.

504-3 APPLICATIONS OF FIBER OPTICS. Optical fiber characteristics; fiber preparation; single and multimode fibers; sources; coupling; communication systems;

multiplexing techniques; fiber-optic sensors. Prerequisite: graduate status or consent of instructor.

506-3 EXPERIMENTAL METHODS IN OPTICS. Experimental techniques in optics and optical spectroscopy including absorption, fluorescence, and index of refraction spectroscopy; measurements of nonlinear optical properties of materials using several techniques. Prerequisite: PHYS 410 or PHYS 514.

511-3 METHODS IN CLASSICAL PHYSICS. Selections from: linear and non-linear systems, many-particle systems, normal modes, waves, numerical methods, percolation, fractals, chaos. Prerequisite: graduate standing in Physics or consent of instructor.

512-3 ELECTRODYNAMICS. Multipoles, Laplace equation, time-varying fields, electromagnetic waves and radiation, antennas, reflection, refraction, waveguides, and electrons. Prerequisites: PHYS 405b or consent of instructor.

513-3 QUANTUM MECHANICS. Vector-space formalism, periodic potentials, symmetries and conservation laws, ladder operators, angular momentum, spinors, perturbation theory, transition rates, photons and atoms, introductory second quantization, identical particles. Prerequisite: PHYS 4165 or consent of instructor.

514-3 PHOTONICS I. Ray and wave optics, Gaussian beams, Fourier optics, diffraction, imaging, holography, electromagnetic waves in dielectric media, polarization, and crystal optics. Prerequisite: PHYS 410 or consent of instructor.

515-3 PHOTONICS II. Concepts governing applications of current interest in photonics including waveguides and fiber optics, electro-optics and acousto-optics, photonic switching, and computing. Prerequisite: PHYS 514 or consent of instructor.

516-2 or 3 INDEPENDENT STUDY. Supervised study in an area selected according to needs of the student. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

517-3 PRINCIPLES OF LASERS. Population inversion, rate equations, laser resonators, Q-switching, mode locking, gas lasers, solid state lasers, semiconductor lasers, dye lasers, laser applications in communications, medicine, and holography. Prerequisite: PHYS 514 or consent of instructor.

518-3 NONLINEAR OPTICS. Maxwell's equations in nonlinear media, second-order nonlinearities, second-harmonic generation, parametric processes, third-order nonlinearities, Kerr-type nonlinearities, Raman amplification, two-photon absorption, nonlinear crystals. Prerequisites: PHYS 512 and PHYS 513 or consent of instructor.

520-2 to 4 GRADUATE PHYSICS PROJECT. Individual investigation of a topic to be agreed upon with the instructor. May be experimental or theoretical. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

575-1 COLLOQUIUM. Participation in departmental colloquia; student presentation on topic of current interest. May be repeated to a maximum of 2 hours provided no topic is repeated. Prerequisite: consent of instructor.

580-2 to 4 SELECTED TOPICS IN PHYSICS. Classroom instruction in a topic of special interest not covered in other graduate courses. May be repeated to a maximum of 8 hours provided no topic is repeated. Prerequisite: consent of instructor.

594-3 PHYSICS TEACHING METHODS FOR SECONDARY SCHOOLS. Current teaching and resource materials. Ways to teach different topics in physics, problem-solving techniques, and societal issues. Preparing for laboratory activities. Safety concerns.

598-1 to 6 ADVANCED RESEARCH PROJECT IN PHYSICS. Advanced research project in physics. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

599-1 to 6 THESIS. Thesis research in physics. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

POLITICAL SCIENCE (POLS)

424-3 ADMINISTRATIVE LAW. Principles of administrative law in the United States; extent of and limitations on powers of government regulatory agencies. Prerequisite: POLS 112.

429-1 to 3 TOPICS IN PUBLIC ADMINISTRATION. Selected administrative problem or process; content may vary semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: POLS 320 or consent of instructor.

440-3 AFRICAN-AMERICAN POLITICS. Examination of the politics of African Americans. Description and analysis of the affect of political officials and institutions on African Americans and vice versa. Prerequisite: POLS 112 or consent of instructor.

441-3 WOMEN & POLITICS IN AMERICA. Consideration of politics and power in gender roles, family, class, occupation, and research, women and the political system and women and public policy. Prerequisite: POLS 112 or consent of instructor.

445-3 VOTING AND ELECTIONS. Political-legal, sociological, psychological bases of voting behavior; theories of electoral outcomes and consequences. Prerequisite: POLS 112 or consent of instructor.

449-1 to 3 TOPICS IN AMERICAN POLITICS. Selected topics in American politics; content may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: POLS 112 or consent of instructor.

459-1 to 3 TOPICS IN COMPARATIVE POLITICS. Selected topics in comparative politics; content may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: POLS 111 or consent of instructor.

472-3 INTERNATIONAL ORGANIZATIONS. Past and present international organizations; origins, structure; decision-making processes, functioning of United Nations and its specialized agencies; problems and prospects. Prerequisite: POLS 370 or consent of instructor.

473-3 UNITED STATES FOREIGN POLICY. Formulation, implementation, content; general policy patterns; international, domestic sources; policy instruments; regional dimensions and implications. Prerequisite: POLS 370 or consent of instructor.

479-1 to 3 TOPICS IN INTERNATIONAL RELATIONS. Selected topics in international relations; content may vary from semester to semester. May be repeated to maximum of 6 hours provided no topic is repeated. Prerequisite: POLS 370 or consent of instructor.

484-3 CLASSICAL POLITICAL THEORY. Works of major political thinkers from ancient times to the Renaissance including Plato, Aristotle, St. Augustine, St. Thomas, and Machiavelli.

485-3 MODERN POLITICAL THEORY. Works of major political thinkers from the Renaissance to the present including Hobbes, Locke, Rousseau, Hegel, Marx, Mill, and Nietzsche.

489-1 to 3 TOPICS IN POLITICAL THEORY. Major issues in political theory or works of one major political thinker. May be repeated for a maximum of 6 hours provided no topic is repeated. Prerequisite: POLS 385 or consent of instructor.

495-3 CONSTITUTIONAL LAW: POWERS OF GOVERNMENT . Analyzes Supreme Court decisions regarding judicial, legislative, and executive power and the relationship between states and federal government in a range of policy areas. Prerequisite: POLS 390 or consent of instructor.

496-3 CONSTITUTIONAL LAW: CIVIL RIGHTS AND CIVIL LIBERTIES. Analysis of Supreme Court decisions dealing with individual rights, particularly free speech and press, religion, rights of criminal defendants, voting, and constitutional protection against race and sex discrimination. Prerequisite: POLS 390 or consent of instructor.

497-3 ENVIRONMENTAL LAW. Examines regulatory framework that has developed around the protection of various aspects of the environment over the past thirty years. Prerequisite: POLS 111 or consent of instructor.

499-3 TOPICS IN PUBLIC LAW. Selected topics in public law; content may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: POLS 390 or consent of instructor.

500-3 SCOPE AND CONCEPTS OF POLITICAL SCIENCE. Conceptual orientations; relationship to other disciplines. Prerequisite: graduate standing.

501-3 QUANTITATIVE TECHNIQUES OF POLITICAL SCIENCE. Research methodology and statistics; research design, data analysis, computer applications. Prerequisite: graduate standing.

510-1 to 8 READINGS IN POLITICAL SCIENCE. Individualized program designed by instructor and student. Normal assignment is 1000 pages per credit hour; requirements determined prior to registration. May be repeated to a maximum of 8 hours. No more than 6 hours may apply to degree. Prerequisite: consent of instructor.

520-3 SEMINAR IN PUBLIC ADMINISTRATION. Selected topics on processes and problems; subject may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

540-3 SEMINAR IN AMERICAN POLITICS. Selected topics on processes and problems; subject may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

550-3 SEMINAR IN COMPARATIVE POLITICS. Selected topics on processes and problems; subject may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

570-3 SEMINAR IN INTERNATIONAL RELATIONS. Selected topic on processes and problems; subject may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

580-3 SEMINAR IN POLITICAL THEORY. Major issues in political theory or works of one major political thinker. Subject may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

590-3 SEMINAR IN AMERICAN PUBLIC LAW. Selected topic on processes and problems; subject may vary from semester to semester. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

595-1 to 4 INDIVIDUAL RESEARCH. Supervised research and writings in selected subjects. May be repeated to a maximum of 4 hours. Prerequisite: consent of instructor.

599-1 to 6 THESIS. Supervised individual research on selected and approved topic. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

PRODUCTION (PROD)

461-3 PRODUCTION PLANNING AND CONTROL. Long range and aggregate planning; master scheduling; rough cut capacity planning; MRP; CRP; lead time management; production activity control, sequencing, and line balancing. Prerequisites: PROD 315; MS 251.

490-1 to 6 INDEPENDENT STUDY IN OPERATIONS MANAGEMENT. Topical areas in greater depth than regularly titled courses permit. Individual or small group readings or projects. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor and department chairperson.

529-3 OPERATIONS MANAGEMENT AND PROCESS ANALYSIS. A process view of operations management concepts such as process design, capacity, flow time, supply chain and logistics in manufacturing and service organizations is presented. Prerequisites: MBA 521 & 522.

568-3 SEMINAR IN POM. Decision-making in manufacturing: integration of many individual topics covered in POM. Prerequisite: PROD 529.

PSYCHOLOGY (PSYC)

407-3 MULTICULTURAL ISSUES IN PSYCHOLOGY. Students will develop a critical framework for looking at the concept of "culture" in contemporary America. Students will explore how culture impacts psychological services. Prerequisite: PSYC 111.

409-3 HISTORY AND SYSTEMS OF PSYCHOLOGY. Important antecedents of contemporary scientific psychology, issues, conceptual development, major schools and systems. Prerequisites: junior or senior standing and PSYC 111.

420-3 APPLIED BEHAVIOR ANALYSIS. Learning principles, evaluation methods and techniques of managing and modifying human behavior based upon operant and respondent conditioning. Prerequisite: PSYC 111.

