SIUE GRADUATE COURSES

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.

421-3 ADVANCED TAXATION-INDIVIDUAL. U.S federal taxes for individuals. Includes compliance, tax research and tax planning strategies for individual taxpayers. Prerequisites: C or better in ACCT 321.

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.

501-3 MSA INTERMEDIATE FINANCIAL ACCOUNTING I. Financial accounting concepts, research, and reporting methods, including regulatory aspects of financial accounting. Prerequisites: ACCT 524 with B or better, or ACCT 200 with B or better, or equivalent.

502-3 MSA INTERMEDIATE FINANCIAL ACCOUNTING II. Financial accounting concepts, research, and reporting methods, including regulatory aspects of financial accounting. Prerequisites: ACCT 524 with B or better, or ACCT 200 with B or better, or equivalent.

503-3 MSA COST ACCOUNTING. Cost of managerial decisions making in changing business environments including quantitative and behavioral applications; extensive communication and analytical skills development. Prerequisites: ACCT 524 with a B or better, or ACCT 200 with a B or better, or equivalent.

504-3 MSA ACCOUNTING SYSTEMS. Accounting systems, concepts, design, information needs and flows with special emphasis on internal control. Prerequisites: ACCT 524 with a B or better, or ACCT 200 with a B or better, or equivalent.

505-3 MSA INCOME TAXATION. Survey of federal tax laws applicable to individuals, corporations, estates, trusts. Prerequisites: ACCT 524 with a B or better, or ACCT 200 with a B or better, or equivalent.

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, completion of ACCT 303 or equivalent.

524-3 ACCOUNTING FOR MBA'S. Understanding and analysis of financial and managerial accounting information to enable internal/external users to make informed 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 global cultures' visual and material art forms in museum collections with focus on form, process, meaning, function and value. Prerequisite: Junior standing or greater 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 111a or ANTH 111b with a minimum grade of "C".

420-3 MUSEUM ANTHROPOLOGY. Through case studies and exhibit analysis, this course examines historical developments, theoretical approaches, and contemporary ethical issues in museological approaches to anthropology's four fields. Prerequisite: ANTH 111a or ANTH 111b with minimum grade of "C".

432-3 PREHISTORY OF ILLINOIS. The history and archaeology of Native Americans in Illinois, will include examination of artifacts and artifact casts, and field trips to archaeological sites.

433-3 GEOARCHAEOLOGY. Field and laboratory methods in geoarchaeology including soil, sediment, and landform analysis. Hands-on examples and research projects on campus and in the lab.

434-3 GEOMATICS APPLICATIONS IN ARACHAEOLOGY. Students gain hands-on experience with various geomatics applications in archaeology, including resistivity, magnetometry, 3-D laser scanning, aerial photograph interpretation, and GIS.

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.

473-3-6 ETHNOGRAPHIC FIELD SCHOOL. Students participate in an original field –based research project in linguistic or cultural anthropology directed by the instructor. Emphasizes data collection/analysis/write-up. Prerequisite: ANTH 111B with C or better and consent of instructor.

474 3-6 BIOLOGICAL ANTHROPOLOGY FIELD SCHOOL. Research design, data collection, and analysis in primatology, skeletal biology, forensic anthropology, or paleoanthropology requiring an independent project or participation in joint project. Prerequisite: ANTH 111A with C or better and consent of instructor.

475-3-6 ARCHAEOLOGICAL FIELD SCHOOL . 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.

476-3 CULTURAL RESOURCE MANAGEMENT. Examination of cultural resource management (CRM) history and laws. Students will gain practical experience in background research, field survey, evaluation, mitigation, report preparation, and curation. Prerequisite: ANTH 111A with C or better 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.

590-3 to 6 MUSEUM INTERNSHIP. Professional experience in aspects of museum work, such as, exhibition, interpretation, collections management, or administration.

APPLIED COMMUNICATION STUDIES (ACS)

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.

416-3 INTERNATIONAL PUBLIC RELATIONS. Upper level course providing opportunities to gain hands-on experience in public relations by undertaking and/or reflecting on study abroad experiences. Examination of the impact of cultural and socio-political differences on public relations practices.

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 PUBLIC RELATIONS VISUAL COMMUNICATION. The study of perceptual and cognitive aspects of visual communication useful for awareness and promotion campaigns. Focus on visual literacy and hands-on opportunities to analyze visuals.

432-3 SOCIAL MEDIA FOR PUBLIC RELATIONS. Social media use and measurement in Public Relations campaigns.

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.

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.

502-3 QUALITATIVE RESEARCH METHODS IN COMMUNICATION. The course will focus upon the use of qualitative methods for research. Methods including interviewing, participant observation, and textual analysis will be taught and practiced.

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.

521-3 SEMINAR IN COMPUTER-MEDIATED COMMUNICATION. Relationships and groups formed through computer-mediated interpersonal communication as well as how CMC functions in various contexts (interpersonal, educational, organizational, commerce).

522-3 SEMINAR IN FAMILY COMMUNICATION. This seminar will take an in-depth look at family communication concepts, theories, skills, and research findings in a variety of family contexts.

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.

551-3 NONPROFIT PUBLIC RELATIONS. Course uses case study approach to engage students in critical examination of strategies employed by public relations practitioners to further the mission/goals of non-profit organizations. Prerequisite: SPC 550 or permission of instructor.

552-3 CORPORATE SOCIAL RESPONSIBILITY. Students will analyze corporate decisions and communication strategies related to the balance between profit-making and social responsibility. Prerequisite: SPC 550 or permission of instructor.

553-3 ISSUES IN REPUTATION MANAGEMENT. Students will examine issues, theories, and tools in reputation management and explore ways corporations, non-profits, individuals, and countries control or restore their image after a crisis.

554-3 ETHICS IN PUBLIC RELATIONS AND COMMUNICATION MANAGEMENT. Students will analyze ethical dilemmas of public relations and communication management practices. They will also apply ethical principles to professional decision making in organizational settings.

560-3 SEMINAR IN SPEECH EDUCATION. Develop instructional skills of preparation, presentation, and evaluation, and to learn course management skills for instructors of speech communication.

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.

573-3 CULTURAL, HEALTH AND COMMUNICATION. This course explores the interplay between culture and health. More specifically, it examines the impact of culture on health decision making and health communicative behaviors.

590-1 to 6 INDIVIDUAL RESEARCH IN SPEECH COMMUNICATION. Individual advanced research projects in selected communication problems. Assignment to be developed in consultation with a speech communication graduate faculty member prior to enrollment. Only 3 credits apply toward SPC program of study. 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.

598-1 to 6 APPLIED PROJECT. Applied project on approved topic to satisfy exit requirements. Written proposal and oral defense required. May be repeated to a maximum of 6 hours.

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 adviser.

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.

410-3 RESEARCH IN PRINTMAKING. Advanced study in traditional or experimental methods. May be repeated to a maximum of 12 hours. Can be taken concurrently with ART 358, ART 359, or ART 360. Prerequisite: 302a or 312 with a grade C or higher or consent of instructor.

412-3 RESEARCH IN GRAPHIC DESIGN. Directed practicum in advanced client-based desktop design and publishing. Prerequisite: undergraduate level ART 311 and ART 312 with a minimum grade of C, graduate standing, or consent of instructor.

413-3 CONCEPTUAL ART AND DIGITAL MEDIA. Conceptual development through computer-based image capture and manipulation and integration of digital technology 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. Course work combines lecture materials, quizzes, readings and research into studio projects. Prerequisites: minimum grade of C or better in undergraduate level ART 225a or ART 225b, and ART 311 and ART 312, graduate standing,or consent of instructor.

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: minimum grade of C or better in undergraduate level ART 311 and ART 312, graduate standing, or consent of instructor.

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.

424-3 BAROQUE ART. Major developments in Baroque painting, sculpture, and architecture in seventeenth-century Italy, Spain, France, Flanders, and the Dutch Republic. Prerequisite: ART 225b with grade of C or better 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 PUBLICATION AND INFORMATION DESIGN. Techniques in the applied art of illustration using both traditional and contemporary techniques. Exploration of editorial, book, advertising, and institutional illustration. Prerequisites: minimum grade of C or better in undergraduate level ART 311 and ART 312 C, graduate standing, or consent of instructor.

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.

448-3 MEDIEVAL ART. Visual Arts of the Early Christian and Medieval periods from the 4th century through Romanesque and Gothic. Prerequisite: ART 225a with grade of C or better or consent of instructor.

449-3 ITALIAN RENAISSANCE ART. Architecture, sculpture, and painting of the Late Gothic, Renaissance, and Mannerist periods in Italy. Prerequisite: ART 225b with grade of C or better 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.

451-3 NORTHERN RENAISSANCE ART. Architecture, sculpture, and painting of the Renaissance and Mannerist periods in Northern Europe. Prerequisites: undergraduate level ART 225a or ART 225b minimum grade of C, or graduate standing.

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.

467-3 ISLAMIC ART AND ARCHITECTURE. Arts and architecture of the Islamic world from 650 to the present. Prerequisite: undergraduate level ART 225a or ART 225b with grade of C or better, graduate standing, 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: undergraduate level ART 225a or ART 225b with grade of C or better, graduate standing, or consent of instructor.

471-3 TOPICS IN RENAISSANCE AND BAROQUE ART. Variable content course in the history of Renaissance and Baroque art. May be repeated to a maximum of 9 hours as long as no topic is repeated. Prerequisite: ART 225b with grade of C or better or consent of instructor.

472-3 TOPICS IN MODERN ART. Variable content course in the history of modern art. Maybe repeated to 9 hours as long as no topic is repeated. Prerequisite: ART 225b with grade of C or better or consent of instructor.

473-3 WOMEN IN ART. History of women artists from the Renaissance to the present. Prerequisite: ART 225b with grade of C or better or consent of instructor.

474-3 TOPICS IN PUBLIC ART. Variable content course in the history of public art. May be repeated to 9 hours as long as no topic is repeated. Prerequisites: ART 225a or 225b with grade of C or better 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: undergraduate level ART 225b with grade of C or better or graduate standing.

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: undergraduate level ART 225b with grade of C or better, graduate standing.

480-3 AMERICAN ART. Survey of the history of art in the U.S. from the colonial period to the present day. Prerequisite: undergraduate level ART 225b with grade of C or better, graduate standing

481 -3 MODERN ART. Principle movements and theories of art in the modern period. Prerequisite: ART 255b with a grade of C or better or consent of instructor.

482-3 CONTEMPORARY ART. Principal movements and theories of contemporary art, ca. 1950 to the present. Prerequisite: ART 225b with grade of C or better or consent of instructor.

483-3 RESEARCH IN ART HISTORY. Individual research in painting, sculpture, architecture, and related arts of various periods. 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.

485-3 ART HISTORY METHODS AND RESEARCH. Study of primary methods of research, interpretation, and writing in art history. Prerequisites: ART 225a,b with grades of C or better 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.

572-3 MEDICAL ART THERAPY COUNSELING. This course will explore theory and application of medical art therapy with a focus on clinical interventions across the life span.

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.

423-3 FORENSIC BIOLOGY. Principles of human anatomy and physiology, population and molecular genetics, botany, entomology are reviewed in the context of their applications to legal contexts. Prerequisite: BIOL 220 with a grade of C or better, or consent of instructor.

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 DISEASE. Causes and pathophysiology of diseases presented from the cellular and molecular levels. Prerequisite: BIOL 319 with a grade of C or better.

440-4 FUNCTIONAL HUMAN ANATOMY. Systemic and regional study of the human body, including thorax, abdomen, pelvis, back, limbs, head, neck, emphasizing structural, functional and clinical relationships within each region. BIOL 220 with a grade of C or better, or consent of instructor.

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.

456-4 PRINCIPLES TO BIOPHYSICS. Interdisciplinary approach to biophysics for students in biology, chemistry, and bioengineering. Weekly labs will include a variety of guest scientists demonstrating biophysical applications. Prerequisites: PHYS 131a,b and MATH 150 or their equivalent, or consent of instructor.

460-3 WILDLIFE MANAGEMENT. Wildlife ecology, conservation, and management including effects of habitat, behavior, disease, and predation on population. Optional field trips. Prerequistie: BIOL 365 with C or better.

463-4 CONSERVATION BIOLOGY. Examination of concepts and principles of conservation biology, leading to an understanding of threats to biodiversity and techniques to minimize ecosystem degradation and biodiversity loss. Prerequisite: BIOL 365 with grad of C or better, or consent of instructor.

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 with grades of C or better.

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.

475-4 PLANT MOLECULAR BIOLOGY. Molecular processes underlying a plant's ability to sense its environment, utilize available resources, regulate gene expression and alter development based on environment and resources. Prerequisite: BIOL 319 with a grade C or better.

481-4 QUANTITATIVE MORPHOLOGY. Principles of the quantitative analysis of morphology, or an organism's size and shape, and its consequences. Prerequisite: BIOL 220 with a grade of C or better, 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.

483-4 ENTOMOLOGY AND INSECT COLLECTION. An introduction to the life history, ecology, physiology, behavior, forensics, diversity, and taxonomy of insects. Two lectures and two laboratories per week. Prerequisites: BIOL 150, 151, and 220 with a grade of C or better or consent of the instructor.

487-4 ORNITHOLOGY. Examination of form, function, behavior, ecology and evolution of birds. Emphasis on local fauna. Saturday field trips required. Optional extended Spring Break field trip. Lecture and lab.

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.

489-4 COMPARATIVE VERTEBRATE ANATOMY. A systemic study of vertebrate body. Comparative approach will explore the anatomical similarities and differences among major vertebrate taxonomic groups. Lecture and lab.

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.

532-4 ADVANCED CELL BIOLOGY. Analysis of advanced topics in cell and molecular biology. Emphasis on laboratory projects and current literature with supporting lectures. Prerequisites: BIOL 319 with a grade of C or better.

534-3 AQUATIC ECOTOXICOLOGY. (Same as ENSC 534) Biological effects of aquatic pollution from the molecular to the ecosystem level; uptake, metabolism, excretion, food chain transfer, environmental fate and transport of aquatic pollutants. Prerequisites: ENSC 220 and ENSC 330 or ENSC 531 or BIOL 319 or BIOL 365 or CHEM 471 or consent of instructor.

536-3 MOLECULAR TOXICOLOGY AND PHARMACOLOGY. (Same as ENSC 532) Molecular, biochemical, and cellular mechanisms of toxicity, mode of action, metabolism, and interactions of environmental pollutants, toxic chemicals, and drugs. Prerequisite: BIOL 319, or CHEM 471, or ENSC 531, or consent of instructor.

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 FUNDAMENTALS OF NEUROPHYSIOLOGY. Cellular and molecular basis of synaptic transmission, information processing, and control of behavior. Current mechanisms of learning, memory, drug actions, motor control. Prerequisite: BIOL 319 with a C or better or consent of instructor.

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.

592-1 GRADUATE COLLOQUIUM IN BIOLOGY. Attendance in the weekly colloquium seminar series. Students will critique colloquium presentations and will engage in group discussions of presentations. May be repeated to a maximum of 4 hours.

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 ORGANISMAL 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)

410-3 BIOINORGANIC CHEMSITRY. Exploration of the principles of inorganic reactivity through the structure, stability and reactivity of metal ion-biomolecule complexes, as revealed through appropriate physical methods. Prerequisite: CHEM 451 b with a C or better.

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,c -6 (3,3,3) BIOCHEMISTRY. Life processes at molecular level. (a) Structure and function of biomolecules; (b) Intermediary metabolism, transmission of hereditary information; (c) Advanced topics including proteomics, genomics, celluar and molecular techniques, bionanalytical, biophysical and bioorganic chemistry. Must be taken in sequence. Prerequisite: (a)CHEM 241b, (b) CHEM 451a, (c) CHEM 451b.