421-3 PSYCHOLOGICAL TESTS AND MEASUREMENTS. Principles of psychological measurement, test construction and evaluation; problems in assessment and prediction. Prerequisite: PSYC 220.

431-3 PSYCHOPATHOLOGY. Classification, description, etiology, and treatment of disorders of personality organization and behavioral integration. Prerequisite: PSYC 111.

442-3 ADLERIAN PSYCHOLOGY. In-depth summary of theory and application of Alfred Adler and Rudolf Dreikurs applied to mental health and human relations in family, school, clinic, and workplace. Prerequisites: PSYC 111; graduate standing.

461-3 ADVANCED SOCIAL PSYCHOLOGY. May include social cognition, attitudes, attraction, social influence, aggression, and other issues. Prerequisite: PSYC 206 or consent of instructor.

473-3 PERSONNEL PSYCHOLOGY. Psychological principles and techniques used in job selection, training, and employee evaluation. Prerequisite: PSYC 320.

487-3 PSYCHOLOGY OF AGING. Biological, psychological, and sociocultural factors in development and aging; age changes in learning, memory, intelligence, personality; special issues such as retirement, Alzheimer's disease, elder abuse. Prerequisite: PSYC 204 or graduate standing.

495-1 to 3 SEMINAR: SELECTED TOPICS. Offered occasionally when needed. May be repeated to a maximum of 9 hours so long as no topic is repeated. Prerequisite: consent of instructor.

507-3 MULTICULTURAL CONUSELING AND PSYCHOTHERAPY. Focused on broadly defined multicultural issues in counseling and psychotherapy, with emphasis placed on becoming an effective multicultural counselor/psychotherapist via increased awareness. Prerequisite: graduate standing in Department of Psychology or permission of instructor.

514-3 ADVANCED BIOPSYCHOLOGY. Advanced study of biological foundations of behavior; structure and function of brain related to personality, behavior, and health. Prerequisite: PSYC 314 or consent of instructor.

519-3 PROFESSIONAL ISSUES IN TEACHING PSYCHOLOGY. Secondary, college, and graduate levels; models for teaching psychology; library, laboratory, and testing resources. Prerequisite: graduate standing in psychology.

520-3 RESEARCH DESIGN AND INFERENCE I. Research methods, philosophy of science, research writing, review of basic statistics, using computer for statistical analysis and research writing. Prerequisite: graduate standing in Psychology or consent of instructor.

521-3 RESEARCH DESIGN AND INFERENCE II. Design, analysis, and interpretation of experimental research designs including ANOVA, ANCOVA, and trend analysis;

design, analysis, and interpretation of field research; multiple regression. Prerequisite: graduate standing in Psychology or consent of instructor.

523-1 to 6 PRACTICUM IN CLINICAL ADULT PSYCHOLOGY. Practicum experience in professional setting under staff supervision. May be repeated to a maximum of 12 hours. Prerequisites: PSYC 538; 543b.

524-1 to 12 PRACTICUM IN CLINICAL CHILD/SCHOOL PSYCHOLOGY. Practicum experience in professional setting under staff supervision. Prerequisite: graduate standing in psychology.

525-1 to 6 PRACTICUM IN INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY. Practicum experience in professional setting under staff supervision. May be repeated to a maximum of 12 hours. Prerequisite: graduate standing in psychology.

527-1 to 6 PRACTICUM: TEACHING OF PSYCHOLOGY. Practicum teaching experience in professional setting under staff supervision. May be repeated to a maximum of 12 hours. Prerequisites: PSYC 519; graduate standing in psychology.

531-3 ADVANCED PSYCHOPATHOLOGY. Current research and literature. Prerequisites: PSYC 431; graduate standing in psychology.

535-3 COGNITIVE-BEHAVIORAL PSYCHOTHERAPY. Review the theory, research, and application of cognitive-behavioral psychotherapy. Specific treatment programs designed to treat various disorders will be reviewed. Prerequisites: PSYC 531 or 553; graduate standing in psychology, or consent of instructor.

537a-3 COUNSELING AND PSYCHOTHERAPY WITH ADOLESCENTS AND FAMILIES. Psychotherapeutic approaches, methods and procedures with children, adolescents, and families. Developmental approach and multicultural perspective. Prerequisite: graduate standing in psychology.

537b-3 COUNSELING AND PSYCHOTHERAPY OF THE ADULT. Major approaches. Aspects of therapeutic situation and changes during psychotherapy with adults. Evaluation of both theory and practice. Prerequisite: graduate standing in psychology.

538-3 CONTEMPORARY INTERPERSONAL THERAPIES: GROUP/FAMILY/MARITAL. Current theory and research in group, family, and marital therapy. Prerequisites: PSYC 537a or 537b; graduate standing in psychology.

539-3 CRISIS INTERVENTION AND CRISIS THERAPY. Crisis theory and intervention strategies for major situational and developmental life crises. Prerequisite: graduate standing in psychology or instructor approval.

541a-3 COGNITIVE ASSESSMENT OF CHILDREN AND ADOLESCENTS. Administration and interpretation of psychological techniques used to assess cognitive

abilities. Developmental approach and multicultural perspective. Prerequisite: graduate standing in psychology.

541b-3 COGNITIVE ASSESSMENT OF THE ADULT. Training in administration/interpretation of psychological techniques used to assess cognitive abilities. Prerequisite: graduate standing in psychology.

543a-3 BEHAVIORAL AND EMOTIONAL ASSESSMENT OF CHILDREN AND ADOLESCENTS. Administration and interpretation of psychological techniques used to assess behavior and emotion. Developmental approach and multicultural perspective. Prerequisite: graduate standing in psychology.

543b-3 PERSONALITY ASSESSMENT OF THE ADULT. Theory underlying use of objective and projective methods of assessing adult personality. Application of techniques to personality, clinical diagnosis, research. Prerequisites: PSYC 541b; graduate standing in psychology.

544-3 RESPONSE TO INTERVENTION: EVALUATING THE EFFECTIVENESS OF ACADEMIC AND BEHAVIORAL TREATMENTS. Assessing students' responses to intervention, single case study design, and measuring progress through curriculum based measurement and other techniques. Prerequisite: PSYC 541a.

545-3 PSYCHOEDUCATIONAL ASSESSMENT AND INTERVENTION. Assessment of students' psychoeducational functioning through norm-referenced and alternative data-based methods. Development, implementation, and interpretation of empirically-validated academic interventions in reading, writing, and mathematics. Prerequisites: Graduate Standing in Psychology, PSYC 541a.

550-3 ETHICAL AND PROFESSIONAL ISSUES IN PSYCHOLOGY. Ethical and professional issues in the field of psychology, especially as outlined in the Code of Ethics of the American Psychological Association. Prerequisite: Graduate student in Psychology Department.

553-3 SEMINAR IN CLINICAL CHILD PSYCHOLOGY: PSYCHOPATHOLOGY OF CHILDREN AND FAMILIES. Theories of childhood psychopathology, typical psychological disorders, therapeutic interventions. Prerequisite: graduate standing in psychology.

556-3 SEMINAR IN COMMUNITY PSYCHOLOGY: PREVENTION PROGRAMS FOR CHILDREN AND FAMILIES. Review and development of intervention programs in social systems that promote wellness and prevent psychopathology in children and their families. Prerequisites: graduate standing in psychology or related human service program; consent of instructor.

557-3 SEMINAR IN DEVELOPMENTAL PSYCHOLOGY: INFANCY AND EARLY CHILDHOOD. Developmental principles and theories, normal and atypical development,

assessment methods, intervention approaches. Prerequisites: PYSC 201 or equivalent; graduate standing in psychology or related human service program.

565-3 CONSULTATION: THEORY AND PRACTICE. Principles and methods of consulting in mental health, educational, and other human service organizations. Prerequisites: graduate standing in psychology; completion of 24 graduate hours or consent of instructor.

571-3 SEMINAR IN MOTIVATION AND LEADERSHIP. Factors affecting motivation and leadership in organizations as well as their measurement, evaluation, and application. Prerequisite: graduate standing in psychology or consent of instructor.

572-3 SEMINAR IN WORK ATTITUDES. Measurement, evaluation, and consequences of different work attitudes with a specific emphasis on job satisfaction, organizational commitment, and other issues. Prerequisite: graduate standing in psychology or consent of instructor

573-3 SEMINAR IN PERSONNEL PSYCHOLOGY. Research and practice of Personnel Psychology. Topics include employee recruitment, selection, training, performance appraisal, job analysis, and legal issues. Prerequisite: graduate standing in psychology or consent of instructor.

574-3 SEMINAR IN ORGANIZATIONAL PSYCHOLOGY. Issues and research on interaction between person, position, and organization variables. Theoretical and practical issues; focus on individual and organization. Prerequisite: graduate standing in psychology or consent of instructor.

575-3 SEMINAR IN EMPLOYEE SELECTION. Theory, research, and practice of employee selection. Topics include selection techniques, validation, job analysis, and legal issues. Prerequisite: graduate standing in psychology or consent of instructor.

576-3 SEMINAR IN ORGANIZATIONAL DEVELOPMENT. Early history, assumptions, concepts, and various change strategies. Human process approaches to planned change within systems framework. Prerequisite: graduate standing in psychology or consent of instructor.

578-3 PSYCHOLOGY OF STRESS AND STRESS MANAGEMENT. Physical, psychological, and social variables involving stress. Theories, models, substantive issues. Prerequisite: graduate standing in psychology.

580-3 PSYCHOLOGY OF EMPLOYEE DEVELOPMENT. Theory, research, and practice of employee training, career development, and performance appraisal. Prerequisite: graduate standing in psychology or consent of instructor.

590-1 to 3 READINGS IN PSYCHOLOGY. Selected topics under faculty supervision. May be repeated to a maximum of 16 hours provided no topic is repeated. Prerequisites: graduate standing in psychology; consent of instructor.