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.

461a-3 BIOPHYSICAL CHEMISTRY 1. Examination of the biophysical chemistry principles of thermodynamics and kinetics and the understanding of biological systems using physical chemistry. Prerequisites: CHEM 451b, PHYS 131b or PHYS 152, MATH 150, with a C or better.

461b-3 BIOPHYSICAL CHEMISTRY 2. Examincation of the biophysical chemistry principles of quantum mechanics and spectroscopy and the understanding of biological systems using physical chemistry. Prerequisites: CHEM 461a with a C or better.

465-2 BIOPHYSICAL CHEMISTRY LAB. Investigations of biophysical chemical phenomena. Emphasis on computer aided data analysis, rigorous preparation of written reports, introduction to chemical literature. Six hours of laboratory per week. Prerequisites: CHEM 461 a with a C or better, or concurrent enrollment.

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)

416-3 ENGINEERING HYDROLOGY. Hydrological processes and their relationship to design of structures for control and management of water resources, rainfall-runoff relationship, probability and frequency analysis, surface water hydrology. Prerequisites: upper-division of civil engineering standing, CE 315, 354 or concurrent enrollment, STAT 380, graduate standing, or consent of instructor.

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, 343 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. Prerequisites: CE 354 or consent of instructor.

457-3 SOIL MECHANICS IN ENGINEERING. Mineralogy and soil behavior, advanced seepage and consolidation analyses, engineering applications in soil mechanics, implementation of numerical modeling in soil mechanics. Prerequisites: Upper division civil engineering standing, CE 354 or equivalent, 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.

473-3TRAVEL DEMAND FORECASTING. Transportation engineering principals for estimating the impact of new development on specific facilities and on a region using travel demand forecasting tools. Prerequisite: CE 376.

474-3 COMPUTER SIMULATION IN TRAFFIC ENGINEERING. Highway capacity software (HCS), signal timing software (SYNCHRO), and micro-simulation software (TSIS). Prerequisite: CE 376

475-3 TRANSPORTATION PLANNING. Covers the basis for transportation planning process, modeling transportation demand and supply, project evaluation for decision making, and transportation sustainability. Prerequisite: CE 376 or consent of instructor.

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. Intelligent transportation systems combine traffic flow principles, computer and communication technologies, and management strategies to improve travel efficiency, safety, and security, thus sustainability.

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, including sustainability. 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 234 with a grade of C or better, CMIS major or specialization.

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 232 with grade of "C" or better, CMIS major or specialization.

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.

495-3 TO 6 SEMINAR: INFORMATION SYSTEMS. Current issues related to business aspects dealing with information systems. May be repeated to a maximum of 6 hours if topics differ. Prerequisite: CMIS major or specialization.

526-3 INFORMATION SYSTEMS AND TECHNOLOGY. Information systems and state-of-the-art information technology with a middle-level managerial focus.

528-3 MANAGING TECHNOLOGY. Management of the IT (information technology) function and emerging technologies with a strategic-level focus. Prerequisite: CMIS 526.

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: admission into any graduate program in business..

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: admission into any graduate program in business.

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.

548-3 PROGRAM AND PROJECT PORTFOLIO MANAGEMENT. Management of program and project portfolios from a strategic organizational perspective, including selection and prioritization, performance measurement, and optimization. Prerequisite: CMIS 540

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. Prerequisites: ACCT 524 and admission into any graduate program in business.

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 or 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: a programming course.

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

566-3 INTRODUCTION TO BUSINESS INTELLIGENCE AND ANYALYTICS. Introduction to the concepts and applications of business analytics to support data driven decision making in organizations. Prerequisites: MBA 521 or ECON/FIN 515 or MKTG 546; and CMIS 526 or ECON/FIN 517 or ACCT 561 or MKTG 544.

567-3 BUSINESS ANALYTICS CAPSTONE. Overview of business analytics and business intelligence using SAP tools, including how to assess and use data, determine data needs, and generate and process reports. Prerequisites: CMIS 566, and 2 of the following electives: CMIS 563, CMIS 564, CMIS 588, MKTG 560, MKTG 562, MKTG 595, or ECON 581.

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: admission into any graduate program in business.

587- 3 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.

596a-1 CAPSTONE I. The student will initiate the information systems design project which includes a feasibility study to determine the project scope and objectives, alternative design options, and cost-effectiveness. Prerequisites: NURS 509, CS 434, CMIS 535, and CS 560.

596b-1 CAPSTONE II. The student will develop the requirements for the design project including detailed analysis of the existing system and logical systems design for the proposed system. Prerequisite: NURS 596a or CMIS 596a or CS 596a.

596 c-1 CAPSTONE III. The student will implement the information systems design project focusing on detailed systems design, including program design, configuration and test planning, and systems implementation.

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)

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 234 and CS 240, both with a minimum grade of C.

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.

560-3 INFORMATION DISCOVERY IN ELECTRONIC HEALTHCARE RECORDS. This course surveys analytical techniques for discovering information in electronic healthcare record systems through data mining, text mining, and visual analytics techniques. Prerequisites: NURS 510, CMIS 564 or CS 434.

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 no 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 6 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.

596a-1 CAPSTONE I. The student will initiate the information systems design project which includes a feasibility study to determine the project scope and objectives, alternative design options, and cost-effectiveness. Prerequisites: NURS 509, CS 434, CMIS 535, and CS 560.

596b-1 CAPSTONE II. The student will develop the requirements for the design project including detailed analysis of the existing system and logical systems design for the proposed system. Prerequisite(s): NURS 596a or CMIS 596a or CS 596a.

596c-1 CAPSTONE III. The student will implement the information systems design project focusing on detailed systems design, including program design, configuration, and test planning, and systems implementation. Prerequisite(s): NURS 596b or CMIS 596b or CS 596b.

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)

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: CJ 273 with a grade of C or better.

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-j-1-3 SELECTED TOPICS IN CURRICULUM AND INSTRUCTION. (a) Early Childhood; (b) Elementary; (c) Middle Level; (d) Middle/Secondary; (e) Literacy; (f) English/Language Arts; (g) Mathematics; (h) Science; (i) Environmental Education; (j) Social Studies. Maximum of 9 credit hours total. 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 ADOLESCENT LITERACY. Instructional theories, practices, and strategies for literacy across content areas in middle and high school, enhancing interest and motivation, and assessment of students' literacy performance.

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.

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.

510a-o-3 ANALYSIS OF INSTRUCTION. Teaching and relationship between teaching and learning in the area of: (a) P-12; (b) English Language Arts; (c) Science; (d) Literacy; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (m) Environmental Education; (o) Culturally Relevant Pedagogy. Maximum of 3 credits per segment, maximum of 6 credits overall.

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.

519b-3 TEACHING WITH PRIMARY SOURCES. In-depth study on research and practice of using primary sources and Library of Congress digital collections to enhance K-12 instruction. Prerequisites: CI 519 and 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.

522-3 WORD STUDY: STRATEGIES FOR PHONICS, STRUCTURAL ANALYSIS, SPELLING AND VOCABULARY. Stages of word knowledge, development, including phonemic awareness, phonics, structural analysis, spelling, vocabulary. Effective instruction to understand, read and write words.

524-1-6 PIASA BLUFFS WRITING PROJECT INVITATIONAL SUMMER INSTITUTE. Classroom teachers study writing process pedagogy to modify instruction. Students develop, demonstrate and inquire into their teaching practices by studying writing process pedagogy theoretical perspectives.

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.

526-3 ADULT LITERACY. Application of literacy theory and pedagogy to adults seeking to further language arts skills by understanding language, learning language arts, and developing adult literacy curriculum.

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.

548a-m-3 ACTION RESEARCH. Action research methodology, ethics of research, project planning, and academic research and writing in the area of: (a) P-12; (b) English Language Arts (c) Science; (d) Literacy; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (m) Environmental Education. Maximum of 6 credits.