591-1 to 6 RESEARCH IN PSYCHOLOGY. Research under faculty supervision. May be repeated to a maximum of 18 hours. Prerequisites: graduate standing in psychology; consent of instructor.

594-3 SEMINAR IN SCHOOL PSYCHOLOGY. History, theory, and practice of school psychology; psychoeducational assessment and remediation with variety of exceptionalities. Prerequisites: graduate standing in psychology; completion of 24 hours or consent of instructor.

595-1 to 3 GRADUATE SEMINAR: SELECTED TOPICS. Varied content. May be repeated to a maximum of 8 hours provided no topic is repeated. Prerequisites: advanced graduate standing in psychology; consent of instructor.

596-5 INTERNSHIP IN SCHOOL PSYCHOLOGY. Professional training in school settings; full time for one academic year. Must be repeated once for a total of 10 hours. Prerequisites: graduate standing in psychology; consent of instructor.

598-3 RESEARCH PROJECT IN COMMUNITY SCHOOL PSYCHOLOGY.
A paper reviewing theory and research on a topic approved and supervised by a faculty committee. Prerequisite: graduate standing in Community School Psychology.

599-1 to 6 THESIS. Design and implementation of psychological research study. May be repeated to a maximum of 6 hours. Prerequisite: graduate standing in psychology.

PUBLIC ADMINISTRATION AND POLICY ANALYSIS (PAPA)

410-1 MICROCOMPUTING. Personal computers and development of skills in using word-processing and database applications common to the public sector.

411-1 SPREADSHEET APPLICATIONS. Spreadsheet construction and public sector applications.

412-1 SPSS. Skills in using SPSS-PC: importing files, data entry, data analysis, exporting files. Prerequisite: concurrent enrollment in PAPA 420 or consent of instructor.

420-3 QUANTITATIVE ANALYSIS. Research design, descriptive statistics, hypothesis testing, nonparametric statistics, analysis of variance, correlation, and regression. Prerequisite: concurrent enrollment in PAPA 412 or consent of instructor.

499-1 to 3 SEMINAR IN PUBLIC ADMINISTRATION. Intensive study of selected topic. Topics chosen by department to supplement regular course offerings. May be repeated to a maximum of 9 hours provided no topic is repeated.

500-3 PROSEMINAR IN PUBLIC ADMINISTRATION. Concepts, issues, and problems as confronted in the public sector and nonprofit organizations. Organizational structure and behavior, personnel, budgeting, leadership, planning and decision-making.

501-3 PUBLIC ORGANIZATIONS. Theoretical analysis of environment, structure, communication patterns, leadership, informal groups, decision-making of government and nonprofit agencies. Prerequisite: PAPA 500 or consent of instructor.

506-3 PUBLIC LAW. Legal concepts, regulatory agencies and rule making, federal and state relations, employee relations, civil rights, administrator liability.

507-3 VALUES AND THE PRACTICE OF PUBLIC ADMINISTRATION. Role of organizational, societal, and individual values in ethical public administration; models for resolving ethical and values-based conflict in public organizations.

510-3 PUBLIC INFORMATION MANAGEMENT. Challenges to public information management such as freedom of information and right to privacy. Development of skills in designing decision support applications and management information applications. Prerequisites: PAPA 410; 411, or consent of instructor.

525-3 PROGRAM EVALUATION. Research design and execution of quantitative approaches in application of statistical techniques for analysis of administrative programs and policies. Prerequisite: PAPA 420.

526-3 ADVANCED QUANTITATIVE METHODS. Skills in advanced statistical techniques for public managers: factor analysis, advanced regression applications, discriminant analysis, and multivariate analysis of variance. Prerequisite: PAPA 420 or consent of instructor.

530-3 PUBLIC BUDGETING. Budgeting topics including revenue, governments and economic activity, history, process, approaches, politics, reform.

535-3 PUBLIC FINANCIAL ADMINISTRATION. Includes accounting auditing, revenue, expenditure, pension, debt, and investment administration; purchasing; cash and risk management; cost analysis; economic development; assessing financial conditions. Prerequisite: PAPA 530 or consent of instructor.

536-3 FUND ACCOUNTING. Practical, hands-on orientation to fund accounting as used by governments and nonprofit organizations.

540-3 PUBLIC PERSONNEL ADMINISTRATION. Personnel functions as applied to public organizations: evolution of civil service, theory and practice of recruitment, testing, job evaluation, training and the legal environment.

545-3 PUBLIC SECTOR LABOR RELATIONS. Public sector collective bargaining: right to organize, representation elections, impasse resolution, unfair labor practices, contract administration; grievance arbitration, right to strike.

546-3 PERFORMANCE APPRAISAL FOR THE PUBLIC SECTOR. Current research and applications of performance evaluations in the public sector. Topics include review of appraisal literature, legal issues, and current methodologies. Prerequisite: PAPA 540 or consent of instructor.

548-3 PUBLIC SUPERVISORY PRACTICES. Case study approach to common supervisory problems in public and nonprofit sectors. Work scheduling, managing declining public resources, problem solving, coaching, disciplining, conflict management, leadership.

550-3 PUBLIC POLICY: CONTEXT, PROCESS AND ANALYSIS. Policy making environment, policy process, policy formulation, implementation strategies, policy analysis techniques.

555-1 to 3 TOPICS IN POLICY ANALYSIS. Special topics not treated in other course offerings. Content varies, depending on student interest and availability of faculty. May be repeated to a maximum of 9 hours provided no topic is repeated.

565-3 INTRODUCTION TO HEALTH CARE MANAGEMENT. Current policy issues in management of health services, focusing on acute and ambulatory care services. Cost, quality, and access considerations in delivery of these services.

566-3 HEALTH CARE FINANCING. Private and public insurance (Medicare, Medicaid) systems. Evolution of hospital financial reimbursement capital allocation practices. Cost containment from perspective of providers, insurance, and employers. Physician payment and forms.

567-1 to 3 TOPICS IN HEALTH CARE. Current policy issues in management of health care services. Content varies, depending on student interest and availability of faculty. May be repeated to a maximum of 9 hours provided no topic is repeated.

575-3 NONPROFITS. Role of independent sector in U.S. society; unique problems of nonprofit administration; role of leadership in nonprofit organizations.

576-3 STRATEGIC PLANNING & ORGANIZATIONAL DEVELOPMENT. Skills and methods of strategic planning as tools to lead, strengthen, and develop the public and/or nonprofit organization.

577-3 NEEDS ASSESSMENT & STRATEGIC MARKETING. Effective nonprofit leadership in systematically assessing community needs; marketing the nonprofit organization; obtaining public, private, and nonprofit action in addressing community problems.

578-3 FUND RAISING. Administration and management of fund raising process; principles, skills, methods, and techniques of fund raising; direct mail, telephone, major gifts, capital campaigns, and other methods.

579-3 GRANTSMANSHIP. Administration and management of grantsmanship process; basic principles, skills, methods, and techniques of grantsmanship for public and nonprofit organizations.

585-3 LOCAL GOVERNMENT ADMINISTRATION. Situation and functions of general-purpose local government. Situational elements include legalities, politics, and intergovernmental relations. Functions include public safety, human services, and public works.

586-3 LOCAL GOVERNMENT LAW. Formation, power, and duties of units of local government; contact, torts, planning and zoning intergovernmental relations.

595-3 PUBLIC ADMINISTRATION INTERNSHIP. Service in approved public administration work assignment under faculty supervision. May be repeated up to five times. Only 3 credit hours may be counted among the 39 hours required for graduation. Prerequisite: consent of internship coordinator.

596-1 to 3 INDIVIDUALIZED RESEARCH. Independent research and study of approved topic. May be repeated to a maximum of 3 hours. Prerequisite: consent of instructor.

597-1 to 3 READINGS. Supervised readings on selected topics. Students explore interests not satisfied by regular course offerings. May be repeated to a maximum of 3 hours. Prerequisite: consent of instructor.

599-1 to 3 SEMINAR IN PUBLIC ADMINISTRATION. Intensive study of selected topic. Topics chosen by department to supplement regular course offerings. May be repeated to a maximum of 6 hours provided no topic is repeated.

SCIENCE (SCI)

401-2 to 4 SELECTED CONCEPTS IN PHYSICS. New discoveries and/or methodologies and techniques in the field. Demonstration and laboratory experiences to support the learning process. May be repeated to a maximum of 8 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

405-2 to 4 SELECTED TECHNIQUES IN PHYSICS. Modern experiments, demonstrations, and equipment; advances in technology; laboratory management and safety. May be repeated to a maximum of 8 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

411-2 to 4 SELECTED TOPICS IN CHEMISTRY. New discoveries and/or methodologies and techniques in the field. Demonstration and laboratory experiences to support the learning process. May be repeated to a maximum of 8 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

414-1 to 3 HISTORY OF CHEMISTRY. Topics in history of chemistry. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

415-2 to 4 SELECTED TECHNIQUES IN CHEMISTRY. Modern experiments, demonstrations, and equipment; advances in technology; laboratory management and safety. May be repeated to a maximum of 8 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

421-2 to 4 SELECTED TOPICS IN BIOLOGY. New discoveries and/or methodologies and techniques in the field. Demonstration and laboratory experiences to support the learning process. May be repeated to a maximum of 8 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

425-2 to 4 SELECTED TECHNIQUES IN BIOLOGY. Modern experiments, demonstrations, and equipment; advances in technology; laboratory management and safety. May be repeated to a maximum of 8 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

431-2 to 4 SELECTED TOPICS IN EARTH AND ENVIRONMENTAL SCIENCES. New discoveries and/or methodologies and techniques in the field. Demonstration and laboratory experiences to support the learning process. May be repeated to a maximum of 8 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

435-2 to 4 SELECTED TECHNIQUES IN EARTH AND ENVIRONMENTAL SCIENCES. Modern experiments, demonstrations, and equipment; advances in technology; laboratory management and safety. May be repeated to a maximum of 8 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

442-1 to 4 SPECIAL TOPICS IN TEACHING SCIENCE IN ELEMENTARY SCHOOL. Topics of special interest in teaching science. Lecture and/or laboratory format. May be repeated to a maximum of 8 hours provided no topic is repeated. Prerequisite: two years of college science and mathematics.

451-3 INTEGRATED SCIENCE. Laboratory-based integrated science course. Interactions of the sciences – earth and space, physical, life sciences and mathematics. Research project, paper, and presentation. Prerequisites: Completed 24 semester hours of science credit: 2.5 or higher GPA.

452-1 to 4 SPECIAL TOPICS IN TEACHING SCIENCE IN SECONDARY SCHOOL. Topics of special interest in teaching science. Lecture and/or laboratory format. May be repeated to a maximum of 8 hours provided no topic is repeated. Prerequisite: consent of instructor.

462-1 to 4 SPECIAL TOPICS IN TEACHING SCIENCE IN COLLEGE. Topics of special interest in teaching science. Lecture and/or laboratory format. May be repeated to a maximum of 8 hours provided no topic is repeated. Prerequisite: consent of instructor.

489-1 to 3 INDEPENDENT STUDY IN SCIENCE EDUCATION. Supervised study of assigned material based on needs of student. May be repeated to a maximum of 9 hours provided no topic is repeated. Primarily for teachers of science. Prerequisite: consent of instructor.

SOCIAL WORK (SOCW)

501-3 GENERALIST PRACTICE: INDIVIDUALS AND FAMILIES. Generalist practice methods with individuals, families, and groups for enhancement of social functioning. Special focus on gender, age, race, ethnicity, and class. Prerequisite: admission to the MSW program.

502-3 GENERALIST PRACTICE WITH ORGANIZATIONS, AND COMMUNITIES. Generalist practice in communities, including locality development, social planning, advocacy, and social action. Strategies for working within organization to promote change. Prerequisite: admission to MSW program.

503-3 COUNSELING SKILLS DEVELOPMENT. Micro skills of counseling for generalist social work practice. Lab based. Specific focus on cultural competency, professional values/ethics, and social justice for oppressed populations. Prerequisite: admission to MSW program.

504-3 SOCIAL WELFARE POLICY. Social welfare policies and services, including their historical evolution, inherent values and ideology, and their effects on social problems and the social work profession. Prerequisite: admission to the MSW program.

505-3 GENERALIST PRACTICE WITH GROUPS. Social group work intervention within the generalist framework. Leadership skills to conduct treatment and task groups. Special knowledge and skills for diverse populations. Prerequisite: admission to MSW program.

506-4 RESEARCH METHODS AND DATA ANALYSIS. Theory and application of quantitative and qualitative research methods for social work theory and practice. Research designs, data analysis, and interpreting research findings. Includes lab. Prerequisite: admission to MSW program.

507-3 HUMAN BEHAVIOR IN THE SOCIAL ENVIRONMENT. Examination of biophysical, psychological, and social aspects of human development across the life course, within the ecological systems perspective, including challenges of minority groups. Prerequisite: admission to the MSW program.

508-3 DIVERSITY, VALUES, ETHICS, AND SOCIAL JUSTICE PRINCIPLES AND PRACTICE. Understanding diverse groups distinguished by race/ethnicity, class, gender, religion, sexual orientation, age, and ability. Implications for social justice practice and NASW Code of Ethics. Prerequisite: admission to MSW program or consent of MSW director.

511-3 AREA DEVELOPMENT. Overview of social theory and models for social change with emphasis on southwestern Illinois. Prerequisite: completion of foundation curriculum or advanced status.

514-3 DESCRIPTIVE STATISTICS FOR SOCIAL WORK PRACTICE. Understanding and use of descriptive statistics and hypothesis testing for social work practice. Prerequisite: admission to the MSW program.

515-3 RESEARCH AND EVALUATION FOR SOCIAL WORK PRACTICE. Quantitative and qualitative research methods applied to the direct practice of social work. Prerequisite: SOCW 514 or special permission of director of the MSW program.

517-3 DIVERSITY. Multi-dimensional framework presented to examine ethnicity, racism, sexism, prejudice, stereotypes, discrimination, dual value systems within micro and macro contexts, and implications for practice and policy. Prerequisite: admission to the MSW program.

520-3 ADVANCED PRACTICE WITH CHILDREN AND FAMILIES. Family-centered generalist practice with emphasis on theories, models and strategies for problem solving and change. Prerequisite: completion of foundation curriculum or advanced standing status.

524-3 HUMAN BEHAVIOR: FAMILIES, HEALTH, MENTAL HEALTH AND DISABILITIES. Advanced applications of theories of human behavior to problems of gender, race, socioeconomic status, and disabilities. Prerequisite: SOCW 507 or advanced standing status.

526-4 FIELD INSTRUCTION I. Supervised social work practice experiences of at least 225 hours in an approved social service setting. Includes an integrative seminar. Prerequisites: SOCW 501, 503, 507, 508, and permission of Director of Practica.

527-4 FIELD INSTRUCTION II. Supervised social work practice experiences of at least 225 hours in an approved social service setting. Includes an integrative seminar. Prerequisites: SOCW 526 and permission of Director of Practica.

528-4 ADVANCED FIELD INSTRUCTION III. Supervised concentration field experiences of at least 250 hours in an approved setting. Includes an integrative seminar. Prerequisites: completion of foundation curriculum or advanced standing status, and permission of Director of Practica.

529-4 ADVANCED FIELD INSTRUCTION IV. Supervised concentration field experiences of at least 250 hours in an approved setting. Includes an integrative seminar. Prerequisite: SOCW 528 and permission of Director of Practica.

530-3 ADVANCED SOCIAL POLICY WITH CHILDREN AND FAMILIES. Analysis of social policy development and implementation that affect children and families. Prerequisite: completion of foundation curriculum or advanced standing status.

531-8 BLOCK FIELD INSTRUCTION I. Supervised social work practice experience (minimum of 450 hours) in an approved social service setting. Includes a seminar to integrate knowledge and practice. Substitutes for SOCW 526 and 527. Prerequisites: SOCW 501, 503, 507, 508, and permission of Director of Practica.

532-8 BLOCK FIELD INSTRUCTION II. Supervised concentration field experience of at least 500 hours. Includes an integrative seminar. Substitutes for SOCW 528 and 529. Prerequisites: completion of foundation curriculum or advanced standing status and permission of Director of Practica.

533-2 SOCIAL WORK PRACTICE IN SCHOOLS. Examines the history of school social work, the legal mandates, and institutional policies that impact social work practice in public schools. Prerequisites: admission to MSW school social work program and SPE 400.

535-3 PROGRAM EVALUATION. Quantitative and qualitative research methods for evaluating social practices and programs, basic concepts of measurements and various research strategies are employed. Prerequisites: SOCW 514; SOCW 515, or admission to advanced standing.

537-3 PSYCHOPATHOLOGY AND DIAGNOSTIC ASSESSMENT. Comprehensive examination of forms of psychopathology and skills for DSM-IV-TR diagnosis. Social work values, ethics and perspectives related to medical model explored. Prerequisite: admission to MSW program or consent of MSW Director.

540-3 ADVANCED PRACTICE WITH INDIVIDUALS. Counseling models and skills for treatment of individuals. Special emphasis on strengths-based, culturally compatible

approaches that promote empowerment and social/economic justice. Prerequisite: admission to MSW program.

541-3 ADVANCED PRACTICE WITH FAMILIES AND GROUPS. Intervention models and skills for counseling for families and groups. Special emphasis on diverse family forms and culturally-compatible approaches, incorporating strengths-based techniques. Prerequisite: completion of all foundation courses or advanced status.

542-3 SOCIAL WELFARE POLICY: MICRO PRACTICE. Policy analysis, advocacy models, and theories of social justice are examined and applied on a policy advocacy project to empower individuals and families. Prerequisite: completion of all foundation courses or advanced standing status.

543-3 SOCIAL WELFARE POLICY: MACRO PRACTICE. Policy analysis and policy advocacy models and skills for work with communities, state and national governments. Students will complete a social action project. Prerequisite: completion of all foundation courses or advanced standing status.

544-3 ADVANCED PRACTICE WITH NEIGHBORHOODS AND COMMUNITIES. Models of community change, combined with skill training are used to conduct a needs assessment and social change project in community context. Prerequisite: completion of all foundations courses or advanced standing statue.

545-3 ADMINISTRATION. Organizational and management theories are applied to the administration of human service activities. Prerequisite: completion of foundation curriculum or advanced standing status.

546-3 APPLIED SOCIAL SCIENCE RESEARCH. Methods of both basic and applied social research. Students conduct either a program evaluation or write a grant proposal for agency use. Prerequisite: completion of all foundation courses or advanced standing status.

547-3 ADVANCED PRACTICE WITH ORGANIZATIONS. Models and skills of management and supervision, and on creating change in human service organizations, using power analysis. Students conduct social action project. Prerequisite: completion of all foundation courses or advanced standing status.

555-3 WOMEN, WORK, AND FAMILY. Gender-specific social policies and practice are examined as they apply to women in the workplace and the family, with emphasis on diversity among women. Prerequisite: completion of foundation curriculum or advanced standing status.

556-3 CHILD WELFARE SERVICES. Development of child welfare services and their present societal context, current issues and trends in service provision, models, and strategies of prevention intervention and treatment. Prerequisite: completion of foundation curriculum or advanced standing status.

557-3 SUBSTANCE ABUSE. Administration, rehabilitation facilities, and community responses to assessment and follow-up with substance abusers, and the most widely used treatment with special groups will be addressed. Prerequisite: completion of foundation curriculum or advanced standing status.

560-3 MENTAL HEALTH SERVICES. Models and skills used in psychosocial treatment of mental disorders. Examination of managed care, political, and economic influences on service delivery systems. Prerequisite: completion of all foundation courses or advanced standing status.