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 middle/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 schools. Includes a semester of student teaching. Prerequisites: CI 557 and CI 558.

560-3 TEACHING AND LEARNING IN THE 21ST CENTURY. Explores curricular and instructional shifts needed in 21st century education, including essential skills and literacies, learning environments, instructional and assessment practices.

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.

567-3 CURRICULUM DESIGN. Examine relationships between curriculum and instruction, including the design and delivery of curriculum to improve instructional processes and student learning.

568-1-3 SEMINAR ON CURRENT ISSUES IN CURRICULUM AND INSTRUCTION. Examination of current issues in curriculum and/or instruction. May be repeated to a maximum of 9 hours provided no topic is repeated.

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.

580-3 INNOVATION AND CHANGE IN EDUCATION. Foundations of change processes, relationships between innovation and change, factors that promote innovation and change, barriers to change.

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.

588-0 CURRICULUM AND INSTRUCTION GRADUATE CO-OP. Education-related work in a school, educational center, or other business or agency under the supervision of a field supervisor. Prerequisites: Minimum cumulative GPA of 3.0. Consent of Career Development Center.

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.

596a-m-3 FIELD STUDY IN CURRICULUM & INSTRUCTION. Identify problem, survey pertinent literature, collect and analyze data, draw appropriate conclusions in: (a) P-12; (b) English Language Arts; (c) Science; (d) Literacy; (e) Social Studies; (f) Mathematics; (g) Early Childhood Education; (h) Elementary Education; (i) Middle School Education; (j) Secondary Education; (m) Environmental Education; (o) Foreign Language; (p) Culturally Relevant Pedagogy. Maximum of 6 credit hours.

598-0-3 CURRICULUM AND INSTRUCATION GRADUATE INTERNSHIP. Education-related work in a school, educational center, or other business or agency under the supervision of a field supervisor. Maximum of 3 hours. Prerequisites: Consent of instructor.

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, 302, MS 250 or consent of instructor.

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. Will not count toward MA or MS in Economics and Finance.

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.

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: MBA 521 with a grade of C or better.

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 IN EDUCATION. Designed for professional development in education. Topics may vary. Programs may limit the number of credit transferable to a graduate program.

EDUCATIONAL ADMINISTRATION (EDAD)

500-3 INTRODUCTION TO SCHOOL LEADERSHIP. Preparation of professional portfolio and participation in seminars on leadership and school improvement. Prerequisite for program admission.

504-3 HISTORY, PHILOSOPHY, AND ORGANIZATION OF HIGHER EDUCATION. Key developments in the role and function of higher education in the U.S., with emphasis on student affairs practice.

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. Analysis of state and federal statutes and case law, emphasizing needs of English language learners and students with disabilities. Prerequisite: EDAD 500 and program admission.

524-3 LEGAL AND ETHICAL ISSUES IN STUDENT AFFAIRS. Legal status of students; legal and ethical issues surrounding admissions, financial aid, student records, discipline, and support services.

525(a)-3 INSTRUCTIONAL LEADERSHIP & SUPERVISON: THEORY & RESEARCH. Research and theory related to the instructional leadership. Emphasis on hiring, evaluation, and professional development of teachers. Prerequisites: EDAD 500 and program admission.

525(b)-3 INSTRUCTIONAL LEADERSHIP & SUPERVISION: FIELD EXPERIENCE. A field-based internship. Prerequisites: EDAD 500, EDAD 525(a) can be concurrent with EDAD 525(a) and program admission.

530(a)-3 DATA DRIVEN SCHOOL IMPROVEMENT AND ACCOUNTABILITY: THEORY AND RESEARCH. Principles and procedures of educational program evaluation. Data-driven school improvement processes. Prerequisites: EDAD 500 and program admission; EPFR 501.

530(b)-3 DATA DRIVEN SCHOOL IMPROVEMENT & ACCOUNTABILITY: FIELD EXPERIENCE. A field-based internship. Prerequisites: EDAD 500, EDAD 530(a) (can be concurrent with EDAD 530(a) and program admission.

535(a)-3 CURRICULUM LEADERSHIP: THEORY AND RESEARCH. Curriculum leadership for school leaders to enhance learning of all students. Prerequisites: EDAD 500 and program admission.

535(b)-3 CURRICULUM LEADERSHIP: FIELD EXPERIENCE. A field-based internship. Prerequisites: EDAD 500, EDAD 535(a) can be concurrent with EDAD 535(a) and program admission.

545(a)-3 THE PRINCIPALSHIP: THEORY AND RESEARCH. Theory and research related to leadership role of building principal. Prerequisites: EDAD 500 and program admission.

545(b)-3 THE PRINCIPALSHIP: FIELD EXPERIENCE. A field-based internship. Prerequisites: EDAD 500, EDAD 545(a) can be concurrent with EDAD 545(a) and program admission.

550-3 TEACHER LEADER PRACTICUM. Practical application fo teacher leader theory and practice supervised by an approved administrator or teacher and program faculty member. Course must be taken last semester of the program. May be repeated to a maximum of 6 hours Prerequisite: EDAD 500 and program admission.

554-6 PRACTICUM. Field assignment in student affairs offices in higher education settings. Seminar discussions of work experience.

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.

564-3 THE COMMUNITY COLLEGE. An overview of how various types of two-year postsecondary institutions have evolved and how they function.

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.

574-3 LEADERSHIP AND ADMINISTRATION IN HIGHER EDUCATION. Major leadership theories and their application to higher education, with emphasis on student affairs programs.

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.

594-3 FINAL RESEARCH PROJECT. Students will conduct an inquiry-based project related to the field. Prerequisites: EDAD 504, EDAD 524, EDAD 574, EPFR 503, EPFR 506, EPFR 514, EPFR 516, EPFR 522, or consent of instructor.

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.

600-3 PROFESSIONAL SEMINAR IN DOCTORAL STUDY. An in depth analysis of issues facing school superintendents. Prerequisites: Admitted to EdD; EDAD 555, 560, 563, 565, 570, 573, 575, 580, 585, 591 or 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 315; EPFR 320, 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.

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.

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.

502-3 QUALITATIVE INQUIRY IN EDUCATION. Qualitative research methods and action research for answering educational questions. Also includes selected quantitative concepts including correlation and test score interpretation.

503-3 RESEARCH METHODS IN HIGHER EDUCATION. Research methods in higher education, with a focus on conceptual, methodological, and practical issues in quantitative and qualitative research.

506-3 ASSESSMENT AND EVALUATION IN STUDENT AFFAIRS. Assessment and program evaluation in college student affairs.

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.

514-3 COLLEGE STUDENT LEARNING AND DEVELOPMENT. Overview of college student development theories, practices, and problems, with a focus on application.

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.

516-3 INDIVIDUAL AND GROUP DYNAMICS. Advisement of college students; the design, implementation, and evaluation of developmentally appropriate strategies for individuals and groups.

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.

522-3 DIVERSITY IN HIGHER EDUCATION. Equity issues in higher education.

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 HIGH FREQUENCY DESIGN. High frequency circuit design with elements of RF engineering. Amplifiers, oscillators, modulators, impedance matching, switching, signal integrity and tuning. Prerequisites: declared major in an engineering discipline, grade of C or better in ECE 326.

427-3 KNOWLEDGE-BASED SYSTEMS. (Same as IME 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.

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 MTS 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.

476-ELECTRONIC CIRCUITS II. Small signal analysis and frequency response, operational amplifier design, feedback system analysis, stability and compensation, oscillators, and A/D and D/A converters. Student must be a declared major in an engineering discipline.

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.

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.

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.

599-3. RESEARCH 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.

410-3 RHETORIC, WRITING, AND CITIZENSHIP. Examination of rhetoric's role in US citizenship both past and present. Student will write analytical and persuasive documents. Service learning project required. Prerequisite: ENG 102 with a grade C or better.