561-3 CHILDREN, YOUTH AND FAMILY SERVICES. Study of practice models, ethical and cultural issues, and intervention skills for work in public child welfare, juvenile justice, and other child and adolescent services. Prerequisite: completion of all foundation courses or advanced standing status.

562-3 LEGAL ISSUES IN SOCIAL WORK. Laws and legal processes affecting social services and clients' rights; implications for practice in schools, mental health, child welfare, corrections. Prerequisite: completion of foundation curriculum or advanced standing status.

563-3 GERONTOLOGY SERVICES. Surveys theories of aging and teaches methods and skills of work with older Americans. Issues of cultural compatibility, social action and empowerment strategies. Prerequisite: completion of all foundation courses or advanced standing status.

564-3 SUBSTANCE ABUSE SERVICES. Examines treatment methods and teaches skills for treatment of alcohol and other drugs. Examines ethical, cultural and policy issues of “war on drugs”. Prerequisite: completion of all foundation courses or advanced standing status.

565-3CAPSTONE. Integration of theories and practice models of entire MSW curriculum. Emphasis on critical thinking, diversity issues, and social/economic justice in all fields of practice. Prerequisites: completion of all foundation and advanced standing courses except those offered concurrently with this course.

567-2 SEMINAR IN SCHOOL SOCIAL WORK. Advanced seminar in school social work integrating MSW practice, knowledge, and skills with school field practicum experience. Prerequisites: admission to MSW school social work courses and SOCW 533.

568-4 ADVANCED FIELD III SCHOOL SOCIAL WORK. Advanced directed practicum in approved school setting in which student develops and demonstrates competence for social work practice in schools. Minimum 300 hours. Prerequisites: admission to MSW school social work courses and SPE 400.

569-4 ADVANCED FIELD IV SCHOOL SOCIAL WORK. The second of two advanced level directed practicum in approved school setting in which student develops and demonstrates competence for social work practice in school. Minimum 300 hours. Prerequisite: SOCW 568.

570-3 POLICY/PRACTICE WITH OPPRESSED POPULATIONS. Students will examine various treatment models with groups whose oppression is related to ethnicity, disabilities, gender, and sexual orientation. Prerequisite: completion of foundation curriculum or advanced standing status.

572-7 POST-MSW SCHOOL INTERNSHIP. Block internship consisting of a minimum of 600 clock hours in an Illinois public school setting under supervision of an MSW from a CSWE accredited program. Prerequisites: SPE 400 and admission to the Post-MSW Professional Development Sequence. Concurrent enrollment in SOCW 533.

580-3 ADVANCED SOCIAL POLICY IN HEALTH, MENTAL HEALTH, AND DISABILITIES. Examination of the origins and development of social policy in health, mental health, and disability services. Prerequisite: completion of foundation curriculum or advanced standing status.

583-3 ADVANCED PRACTICE IN HEALTH. Social work practice in health delivery systems. Prerequisite: completion of foundation curriculum or advanced standing status.

584-3 ADVANCED PRACTICE IN MENTAL HEALTH. Exploration of Social Work practice in mental health settings. Special attention to models of intervention and ethics in practice. Prerequisite: completion of foundation curriculum or advanced standing status.

585-3 ADVANCED PRACTICE IN DISABILITIES. Social work practice in disability services with special consideration to consumer-driven services. Prerequisite: completion of foundation curriculum or advanced standing status.

590-3 SOCIAL WORK PRACTICE WITH AFRICAN-AMERICAN FAMILIES. Multi-systems approach to family therapy from the perspective of the African-American experience. Prerequisite: completion of foundation curriculum or advanced standing status.

591-3 AIDS: ISSUES FOR SOCIAL WORK. Examines role of social workers in HIV/AIDS prevention and treatment and applies social work practice theory to persons living with HIV/AIDS and their significant others. Prerequisite: completion of foundation curriculum or advanced standing status.

596-1 to 6 READINGS IN SOCIAL WORK. Supervised readings in selected subjects. May be repeated to a maximum of 6 hours. Prerequisites: consent of instructor and MSW program director.

SOCIOLOGY (SOC)

420-3 LEADERSHIP WORKSHOP. Leadership as vision, competence, community, and fun. Applied to self, family, school, workplace, city, country, and world. Readings, presentations, self-evaluation, discussions, exams, and a portfolio.

421-3 INDIVIDUAL AND SOCIETY. Integration of individual and society, role structure and orientation to society, habits, communication channels, emergence, presentation, and defense of self.

422-3 WHITE-COLLAR CRIME. (Same as CJ 422) An examination of the nature, extent, and distribution of white-collar crime as well as its causes, correlates, and control. Prerequisites: SOC/CJ 272 and junior/senior standing or consent of instructor.

431-3 EMPLOYMENT AND WORKPLACE CHANGE. Practical application and critical analysis of theories, approaches, and strategies of organizational and workplace change. Organizations as mechanistic, organic, cultural, political systems; arenas of conflict.

440-3 SOCIOLOGY OF POPULAR CULTURE. Relevant theories, methodologies, and works of original research. Students apply knowledge gained by analyzing examples from contemporary popular culture.

441-3 HEALTH, ILLNESS, AND SOCIETY. Social determinants of sickness and death, illness as social behavior, patient-practitioner relationships, hospitals, issues in organization and delivery of health care.

444-3 GENDER, ETHNICITY, AND CLASS IN THE WORKPLACE. Traces the evolution of work for women of different races and classes, and studies what issues women now face in the public and private spheres.

470-3 SOCIOLOGY OF DEVIANCE. Behaviors such as prostitution, drug use, murder, robbery, sexual variance, rape, insanity examined theoretically and empirically.

472-3 EXPLAINING CRIME. Examination of the relationship between classical and contemporary criminological theory, research and policy. Prerequisite: SOC/CJ 272 or consent of instructor.

474-3 VICTIMS AND SOCIETY. Sociological analysis of war, crime, inequality, racism, sexism, and other victim-generating conditions and processes. A non-lecture, active-learning course. Prerequisite: consent of instructor.

490-3 SPECIAL TOPICS IN SOCIOLOGY. Topics not included in regular course offerings. May be repeated or taken in multiple 3-credit sections without limit on the total number of credit hours taken, provided no topic is repeated.

501-3 SURVEY OF THEORY. Classical and contemporary theory connecting to historical context, vision, research, application, and to other seminars in the sociology graduate program. Prerequisite: graduate standing.

502-3 SEMINAR IN INTERGROUP RELATIONS. Cross-cultural study of racial, ethnic, and inter-faith relations. Causes of conflict, accommodation, inequality, domination, acculturation, assimilation, pluralism.

503-3 SEMINAR IN APPLIED SOCIOLOGY. Applied sociology: its history, the application of sociology in its varied forms and contexts, and the roles, skills, and methods that sociological practice involves.

515-3 RESEARCH METHODS AND STUDY DESIGN IN SOCIOLOGY. Basic research methods and designs, analysis of social science data, logic of scientific inquiry. Includes preparation of thesis/internship research proposal.

518-3 ADVANCED DATA ANALYSIS. Data analysis methods used in quantitative social research including statistical analysis with SPSS and demographic techniques. Descriptive and inferential statistics including multivariate techniques. Prerequisite: one course in statistics.

521-3 SEMINAR IN SOCIAL PSYCHOLOGY. Theoretical systems, progress toward integrated body of behavioral theory.

536-3 ALTERNATIVES TO BUREAUCRACY. Why bureaucracy? What are the characteristics, problems, strengths, and weaknesses of bureaucratic organizations? Under what conditions do such organizations arise? What are the alternatives to bureaucratic forms of organization.

538-3 SEMINAR IN INDUSTRIAL SOCIOLOGY. Analysis of theoretical, research, and policy issues: technological change and the organization of production, deindustrialization, industrial relations, and industrial policies in the global economy.

540-3 ALTERNATIVES TO CAPITALISM(S). A historical and contemporary examination of the various types of capitalisms internationally and the many social and theoretical movements challenging them.

542-3 SEMINAR IN GENDER AND GENDER INEQUALITY. Theoretical perspectives on the creation, reproduction, and maintenance of gender and gender inequality.

574-3 SEMINAR IN DEVIANCE. Theoretical approaches to such phenomena as drug addiction, mental illness, sexual variances, suicide, and criminal behaviors; emphasis on cross-cultural, historical, and empirical data.

578-3 SEMINAR IN CRIMINOLOGY. Classical and contemporary criminological research and theory. Class performs original research, replicates a significant existing study, theoretical interpretation and/or critique of important criminological work.

590-3 SPECIAL TOPICS. Seminar on topic not included in regular course offerings. May be repeated provided no topic is repeated.

592-3 RESEARCH PRACTICUM. Experience in carrying out and reporting a research project, includes hypothesis generation, data collection and analysis, and oral presentation and written report. Prerequisite: 18 hours of graduate course work including SOC 515 or permission of graduate adviser.

593a-3 GRADUATE INTERNSHIP-EXPERIENCE. Supervised work experience in research or public service organization; requires 140 hours of work time. May be counted toward completion of MA exit requirement. Prerequisite: consent of graduate coordinator.

593b-3 GRADUATE INTERNSHIP-REPORT. Written report relating sociological concepts to internship experience. Counts toward completion of MA exit requirements in combination with successful completion of SOC 593a. Prerequisite: SOC 593a.

595-1 to 6 INDIVIDUAL RESEARCH. Supervised research projects. May be repeated to a maximum of 6 hours. Prerequisites: consent of instructor and graduate coordinator.

596-1 to 6 READINGS IN SOCIOLOGY. Supervised readings in selected subjects. May be repeated to a maximum of 6 hours. Prerequisites: consent of instructor and graduate coordinator.

599-3 to 6 THESIS. Supervised research in approved topic. Written proposal and oral defense required. May be repeated to a maximum of 6 hours. Prerequisite: consent of graduate coordinator.

SPANISH (SPAN)

412a,b-3,3 U.S.A. HISPANICS. Hispanic cultures in the United States. Study of the unique contributions of a) Mexican Americans, and b) Cuban Americans and Puerto Rican Americans through their language, literature, and the arts. Prerequisite: SPAN 301 or SPAN 302 or consent of instructor.

454-3 to 6 SEMINAR. Critical and analytical study of selected topics of literature or literary criticism. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: SPAN 301 or SPAN 302 or consent of instructor.

457-3 DON QUIXOTE. Critical and analytical study of Cervantes' masterpiece. Prerequisite: SPAN 301 or SPAN 302 or consent of instructor.

461-3 SPANISH STYLISTICS. Writing style; application of stylistics to development of skill in written expression. Advanced work in principles of grammar and composition. Prerequisite: SPAN 301 or SPAN 302 or consent of instructor.

491-3 to 6 CULTURAL AND LANGUAGE WORKSHOP. Comparative or contrastive linguistics, advanced methodology and techniques. In-depth study of foreign cultures, travel-study abroad. Supervised projects in foreign studies. May be repeated to a maximum of 6 hours provided no topic is repeated. Prerequisite: advanced or graduate standing.

492-3 SERVICE LEARNING FORTHEADVANCED STUDENT. Study abroad in a service-learning context. Hands-on field study with emphasis on target culture and language, oral, and written communication and supervised individual projects. Prerequisite: SPAN 301 or consent of instructor.

499-3 READINGS IN SPANISH. Selected areas of language, literature, and culture. Individual work or small group work supervised by Spanish faculty. Prerequisite: SPAN 301 or consent of instructor.

550-3 SEMINAR IN THE NEW NARRATIVE AND POETRY OF SPANISH AMERICA. Short stories and poetry. Prerequisite: graduate standing.

551-3 SEMINAR ON A SELECTED SPANISH AUTHOR. Intensive study of one author. May be repeated once for a total of 6 hours provided authors vary. Prerequisite: graduate standing.

552-3 SEMINAR IN LATIN AMERICAN FICTION. Representative works of major authors. Prerequisite: graduate standing.

553-3 THE RENAISSANCE AND GOLDEN AGE. Literature of the Golden Age in Spain and histories of the Indies. Prerequisite: graduate standing.

554-3 THE GENERATION OF 1898. Philosophical trends in representative authors. Prerequisite: graduate standing.

555-3 THE PICARESQUE NOVEL. The *Lazarillo* with collateral readings of other masterpieces of this genre. Prerequisite: graduate standing.

556-3 THE SPANISH BALLADS. This genre in the literature and folklore of Spain and the New World. Prerequisite: graduate standing.

557-3 SEMINAR ON A SELECTED SPANISH-AMERICAN AUTHOR. Intensive study of one author. May be repeated once for a total of 6 hours provided authors vary. Prerequisite: graduate standing.

558-3 SPANISH AMERICAN ESSAY. Representatives of genre. Prerequisite: graduate standing.

559-3 SPECIAL TOPICS IN LATIN AMERICAN LITERATURE. Issues such as the gaucho, the Indian, revolution, and social change. May be repeated once to a total of 6 hours provided no topic is repeated. Prerequisite: graduate standing.

561-3 SEMINAR IN SYNTAX. Stylistic and grammatical analysis. Prerequisite: graduate standing.

SPECIAL EDUCATION (SPE)

400-3 THE EXCEPTIONAL CHILD. Psychology, identification, and methods of teaching individuals with exceptionalities, including individuals with learning disabilities.

415-3 INSTRUCTIONAL AND ASSISTIVE TECHNOLOGY. Overview of the use of instructional and assistive technology. Course will review hardware, software, internet technologies, and application of assistive technology. Prerequisite: SPE 200 or SPE 400 and admission to the Special Education program.

430-3 CLASSROOM MANAGEMENT AND BEHAVIOR SUPPORT IN SPECIAL EDUCATION. Designing effective learning environments and individualized behavior support plans, and applying research-based behavioral practices. Must be taken concurrently with SPE 402, SPE 416, and SPE 450. Prerequisites: admission to the Special Education Program and SPE 401, SPE 405, SPE 412, and SPE 471.

440-3 INFANTS AND TODDLERS WITH SPECIAL NEEDS AND THEIR FAMILIES. Characteristics and interactions of infants and toddlers with special needs and their families; emphasizes collaboration with families and current research, theory, and federal/state policies.

441-3 ASSESSMENT OF PRESCHOOL EXCEPTIONAL CHILDREN. Instruments for assessment of academic, cognitive, and perceptual-motor development. Diagnosis and remediation. Prerequisite: SPE 440.

442-3 METHODS AND PROCEDURES FOR TEACHING EARLY CHILDHOOD STUDENTS WITH DISABILITIES. Preparation of teachers and teacher candidates in the knowledge and skills needed to provide educational services to early childhood students with disabilities and supports to their families. (Requires 10 hours field experience) Prerequisites: SPE 440 and SPE 441.

450-3 INSTRUCTIONAL PLANNING AND PROFESSIONAL COLLABORATION IN SPECIAL EDUCATION. Course covers content in service delivery models, program planning, and collaboration. Must be taken concurrently with SPE 402, SPE 416, and SPE 430. Prerequisite: SPE 401, SPE 405, SPE 412, and SPE 471.

470-3 TRANSITION PLANNING. Overview of transition planning and programming for students with disabilities. Prerequisite: admission to the Special Education program, SPE 401 (may be taken concurrently) SPE 405, SPE 450, SPE 471.

496-1 to 6 READINGS AND INDEPENDENT STUDY IN SPECIAL EDUCATION. Specific problem areas in education of individuals with disabilities. Topic and conditions of study approved via contract. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

498-3 WORKSHOP: SELECTED TOPICS IN SPECIAL EDUCATION. Topical workshop on concepts, strategies, and concerns in special education. May be repeated once to a maximum of 6 hours provided no topic is repeated.

500-3 RESEARCH IN SPECIAL EDUCATION: PREPARATION FOR FIELD BASED RESEARCH. Strengths, weaknesses, and relevance of research to field. Emphasis on interpretation of specialized research. Includes development and presentation of proposal for field based master's research project. Must be taken as first course in program sequence. Prerequisite: admission to graduate program in special education.

501-3 READINGS OR SPECIAL RESEARCH PROBLEM. Readings or research in special education. Topics and conditions approved via contract. May be repeated once to a maximum of 6 hours. Prerequisite: consent of adviser.

502-3 CHARACTERISTICS OF INDIVIDUALS WITH DISABILITIES. Provides teachers with an understanding of the characteristics of students with disabilities including ethical considerations, interventions, and educational modifications. Prerequisite: consent of instructor.

504-3 PARENTS, TEACHERS, AND DISABLED CHILDREN. Prescriptive parent programming. Analysis of models of parent education and training. Prerequisite: SPE 500 or consent of instructor.

506-3 COLLABORATION, CONSULATION, AND CONDUCT IN SPECIAL EDUCATION. Strategies for assisting parents with issues relating to disabilities and for collaborative teaming between school and home. Prerequisite: SPE 500 or consent of instructor.

507-3 SOCIAL SKILLS AND AFFECTIVE DEVELOPMENT IN SPECIAL EDUCATION. Models for teaching social skills and affective education. Prerequisite: SPE 500 or consent of instructor.

511-3 INDIVIDUALIZED EDUCATIONAL ASSESSMENT. Advanced knowledge and informal assessment strategies as applied to the identification, evaluation, and ongoing development of the individual with a disability. Prerequisite: SPE 500 or consent of instructor.

512-3 ADVANCED ASSESSMENT AND PLANNING FOR INDIVIDUALS WITH DISABILITIES. Advanced application of informal and formal assessment to make legal and instructional decisions for children with disabilities. Prerequisite: SPE 500 or consent of instructor.

514-3 LEGAL ASPECTS OF SPECIAL EDUCATION. State and federal regulations, statutes, and court cases affecting implementation of special education services. Prerequisite: SPE 500 or consent of instructor.

515-3 ADMINISTRATION AND SUPERVISION OF SPECIAL EDUCATION SERVICES. Models and practices for supervision and administration of special education programs and districts. Prerequisite: SPE 514 or consent of instructor.

516-3 INSTRUCTIONAL AND ASSISTIVE TECHNOLOGY. Focus on enhancing the technology skills of teachers who teach students with learning/behavior problems.

518-3 WORKSHOP IN SPECIAL EDUCATION. Designed to promote better understanding of psychological and educational problems of children with disabilities. May be repeated once to a maximum of 6 hours provided no topic is repeated.

519-3 COMMUNITY INSTRUCTION OF STUDENTS WITH DISABILITIES. Advantages and disadvantages of community integration and instruction. Transition from school to community. Prerequisite: SPE 500 or consent of instructor.

520-3 TEACHING INDIVIDUALS WITH DIVERSE NEEDS. Advanced knowledge of issues relating philosophical, historical, and legal foundations of education, characteristics of learners, and planning for instruction. Prerequisite: SPE 500 or consent of instructor.

522-3 INSTRUCTIONAL METHODS FOR MILDLY/MODERATELY DISABLED AND AT RISK STUDENTS. Emphasis on current research and application of instructional methodology. Prerequisite: SPE 500 or consent of instructor.

524-3 CURRICULUM ADAPTATIONS AND MODIFICATIONS FOR INDIVIDUALS WITH DISABILITIES. Advanced knowledge and application of instructional strategies; students implement a curriculum development/adaptation actions research project for students who have disabilities. Prerequisites: SPE 500 and SPE 520.

530-3 EARLY CHILDHOOD EDUCATION OF THE DISABLED. In-depth study of developmental disabilities; theories of early childhood education and curriculum appropriate for variety and severity of handicaps encountered in preschool classrooms. Prerequisite: SPE 500 or consent of instructor.