412-3 DIGITAL LITERACIES. Students will investigate digital literacy—electronic technologies, discursive practices, and cyberspaces. Analysis and assessment of digital artifacts, cultures, and texts. Prerequisite: completion of ENG 102 with a grade of C or better.

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.

417-3 LANGUAGE AND ETHNICITY. Introduce students to linguistic thought through definitions of ethnicity, case studies of diverse language communities, ethnic crossing via language, and inter-ethnic communication. Prerequisite: junior standing or higher or signed consent of instructor.

420-3 TOPICS IN FILM STUDIES. A variable topics course focusing on the history and aesthetic development of one or two film genres, styles or historical periods. Prerequisites: ENG 102 with a grade of C or better; junior standing or consent of instructor.

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. Prerequisite: ENG 102.

444-3 CREATIVE NONFICTION. Writing practice in and examination of a wide variety of modes and subjects comprising the genre of creative nonfiction, i.e. memoir, personal essay, lyric essay. Workshop format. Prerequisite: ENG 290.

445-3 YOUNG ADULT LITERATURE. Historical survey of and contemporary perspectives on young adult literature. Students will analyze interactions between literary texts and the cultures in which they are read. Prerequisites: ENG 102 with a grade of C or better; junior standing or consent of instructor.

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, electronic environments, hypertextual editing, and born-digital literatures. 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.

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 TOPICS IN FORMS AND GENRES. This course will address a range of topics relevant to literary forms and genres. May cross periods and geographies. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisite: graduate standing.

506-3 TOPICS IN LITERARY PERIODS. This course will focus on a particular literary period and/or relationships between literary periods. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisite: graduate standing.

508-3 MAJOR AUTHOR STUDIES. This course will involve the comprehensive study of one author or a select group of authors. May be repeated to a maximum of 12 hours provided no topic is repeated. Prerequisite: graduate standing.

521-3 TOPICS IN LITERATURE AND CULTURE. This course will address relationships between literature and culture that are not period or genre specific. May be repeated to a maximum of 12 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.

532-3 TOPICS IN CREATIVE WRITING. This course will focus on special topics in creative writing. May be repeated to a maximum of 12 hours, provided no topic is repeated. Prerequisites: Consent of instructor and 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. Prerequisites: 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. Prerequisites: 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.

545-1 to 3 TESL PRACTICUM. Guided observation and tutoring in a variety of Englisha s a Second Language (ESL) classrooms, supported by readings and reflection papers.

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 WRITING THEORY AND PEDAGOGY. 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 GENDER, 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.

583-3 HISTORY OF RHETORIC I – THE CLASSICAL PERIOD TO THE RENAISSANCE. Major rhetoric figures, texts, and definitions, beginning with Classical origins and continuing into the Renaissance period. Designed for students interested in composition, literature, and criticism.

584-3 HISTORY OF RHETORIC II – THE ENLIGHTENMENT TO TODAY. Major rhetoric figures, texts, and definitions, beginning with the Enlightenment and continuing into the contemporary period. Designed for students interested in composition, literature, and criticism.

587-3 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.

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. Prerequisites: 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. Prerequisites: graduate standing and consent of instructor.

595-3 PROFESSIONAL DEVELOPMENT SEMINAR. Reflection and classroom-research oriented course designed to integrate the theory and practice of TESL via analysis and research of teaching experiences. 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. MA candidates will prepare comprehensive reading lists and produce either three 20 page papers (3 credit hours max) or a scholarly exit project (6 credit hours max). May be repeated to a maximum of 6 hours provided no topic is repeated.

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

ENVIRONMENTAL SCIENCES (ENSC)

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.

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.

525-3 ENVIRONMENTAL CHEMISTRY. Emphasizes chemical equilibrium and thermodynamics, acid-base chemistry, dissolved carbon dioxide, coordination chemistry, precipitation an dissolution, oxidation and reduction, and adsorption reactions. Prerequisite: one year of college chemistry or consent of instructor.

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.

532-3 MOLECULAR TOXICOLOGY AND PHARMACOLOGY. (Same as BIOL 536) Molecular, biochemical, and cellular mechanisms of toxicity, mode of action, metabolism, and interactions of environmental pollutants, toxic chemicals, and drugs. Prerequisite: BIOL 319, or CHEM 471, or ENSC 531, or consent of instructor.

534-3 AQUATIC ECOTOXICOLOGY. (Same as BIOL 534) Biological effects of aquatic pollution from the molecular to the ecosystem level ; uptake, metabolism, excretion, food chain transfer, environmental fate and transport of aquatic pollutants. Prerequisites: ENSC 220 and ENSC 330 or ENSC 531 or BIOL 319 or BIOL 365 or CHEM 471 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.

573-3 GIS MODELING THE NATURAL ENVIRONMENT. Modeling of the natural environment using geographic information science and systems as well as environmental and biological field methodologies. Prerequisite: GEOG 418 consent of instructor.

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.

590-1 to 6 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)

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.

501-3 ADVANCED CORPORATE FINANCE. Theories and analytical tools used to solve problems in firm's financing choices; capital budgeting and project evaluation; cost of capital. Prerequisite: admission to Economics and Finance graduate program.

502-3 INVESTMENT THEORY AND ANALYSIS. Theoretical and empirical concepts in investments; equity, fixed income and derivative securities. Develop modeling skills for financial analyses. Prerequisite: admission to Economics and Finance graduate program.

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.

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. Corequisite: FIN 502.

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)

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.

403-3 ADVANCED URBAN GEOGRAPHY. Selected topics in spatial patterns and processes of urbanization. Topics may include: planning, transportation, sustainability, society and culture, health, housing, global cities, and economic functions. Prerequisite: GEOG 303 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 120 or equivalent 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: College algebra, CHEM 113 or equivalents 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.

414-3 FLOODS, CLIMATE AND THE ENVIRONMENT. Examines the nature of floods, the hydrologic, climatic, and anthropogenic factors that lead to floods and the effects of floods on humans and the environment. Prerequisite: GEOG 411 or permission 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
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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.

430-3 GLOBAL CLIMATE CHANGE. Addresses (a) the scope and controls of climate on various scales; (b) climate throughout history; and (c) addresses both contemporary and future global climate change. Prerequisites: GEOG211 and GEOG314 with grade of C or better.

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.

451-3 TOPICS IN HUMAN GEOGRAPHY. Specific topics in human geography based on faculty expertise. May be repeated to a maximum of 6 hours. Prerequisite: geography major with senior standing or consent of instructor.

452-3 TOPICS IN PHYSICAL GEOGRAPHY. Specific topics in physical geography based on faculty expertise. May be repeated to a maximum of 6 hours. Prerequisite: Geography major with senior standing or consent of instructor.

453-3 TOPICS IN REGIONAL GEOGRAPHY. Specific topics in regional geography based on faculty expertise. May be repeated to a maximum of 6 hours. Prerequisite: Geography major with senior standing or consent of instructor.

454-3 TOPICS IN GEOGRAPHIC TECHNIQUES. Specific topics in regional geography based on faculty expertise. May be repeated to a maximum of 6 hours. Prerequisite: geography major with 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.

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)

455-3 INTRODUCTION TO EPIDEMIOLOGY. Causes, prevention, control of communicable, chronic and degenerative diseases in various community setting settings. Examination of statistical measures and methods for organizing vital statistics. Prerequisite: 201 and 355, or consent of instructor.

462-1 to 3 SPECIAL TOPICS IN HEALTH EDUCATION. Relevant health issues, topic and credit hours announced. May be repeated to a maximum of 12 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.

470-3 SEXUALITY EDUCATION. Individual, family, school, and community concerns and approaches. Physiological, psychosocial and environmental factors affecting sexuality as related to learning experience. Prerequisites: HED 210 and HED 370 with grades of "C" or better.

495-3 GRANT WRITING IN HEALTH EDUCATION. Practical application in the development of a grant for a social service agency or school. Strategies for exploring funding, collaboration, and preparation of quality proposals.

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.

425-3 HISTORY OF AMERICAN IDEAS 1620-1865. History of American Ideas 1620 to 1865 traces ideological conflicts and compromises that created the United States through the Civil War.