532-3 ASSESSMENT OF THE YOUNG CHILDREN WITH DISABILITIES. Formal and informal diagnostic techniques for planning and implementing prescriptive programs.

Case study evaluation, task analysis, IEP's, record keeping, child find. Prerequisite: SPE 530.

540-3 BEHAVIORAL ISSUES AND THE LEARNING ENVIRONMENT. Analysis of theory and practice of behavior management in special education; application in special education and general education settings is emphasized. Prerequisite: SPE 500 or consent of instructor.

542-3 REHABILITATION SERVICES AND THE DISABLED. The rehabilitation process: law, Department of Rehabilitation Services; role of secondary school work study coordinator, special educator, employer, and employment agencies; impact on community services. Prerequisite: SPE 500 or consent of instructor.

546-3 VOCATIONAL APPRAISAL AND PLACEMENT PROCEDURE. Tests and procedures used to assess individual's functional abilities, interests, and work attitudes. Methods used in selection, placement, and follow-up of individuals with disabilities. Prerequisite: SPE 500 or consent of instructor.

575-3 SERVICE DELIVERY MODELS. Innovative and traditional service delivery systems in special education. Prereferral strategies, consultation, integration, collaboration in elementary and secondary education. Special class and resource room. Prerequisite: SPE 500 or consent of instructor.

578-3 to 6 FIELD STUDY. Community based educational experiences needed for professional growth and development. Prerequisite: consent of adviser.

595-3 SEMINAR: ISSUES IN SPECIAL EDUCATION AND FIELD BASED RESEARCH. Issues and trends in practice related to research, theories, and etiological factors relevant to educational programs for individuals with disabilities. Includes completion and presentation of master's field based research project. Final course in special education program.

SPEECH COMMUNICATION (SPC)

403-3 ORGANIZATIONAL COMMUNICATION THEORY AND APPLICATIONS. Diagnosing communication problems in organizations and implementing solutions. Research methods and theoretical applications in organizational communication. Prerequisite: SPC 203 or consent of instructor.

410-3 RHETORICAL THEORY AND CRITICISM. Classical and contemporary theories and methods for analyzing and evaluating public address and other significant forms of communication.

411-3 ANALYSIS OF POLITICAL COMMUNICATION. Role of communication in politics. Topics include speech preparation, delivery, image promotion, public opinion formation, lobbying behavior as factors in political communication strategies.

413-3 CASE STUDIES IN PUBLIC RELATIONS. Strategies and critical analyses of ethical issues and approaches in the social and political atmosphere of public relations. Prerequisite: SPC 213 or consent of instructor.

419-3 SPECIAL TOPICS IN SPEECH COMMUNICATION. Variable content course emphasizing pertinent contemporary communication issues. May be repeated to a maximum of 9 hours provided no topic is repeated.

423-3 TOPICS IN INTERPERSONAL COMMUNICATION. Rotating topic course addressing current topics in interpersonal communication. May be repeated for a total of 9 hours as long as no topic is repeated.

430-3 PERSUASION AND SOCIAL INFLUENCE. The study of contemporary persuasion theories and research toward a clear understanding of the process of social influence; application of concepts in analysis of persuasive messages.

431-3 PATTERNS AND PROCESSES OF INTRAPERSONAL COMMUNICATION. Inner speech, self-concept, personality, emotions, consciousness, perceptual filters, cognitive complexity, decoding stimuli, communication apprehension, other processes within the individual which affect communication behavior.

433-3 LANGUAGE AND SPEECH COMMUNICATION. Role and impact of language in speech communication development, processes, and behavior. Relational development and conflict resulting from differences in language usage. Prerequisite: SPC 330 or consent of instructor.

434-3 NONVERBAL COMMUNICATION. Nonverbal theories across varied contexts. Means of transmission and reception of nonverbal cues. Relationship of nonverbal and verbal behavior. Prerequisite: SPC 330 or consent of instructor.

464-3 FAMILY COMMUNICATION. Communication functions and behavior within families that develop, maintain, enrich, or limit family relationships.

500-3 SEMINAR IN COMMUNICATION THEORY. Current approaches to human communication theory, emphasizing contributions of speech communication scholars. General systems theory, symbolic interaction, rules theory, constructivism, phenomenology, ontology, covering laws. Prerequisite: SPC 330 or consent of instructor.

501-3 COMMUNICATION RESEARCH METHODS AND TOOLS. Resources, paradigms, methods, and tools for quantitative and qualitative communication research. Logic of experimental and quasi-experimental designs and statistical analysis.

509-3 SPECIAL TOPICS IN COMMUNICATION THEORY AND RESEARCH. Variable content course emphasizing contemporary issues in communication theory construction and research methods. May be repeated to a maximum of 9 hours provided no topic is repeated.

510-3 SEMINAR IN GROUP COMMUNICATION. Theory and research in decision making, leadership, cohesiveness, norms, task and socio-emotional dimensions of group behavior; an interaction among groups with differing values, interests, and needs.

511-3 SEMINAR IN INTERCULTURAL COMMUNICATION. Applications of communication theories and models in the study of cooperation and conflict between and among individuals of different cultures.

520-3 SEMINAR IN INTERPERSONAL COMMUNICATION. Theory and research relevant to formation, development, maintenance, and termination of two-person relationships. Interpersonal attraction, styles, and patterns.

540-3 SURVEY OF ORGANIZATIONAL COMMUNICATION RESEARCH. Current research. Topics include organizational culture, leadership, worker involvement programs, Japanese management, women in organizations, and communication consulting. Prerequisite: SPC 403 or consent of instructor.

541-3 SEMINAR IN ORGANIZATIONAL CULTURE. Survey and critique of current theory and research. Analysis of methods used to study cultures, case studies in cultural change, ethical considerations of organizational intervention.

542-3 COMMUNICATION CONSULTING. Principles and techniques of communication consulting. Diagnosis of communication problems, formulating proposals for training and development, conducting workshops, measuring results. Prerequisite: SPC 540 or consent of instructor.

550-3 SEMINAR IN PUBLIC RELATIONS. Analysis and criticism of historic and current development of public relations theory. Theory-building approaches, research agendas, world view constructions, pragmatics of public relations practice.

560-3 SEMINAR IN SPEECH EDUCATION. Philosophy and methods for teaching speech communication. Variable content. May be repeated once for a total of 6 hours provided no topic is repeated.

570-3 SURVEY OF HEALTH COMMUNICATION THEORY AND RESEARCH. Overview of health communication, covering theories and research in various health contexts, ranging from interpersonal settings to public health campaigns.

571-3 SEMINAR IN PROVIDER/CAREGIVER-PATIENT COMMUNICATION. Relational communication theory, research, and practice in health care delivery, health education and promotion, and psychological well-being. Prerequisite: SPC 570.

572-3 SEMINAR IN HEALTH COMMUNICATION CAMPAIGNS. Examination of the role of communication in public health campaigns and how these campaigns are designed, implemented, and evaluated. Prerequisite: SPC 570.

590-1 to 6 INDIVIDUAL RESEARCH IN SPEECH COMMUNICATION. Individual advanced research projects in selected communication problems. Specific assignment to be developed by student in consultation with a speech communication graduate faculty member prior to enrollment. Credit variable. May be repeated to a maximum of 6 hours. Prerequisite: by permit only.

591-3 to 9 INTERNSHIP IN APPLIED SPEECH COMMUNICATION. Assignment in a business, government, or service organization in which students are provided practical experience in their professional career areas. Assignments provide integration and application of concepts acquired in the master's program. The students and their graduate committee determine specific details of internships, and the organizational sponsor involved. Arrangements generally made one semester in advance. Not more than 3 hours may be applied toward the minimum 35 hours required for graduation. Prerequisite: consent of advisory committee.

599-1 to 6 THESIS. Supervised research on approved topic to satisfy exit requirements. Written proposal and oral defense required. May be repeated to a maximum of 6 hours. Prerequisite: consent of thesis advisor.

SPEECH PATHOLOGY AND AUDIOLOGY (SPPA)

469-1 to 3 CLINICAL PRACTICUM IN AUDIOLOGY. Supervised clinical practice in audiometric assessments. May be repeated to a maximum of 3 hours. Prerequisite: SPPA 461.

503-3 RESEARCH METHODS IN SPEECH PATHOLOGY AND AUDIOLOGY. Aspects related to evidence-based research, various types, designs, validity, quantitative and qualitative data analysis and its clinical applications. Prerequisites: SPPA 441, 442, 444.

511-3 COUNSELING STRATEGIES FOR SPEECH-LANGUAGE PATHOLOGISTS AND AUDIOLOGISTS. Counseling theory, process, and application to individuals who present a variety of communicative disorders and to the families of these individuals. Prerequisites: SPPA 441, 442, 444.

515-1 to 3 SPECIAL TOPICS IN SPEECH PATHOLOGY AND AUDIOLOGY. Readings, individual studies, and research. Varied content to be offered as student and faculty interest and time permit. May be repeated to maximum of 6 hours provided no topic is repeated. Prerequisite: consent of instructor.

520-3 NEUROANATOMY AND NEUROPHYSIOLOGY OF COMMUNICATION. The brain and neural systems as they relate to normal and disordered communication with application to clinical case studies. Prerequisite: SPPA 320.

540-3 EARLY INTERVENTION WITH INFANTS, TODDLERS AND THEIR FAMILIES. Family centered, transdisciplinary approach to evaluation, assessment, and intervention with infants and toddlers with special needs. Prerequisite: SPPA 444.

541-3 PHONOLOGIC DISORDERS IN SPECIAL POPULATIONS. Case-based study of characteristics, assessment and intervention related to phonological disorders in children with sensory impairments, craniofacial anomalies, neurogenic disorders, and medically fragile conditions. Prerequisites: SPPA 441, 520 or equivalents or concurrent enrollment.

542-3 SEMINAR IN VOICE DISORDERS. Diagnostic and therapeutic techniques for voice disorders as reported in current literature. Prerequisites: SPPA 320, SPPA 442 or equivalent.