426-3 HISTORY OF AMERICAN IDEAS 1865-PRESENT. History of American Ideas 1854-Present traces ideological conflicts and compromises that created the United States after the Civil War.

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. Gender history exploring 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.

451-3 NATIVE AMERICANS ENCOUNTER LEWIS AND CLARK. Investigates the Lewis and Clark expedition from American and especially Native American points of view.

452-3 NATIVE AMERICAN WOMEN. Investigates Native American gender roles, particularly women's roles, from an ethnohistorical perspective.

455-3 WOMEN AND GENDER IN ISLAMIC HISTORY. Examines the role of women in Islamic history from the pre-Islamic Middle Eastern context through the establishment of classical Islamic family law to contemporary reforms. Prerequisite: HIST 354A or HIST 354B or HIST 354C or WMST 200 or permission of instructor.

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.

556-3 GRADUATE SEMINAR IN HISTORICAL RESARCH. Research methods and practice for graduate student. Required of all M.A. and Ph.D. students. Repeatable once for a total of 6 credit hours.

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.

598-1 to 6 READINGS FOR EXAMS. Preparation for written and oral comprehensive master's exams and portfolio presentation. Prerequisites: Successful completion of HIST 55a/b, HIST 556.

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)

401-3 BIOMECHANICS. Mechanics of human body systems including basic anatomy of human body, 2D and 3D biomechanical models and application of models in real-life problems. Prerequisite: IME 370 with "C" or better.

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 ECE 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.

445-3 FOUNDATIONS OF FINANICIAL ENGINEERING. Financial engineering integrates computational intelligence, mathematical finance, numerical methods and computer simulations for pricing, trading, hedging and investment decisions. Prerequisites: IME 245 and STAT 380 with minimum grades of "C".

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 performed. (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.

464-3 DESIGN AND ANALYSIS WITH APPLICATIONS TO SCIENCE & ENGINEERING. Design for experimentation and statistical inference with engineering and science applications. One-way, two-way classifications; complete and incomplete block designs. Factorial and fractional factorial designs. Perquisite: STAT 380 or STAT 480 and STAT 480b with a grade of C or better.

466-3 ENGINEERING METROLOGY. Exposes the student to the principles 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. Prerequisite: IE 365 or IE 461 or STAT 380 or consent of the instructor.

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, 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.

478-3 NUMERICAL CONTROL PROGRAMMING. Theory/implementation of numerically controlled machine tools. Projects include manual/computer assisted programming and machining. Design principles are discussed in the context of geometry creation. Prerequisite: IME 370 with “C” or better 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 fluctuating 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.

488-3 LEAN PRODUCTION SYSTEMS. Integrated approach to efficient production emphasizing work organization, manufacturing flow, process control, metrics, logistics, and value stream mapping techniques for lean manufacturing implementation. Prerequisite: IME 483 or equivalent 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-art 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: 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.

592-1-5 TOPICS IN INDUSTRIAL 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.

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.

442-3 MEDIA SELECTION. Analysis and criteria for selecting aids and reviewing sources. Includes principles and theories of library media selection, assessment and policy for library media collection development. Prerequisite: permission of instructor.

443-3 INSTRUCTIONAL MEDIA FOR CHILDREN AND YOUNG ADULTS. Media for preschool children and young adults. Includes comparison and evaluation of major writers,, artists, illustrators and designers of media and identification of established genres. Prerequisite: permission of instructor.

448-3 CATALOGING FOR SCHOOL LIBRARIANS. Principles and skills of cataloguing all types of materials, including the use of bibliographic records, Dewey Decimal classification, and Library of Congress Subject Headings. Prerequisite: permission of instructor.

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.

542-3 ADVANCED REFERENCE. Evaluation of information sources including utilization of appropriate data bases in varied and specialized subject areas such as social sciences; science and technology; and literature, and humanities.

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)

413-3 EXERCISE AND AGING. Investigates the basic concepts of the physiology of aging and the forms of exercise and physical activity that is beneficial to the aging population.

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.

496-3 ADVANCED CONCEPTS AND TECHNIQUES IN STRENGTH AND CONDITIONING. Prepare students to take the Certified Strength and Conditioning Specialist (CSCS) certification exam through the National Strength and Conditioning Association. Prerequisites: KIN 319 and KIN 350 or consent of instructor.

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.

501-3 BEHAVIORAL ANALYSIS OF EXERCISE. Provides an in-depth analysis of psychosocial factors related to preventive and rehabilitative exercise behavior.

502-BEHAVIORAL ANALYSIS OF SPORT. Explores the psychological factors influencing participation patterns and performance in sport, and effects of sport upon psychological responses.

503-3 SPORT SOCIOLOGY. Provides an in-depth analysis of the interaction between physical activity and society including the social and cultural processes and institutions which influence, and are influenced by physical activity.

504-3 PSYCHOLOGY FOR SPORT PERFORMANCE. An in-depth exploration of the current professional practices in sport and exercise psychology service delivery that utilize both psychological and educational interventions.

509-3 RESEARCH METHODS IN KINESIOLOGY. Prepare students to read, understand, and evaluate research in the field of kinesiology.

512-3 ADVANCED EXERCISE PHYSIOLOGY. Discussion and application of the physiological and metabolic effects that occur at rest and during exercise in humans.

513-3 CLINICAL EXERCISE PHYSIOLOGY. Review the evaluations, mechanisms and adaptation by which exercise prevents and treats chronic diseases.

514-3 ADVANCED EXERCISE ASSESSMENT AND PRESCRIPTION. Provides in-depth training for the various concepts related to exercise assessment and prescription for healthy persons and those with chronic disease and/or disability.

516-3 ADVANCED CARDIOVASCULAR AND RESPIRATORY PHYSIOLOGY. Discussion and application of the cardiovascular and respiratory physiological effects that occur at rest and during exercise in humans. Includes interpretation of electrocardiograms (ECG).

517-3 PATHOPHYSIOLOGY AND TREATMENT OF OBESITY. Provides in-depth content of the etiology, pathophysiology, prevention and treatments for obesity in adults and children.

518-3 EXERCISE ENDOCRINOLOGY. To provide content on the cellular and systems physiology of the neuro-endocrine system, as well as present research-based findings of how exercise alters neuro-endocrine function.

520-3 PEDAGOGY IN SPECIAL PHYSICAL EDUCATION. Selection of appropriate intervention strategies for individuals with disabilities. Includes instructional strategies and curriculums.

522-3 ANALYSIS OF TEACHING BEHAVIORS IN SPORT AND PHYSICAL EDUCATION. Selection and observation of appropriate teaching behaviors in sport and K-12 physical education.

524-3 ASSESSMENT IN SPORT AND PHYSICAL EDUCATION. Focuses on particular skills necessary for developing, implementing, and evaluating in sport and physical education. Prerequisite: completed bachelor's degree.

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.

527a-3 ACTION RESEARCH IN PHYSICAL EDUCATION I. Introduces students to action research, a form of self-reflective systematic inquiry by practitioners on their own practice. Prerequisites: admission to physical education and sport pedagogy program.

527b-3 PRESENTATION OF ACTION RESEARCH IN PHYSICAL EDUCATION II. Introduces students to presenting action research, a form of self-reflective systematic inquiry by practitioners on their own practice. Prerequisites: admission to physical education and sport pedagogy program.

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 GOVERNANCE 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.

541-3 ADVANCED HUMAN NUTRITION AND METABOLISM. Discussion and application of macronutrients and micronutrients on metabolism in health and disease.

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 adviser; provided no topic is repeated. Prerequisite: consent of instructor.

555-3 INTERNSHIP IN EXERCISE PHYSIOLOGY. Individualized planned experience in agency, organization, or institution appropriate to student's area of professional interest. Prerequisite: consent of instructor.

580-1 to 4 READINGS IN KINESIOLOGY. Supervised reading on selected topics. May be repeated to a maximum of 4 hours.

597-3 SEMINAR IN EXERCISE PHYSIOLOGY. Review and discussion of historically classic articles and current research in exercise physiology.

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. Prerequisites: admission to school of business, MGMT 330 and MGMT 331 or MGMT 340.

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 AND DEVELOPING 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 PERFORMANCE MANAGEMENT AND COMPENSATION. This course focuses on the importance of performance management in the workplace, including performance assessment, compensation and workplace safety, along with performance in union environments. 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. Prerequisites: admission to the School of Business and MGMT 330 and MGMT 331 or MGMT 341.

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. Prerequisites: admission to the School of Business, MGMT 330 and MGMT 331 or MGMT 341.

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. Prerequisites: admission to the School of Business, MGMT 330 and MGMT 331 or MGMT 341.

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. Prerequisites: admission to the School of Business, MGMT 330 and MGMT 331 or MGMT 341.

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: admission to the School of Business, MGMT 330 and MGMT 331 or MGMT 341.

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.

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.

534-3 ADVERTISING RESEARCH. Advertising research using both theory based literature and practical application of current theories of advertising and persuasion. 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 NEW PRODUCT DESIGN, DEVELOPMENT, AND 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 RESEARCH FOR DECISION MAKING. 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.

471-3 SPECIAL TOPICS IN MASS MEDIA. Special and advanced topics in mass media. Topics to be announced. May be repeated to a maximum of 9 hours provided no topic is repeated.

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 functions. Focus on ethical, social, legal, and economic environments as they affect managerial responsibility and organizational performance.

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.

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.

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 (MBA 521, MBA 522, MBA 523, ACCT 524, MKTG 525, CMIS 526, FIN 527, ECON 528, PROD 529.

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. Rings, fields, integral domains homomorphisms, factor rings, rings of polynomials, prime ideals, maximal ideals, extension fields, and vector spaces. Prerequisite: MATH 320 with a grade of C or better 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. Prerequisites: MATH 223, 250, 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.

430-3 A GEOMETRIC INTRODUCTION TO TOPOLOGY. Topological spaces and equivalence through the study of knots, links, surfaces, 3-manifolds and other selected topics. Prerequisite: MATH 350.

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. Prerequisite: MATH 350 with a grade of C or better or consent of instructor.

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 223, MATH 305 and CS 145 with a C or better or consent of the instructor.

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.

490a-h 1 TO 3 each TOPICS IN MATHEMATICS. Selected topics in specified areas of interest. (a) Algebra, (b) Geometry and topology, (c) Analysis, (d) Mathematics education, (e)Logic and foundations, (f) Differential equations, (g) Numerical analysis, (h) Combinatorics and graph theory. Prerequisite: Consent of instructor.

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.

531-3 ALEBRAIC CONTENT, PEDAGOGY, AND CONNECTIONS. focused look at algebraic content, best practices in pedagogy, and connections to other areas. Within the Department of Mathematics and Statistics credit can only be earned for the Post Secondary Mathematics option. Prerequisite: MATH 250 with a C or better or consent of instructor.

532-3 GEOMETRIC CONTENT, PEDAGOGY, AND CONNECTIONS. A focused look at geometric content, best practices in pedagogy, and connections to other areas. Within the Department of Mathematics and Statistics credit can only be earned for the Post Secondary Mathematics option. Prerequisite: MATH 250 with a C or better or consent of instructor.

533-3 DISCRETE MATHEMATICS CONTENT, PEDAGOGY, AND CONNECTIONS. A focused look at discrete mathematics content, best practices in pedagogy, and connections to other areas. Within the Department of Mathematics and Statistics credit can only be earned for the Post Secondary Mathematics option. Prerequisite: MATH 250 with a C or better or consent of instructor.

534-3 CALCULUS CONTENT, PEDAGOGY, AND CONNECTIONS. A focused look at calculus content including limits, differentiation, integration, and series; best practices in pedagogy, and connections to other areas. Within the Department of Mathematics and Statistics credit can only be earned for the Postsecondary Mathematics Education specialization. Prerequisites: MATH 350 with a C or better or consent of instructor.

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 451; 545.

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; 451; 545.

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.

417-3 HEATING, VENTILATING AND AIR-CONDITIONING (HVAC). Air-conditioning systems, psychrometrics, indoor air quality, heating and cooling loads, pumps and fans, duct design, refrigeration. Prerequisite: ME 410 with grade of D or better or concurrent enrollment.

419-3 GAS TURBINES. Quasi-one-dimensional compressible flow; ideal and non-ideal gas turbine cycles, gas turbines for power, turbojet, and turbofan; component performance; engine off-design performance; and engine design considerations. Prerequisites: ME 312 and ME 315.

432-3 VEHICLE DYNAMICS AND TECHNOLOGY. One dimensional dynamics of a vehicle, acceleration performance, breaking performance, power train, tire mechanism, steering mechanism, low and high speed cornering, and suspension system. Prerequisite: ME 350 with C or better.

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.

442-3 MICROELECTROMECHANICAL SYSTEMS. Fundamental science, design, and fabrication of MEMS and microsystems, scaling laws, MEMS flexures, capacitive, piezoelectric, piezoresistive, and thermal sensing actuation. Prerequisite: ME 315, ME 356, ME 380, with grade of C or better, or Graduate standing.

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. Two hours lecture and one laboratory session per week. Approved for graduate credit. Prerequisites: ME 356.

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.

562-3 DISCONTINUOUS DYNAMICAL SYSTEMS. Discontinuous dynamical systems, accessible and inaccessible domains, flow switchability and singularity at the boundary, bifurcations, flows and motion complexity. Prerequisites: ME 530 with B or better, MATH 501 with C or better, or consent of instructor.

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.

576-3 TURBULENT FLOW. Reynolds averaged Navier-Stokes equations (RANS), turbulent energy transport; Closure issues and modeling; Turbulent statistics and applications; Large eddy simulation (LES) and direct numerical simulation (DNS) and CFD considerations. Prerequisites: Graduate standing in Mechanical Engineering.

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)

400z-0-3 SPECIFIC PROJECTS IN MUSIC. Designed for students who will be involved with a specific project: traveling to perform, present, or to develop specific skills related to major.

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-4 APPLIED 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.

442 -3 COUNTERPOINT. Sixteenth and Eighteenth Century contrapuntal techniques. Prerequisite: MUS 225b or consent of instructor.

460a,b-0 or 1 OPERA WORKSHOP. Skills, techniques, and literature used in performance and production of operatic scenes, operas, operettas. May be repeated to a maximum of 16 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.

483-2 READINGS IN MUSIC EDUCATION. May be repeated to a maximum of 6 hours provided no topic is repeated.

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.

509-2 JAZZ COMPOSITION/ARRANGING. Jazz composition/Arranging is designed to allow students an opportunity to explore, develop, and demonstrate written music competencies in the jazz medium. Prerequisite: MUS 409b or consent of instructor.

511a-f-2 each MUSIC LITERATURE. (a) Symphonic; (b) Choral; (c) Chamber; (d) Opera; (e) Special Areas (f) Vocal (g) 20th Century. 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 LEADERSHIP IN MUSIC EDUCATION. This course defines skills and processes that are required for organizing, administering, and assessing school music programs effectively.

553a,b,c,d-2,2,2,2 SEMINAR IN MATERIALS AND TECHNIQUES. (a) Choral; (b) Instrumental; (c) Piano; (d) vocal. 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. Students will apply current pedagogical knowledge to the practical application of voice teaching and explore studio matters of business and philosophy, interpretation and musical development. 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.

500-3 THEORETICAL FOUNDATIONS OF NURSING. Systematic and critical analysis of nursing related concepts, models, and theories as a basis for advanced nursing practice.

501-3 STUDIES IN GENOMICS AND ETHICS. Exploration of genetics, genomics, and ethical knowledge relevant to the advanced nursing role. Prerequisite: admission to the program or permission of Assistant Dean for the graduate program.