543-3 FLUENCY DISORDERS. Etiological factors, assessment, and intervention for individuals who experience dysfluencies from pre-school age through adulthood. Prerequisite: SPPA 442 or equivalent.

544-3 SEMINAR IN LANGUAGE DISORDERS OF CHILDREN. Clinical application of etiology, assessment and intervention procedures for individuals with language disorders and delays from birth through adolescence. Prerequisite: SPPA 444.

545-3 ACQUIRED COMMUNICATION DISORDERS IN ADULTS. Examines the theories and speech and language characteristics of the acquired neurogenic disorders of aphasia, right hemisphere dysfunction, and dementia. Prerequisite: SPPA 520.

547-2 MOTOR SPEECH DISORDERS IN ADULTS. Evaluation and treatment of adults with dysarthria and apraxia due to static and degenerative conditions. Prerequisites: SPPA 520 or equivalent .

548-3 DYSPHAGIA. Course dealing with etiology, assessment and treatment strategies for individuals with feeding and swallowing disorders from infancy through adulthood. Prerequisite: SPPA 520 or equivalent.

549a-1 to 6 GRADUATE PRACTICUM IN SPEECH-LANGUAGE PATHOLOGY I. Supervised clinical practice at the SIUE Speech, Language, and Hearing Center. May be repeated to a maximum of 21hours. Prerequisites: 3.0 GPA, consent of program director.

549b-5 to 8 GRADUATE PRACTICUM IN SPEECH-LANGUAGE PATHOLOGY II. Supervised clinical practice in the treatment and diagnoses of children with communication disorders in an educational setting. May be repeated to a maximum of 15

hours under the supervision of certified SLPs. Prerequisites: 3.25 GPA; SPPA 549a or concurrent enrollment; consent of program director.

549c-3 to 8 GRADUATE PRACTICUM IN SPEECH-LANGUAGE PATHOLOGY III. Supervised clinical practice in the treatment and diagnoses of individuals with communication disorders in a medical setting. May be repeated to a maximum of 15 hours. Prerequisites: 3.25 GPA; SPPA 549a or concurrent enrollment; SPPA 520; 545; consent of program director.

551-3 SEMINAR IN OROFACIAL ANOMALIES. Etiology of oral facial anomalies. Presentation of interdisciplinary team approaches to physical management, feeding issues, communication disorders and psychosocial issues. Prerequisite: SPPA 320, SPPA 442 or equivalent.

555-3 ACQUIRED BRAIN INJURY. Examines neurophysiological, cognitive, neuropsychological, and social/emotional issues associated with acquired brain injury.

558-3 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION. Evaluation, programming and treatment using augmentative and alternative communication including communication boards, electronic devices, and computers using words, pictures, and symbols with and with out voice output. Prerequisites: SPPA 544 and SPPA 545.

560-1 PROFESSIONAL ISSUES IN SPEECH-LANGUAGE PATHOLOGY AND AUDIOLOGY. Seminar addressing issues having an impact on speech-language pathologists and audiologists and their profession.

599-1 to 6 THESIS. May be repeated to a maximum of 6 hours. Prerequisite: consent of program director.

STATISTICS (STAT)

410-3 STATISTICAL ANALYSIS. Design of surveys and experiments. Inferential statistics including confidence intervals and hypothesis testing. Simple and multiple regression. May not be used to satisfy requirements of a mathematics or statistics concentration or minor. Prerequisite: MATH 130, 150, or consent of instructor.

478-3 TIME SERIES ANALYSIS. Statistical analysis of time series. Regression and exponential smoothing. Box-Jenkins methodology. Prerequisite: STAT 380 or 480a,b.

480a,b-3,3 MATHEMATICAL STATISTICS. Mathematical statistical theory: (a) Probability, random variables, probability distributions, joint distributions, functions of random variables, limiting distributions; (b) Point and interval estimation, sufficiency, and hypothesis testing. Must be taken in a,b sequence. Prerequisites: (a) MATH 250; (b) STAT 480a.

481-3 DESIGN AND ANALYSIS OF EXPERIMENTS. Designs for experimentation and their statistical inference. One-way, two-way classifications; complete and incomplete block designs. Factorial and fractional factorial designs. Response surface designs. Prerequisite: STAT 380, 480a,b, or consent of instructor.

482-3 REGRESSION ANALYSIS. Inference in simple, multiple, polynomial, and non-linear regression. Stepwise regression, subset selection, residual analysis, transformations and diagnostics. Prerequisite: STAT 380, 480a,b, or consent of instructor.

483-3 SAMPLE SURVEYS. Simple random sampling, stratified sampling, one-stage and two-stage cluster sampling. Ratio, regression, and difference estimation. Estimation of population size. Prerequisite: STAT 380, 480a,b, or consent of instructor.

484-3 RELIABILITY ENGINEERING. (Same as IME 463) Probabilistic models for the reliability of coherent systems. Statistical models for lifetimes of components and repairable systems. Reliability estimation and prediction. MIL standards. Prerequisite: STAT 480a,b, or IME 365.

485-3 STOCHASTIC PROCESSES. Markov chains with applications. Poisson processes. Markov processes with discrete states in continuous time. Renewal theory and queuing theory. Brownian motion and stationary processes. Prerequisite: STAT 480a,b.

486-3 ACTUARIAL MATHEMATICS. Utility theory, risk models and survival distributions, life tables. Life insurance models, life annuities, premium calculation, valuation theory for pension plans. Prerequisite: MATH 340 and either 380 or 480a.

488-3 DESIGN AND CONTROL OF QUALITY SYSTEMS. (Same as IME 465) Quality design by experimental design, determination of process capability, quality control using statistical control charts, acceptance sampling. Prerequisite: STAT 480a,b or IME 365.

495-1 to 3 INDEPENDENT STUDY. Research and reading in specified area of interest such as analysis of variance, design of experiments, estimation, testing hypotheses, linear models, robust procedures, reliability. May be repeated to a maximum of 9 hours. Prerequisites: written consent of adviser and instructor.

575-3 STATISTICAL COMPUTING. Numerical methods for statistical analysis. Numerical linear algebra for multiple regression. Unconstrained optimization for approximation of maximum likelihood estimates. Numerical integration and function approximation. Prerequisites: STAT 480a,b; MATH 465; 466.

579-3 DISCRETE MULTIVARIATE ANALYSIS. Models for discrete data, two dimensional and higher dimensional tables. Categorical data analysis, chi-square goodness of fit tests. Maximum likelihood estimation of parameters. Prerequisite: STAT 480a,b or consent of instructor.

581-3 ADVANCED EXPERIMENTAL DESIGN. Robust design and Taguchi's methods. Orthogonal arrays and first-order models. Steepest ascent. Response surface designs including central composite and Box-Behnken designs. Prerequisites: STAT 480a,b; 482.

582-3 LINEAR MODELS. Matrix algebra, quadratic forms and their distributions, estimation, hypothesis testing for full rank model; estimation and testing for less than full rank model. Prerequisites: STAT 480a,b; 482.

583-3 SURVEY SAMPLING. Methods of designing and analyzing survey investigation: simple random, stratified, multistage, cluster sampling; data quality; validity and efficient sample plans; reading and project assignments. Prerequisites: STAT 380, or both FIN 320 and MS 251.

584-3 RELIABILITY THEORY. Reliability of complex systems. Statistical analysis of methods for reliability. Statistical analysis of models for repairable systems, including the nonhomogeneous Poisson process. Accelerated life testing. Prerequisites: STAT 480a,b; 484.

588-3 ADVANCED QUALITY CONTROL. Concepts of quality, models for production processes, analysis and application of control charts, acceptance sampling. Prerequisite: STAT 480a,b or consent of instructor.

589-3 MULTIVARIATE ANALYSIS. Matrix algebra, multivariate normal distribution, inference for a mean vector, comparison of several mean vectors, principal components, clustering, discrimination and classification. Prerequisite: STAT 480a,b or consent of instructor.

590-1 to 3 SEMINAR. Intensive study of topics such as analysis of variance, design of experiments, estimation, nonparametric methods, robust procedures, linear models, reliability. May be repeated to a maximum of 18 hours. Prerequisite: written consent of adviser and instructor.

595-1 to 7 SPECIAL PROJECT. Independent study in topics such as analysis of variance, experimental design, estimation, linear models, multivariate analysis, nonparametric statistics, quality control, reliability. May be used to satisfy research paper requirement for MS degree. May be repeated to a maximum of 7 hours. Prerequisite: written consent of research adviser.

599-1 to 6 THESIS. Directed research to satisfy thesis requirement. May be repeated to a maximum of 6 hours. Prerequisite: written consent of thesis adviser.

STUDY ABROAD (SAB)

400-6-16 STUDY ABROAD. University approved study abroad in a country and institution of the student's choosing. For UNDERGRADUATE AND GRADUATE CREDIT. Prerequisites: good standing and sophomore status.

THEATER (THEA)

480-3 COMPUTERS FOR THEATER-MULTI-IMAGE PRESENTATIONS. Computer image-making techniques related to theater and dance. Class and lab work includes computer graphics, "paint box," three-dimensional imagery, ray tracing, video digitizers, computer enhancing, multi-slide presentations. Prerequisite: consent of instructor.

485-1 to 3 SPECIAL PROJECTS IN COMPUTERS. Individual or small group project work in computers as related to performing arts. Computer graphics, computer animation, video enhancing, multi-image slide productions. May be repeated to a maximum of 9 hours. Prerequisite: consent of instructor.

590-1 to 6 INDEPENDENT PROJECTS. Completion of a creative or scholarly project under the direction of a graduate faculty member. May be repeated to a maximum of 6 hours. Prerequisite: consent of instructor.

UNIVERSITY (UNIV)

500-0 CONTINUING ENROLLMENT. Classified, master's level students, who are not otherwise enrolled during an academic term can maintain access to University resources only by enrolling in UNIV 500. Prerequisite: classified, master's level student.