502-3 PROFESSIONAL WRITING FOR ADVANCED PRACTICE NURSES. Development of scholarly writing skills to enhance the success in academic courses. Grammar, writing mechanics, plagiarism, and strategies to develop writing skills are discussed. Prerequisites: BS or BA required. Additional consent required from Adviser.

503-3 TEACHING PRINCIPLES FOR HEALTHCARE PROFESSIONALS. Provides health professionals with overview of basic teaching and learning principles for adult learners in the classroom, hospital or clinical setting. Emphasis on strategies for developing active learning and critical thinking skills. Graduate students in non-teaching specialties, hospital educators or preceptors would benefit from this course. Prerequisite: BS or BA required. Additional consent required from Adviser.

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.

509-3 INTERDISCIPLINARY HEALTH CARE INFORMATICS. Introduces informatics terminology and theory, including searching, managing, and evaluating data, analyzing information systems, and integrating technology into practice. Prerequisite: Admission into the Healthcare Informatics Professional Development Sequence or Master's in Healthcare Informatics.

510-3 HEALTH CARE INFORMATICS. Critical elements of healthcare informatics for advanced nursing practice including searching, managing, and evaluating data, analyzing information systems, and integrating technology into practice. Prerequisite: admission to the program or permission of Assistant Dean for the graduate program.

511-3 SOCIAL, ETHICAL, AND LEGAL ISSUES IN AN INFORMATION AGE. Explores social, ethical and legal issues related to searching, storing and using health care information and the ethical and legal formation of informatics professionals. Prerequisite: Admission into the Healthcare Informatics Program.

512-3 MANAGING QUALITY AND SAFETY IN HEALTHCARE. Examination of processes and integration of concepts used to measure and improve the quality and effectiveness of health care. Examination and analysis of research statistics. Prerequisites: NURS 510, CMIS 535, MGMT 551 or course faculty approval.

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. Describe complex physiologic processes that occur in each organ system across the life span. Differentiate physiologic variations in diverse populations. Examine the impact of genetics variation in human physiology. Analyze the compensatory physiologic responses of multiple organ systems in maintaining health. Analyze current evidence-based knowledge regarding physiologic. Prerequisite: consent from Adviser

515-4 ADVANCED HUMAN PATHOPHYSIOLOGY. Examine the genetic and developmental influences on pathological processes. Differentiate the pathophysiological processes and manifestations in culturally diverse patients. Analyze current evidence-based knowledge regarding physiological adaptation. Prerequisite or Co-requisites: NURS 514 or approval of the Assistant Dean for the graduate program and adviser consent

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.

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.

529-2 ORIENTATION TO NURSE ANESTHESIA PRACTICUM. Orientation to basic skills for safe entry into nurse anesthesia practice. Incorporates lecture and 90 hours of lab and practicum. Prerequisites: NURS 514, NURS 515, NURS 564.

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.

560-3 ETHICAL, LEGAL, AND SYSTEMIC ISSUES IN ANESTHESIA PRACTICE. Fosters the formation of advanced practice nurses through exploration of legal, ethical, safety, wellness, business, regulatory, and social dimensions of nurse anesthesia practice.

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: NURS 516.

564-3 CHEMISTRY AND PHYSICS APPLIED TO ANESTHESIA. Integrate knowledge of chemistry, biochemistry, and physics principles into anesthesia practice. 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 and nursing theory into nurse anesthesia role when caring for specific surgical populations.Prerequisites:NURS 529, NURS 564, NURS 563..

565b-1 CLINICAL PRACTICUM IN NURSE ANESTHESIA I. Application of theoretical principles to care, providing anesthesia to patients while under the supervision of CRNA and /or anesthesiologist preceptors. Prerequisites:NURS 529, NURS 563, NURS 564.

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, complex patient populations. Prerequisites: NURS 565a, NURS 565b.

566b-2 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: NURS 565a, NURS 565b.

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 specialty populations. Prerequisites: NURS 566a, NURS 566b.
567b-2 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: NURS 566a, NURS 566b.

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 or approval of Assistant Dean for the graduate program.

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 and NURS 572 or approval of Assistant Dean for the graduate program .

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.

580-3 TEACHING AND LEARNING THEORY, DEVELOPMENT AND SOCIALIZATION FOR NURSE EDUCATORS. Overview of classic and contemporary teaching and learning philosophies, theories, technologies and research as it relates to the development and socialization of nurse educators. Prerequisites: admission to the nurse educator specialization, consent of Assistant Dean for the graduate program.

581-3 CURRICULUM THEORY, DESIGN, AND PROGRAM EVALUATION IN NURSING EDUCATION. Essential components of nursing curriculum theory, design and program evaluation will be examined. External and Internal influences and barriers on curriculum will be included. Prerequisite: NURS 500. .

582-4 INSTRUCTIONAL DESIGN, ASSESSMENT, AND EVALUATION FOR NURSING EDUCATION. Explores innovative instructional design strategies, outcomes, evidence based assessment and evaluation tools in relation to classroom competence and clinical achievement which includes diverse population needs; includes 90 practicum hours. Prerequisites: NURS 504 and NURS 581.

585-3 SYNTHESIS FOR TEACHING IN THE NURSE EDUCATOR ROLE: SEMINAR & PRACTICUM. In this course, the graduate student integrates evidence-based practice into the role of the specialty nurse educator. Included 90 hours of practicum. Prerequisites: NURS 581, NURS 582 and NURS 586. Additional consent required from Adviser.

586-3 ADVANCED SPECIALTY NURSING PRACTICE FOR NURSE EDUCATORS: SEMINAR. Integrates evidence-based practice and advanced health assessment knowledge in learner's nursing specialty. Investigates the interrelationship among practice, theory, and research through clinical practicum in specialty area; includes 90 hours practicum. 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; includes 45 practicum hours.

591-3 ADVANCED LEADERSHIP ROLE IN HEALTH CARE & 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; includes 90 practicum hours. Prerequisite or Co-requisite: NURS 590.

592-3 FINANCE and BUDGETING IN HEALTH CARE AND NURSING ADMINISTRATION. 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; includes 45 hours practicum.

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.

596a-1 CAPSTONE I. The student will initiate the information systems design project which includes a feasibility study to determine the project scope and objectives, alternative design options, and cost-effectiveness. Prerequisites: NURS 509, CS 434, CMIS 535, and CS 560.

596b-1 CAPSTONE II. The student will develop the requirements for the design project including detailed analysis of the existing system and logical systems design for the proposed system. Prerequisite: NURS 596a or CMIS 596a or CS 596a.

596c-1 CAPSTONE III. The student will implement the information systems design project focusing on detailed systems design, including program design, configuration, and test planning, and systems implementation. Prerequisite: NURS 596b or CMIS 596b or CS 596b.

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.

600-3 THEORY GUIDED PRACTICE. Explores use of models and theories in health care practice with focus on developing a framework for implementing and evaluating a theory guided project. Prerequisite: admission to the DNP program or approval by Assistant Dean for the graduate program.

601-3 STUDIES IN GENMICS AND ETHICS. Focus on critical elements of healthcare for advancing nursing practice including searching, managing, and evaluating data, analyzing information systems, and integrating technology into practice. Prerequisite: admission to the DNP program or approval by Assistant Dean for the graduate program.

604-3 EVALUATING EVIDENCE FOR IMPROVING PRACTICE AND HEALTH CARE OUTCOMES. Translate scientific and clinical evidence for application into practice to improve healthcare outcomes. Prerequisites: admission to the DNP program or approval by Assistant Dean for the graduate program, N600, N617, N620.

605-3 HEALTH POLICY AND FINANCE FOR ADVANCED NURSING LEADERSHIP. Explores finance and economics as they apply to health care and nursing leadership. Prerequisite: admission to the graduate/DNP program or graduate status with approval by Assistant Dean for the graduate program.

617-3 ADVANCED APPLICATIONS OF EPIDEMIOLOGY IN PRACTICE. Analyze and interpret epidemiologic data and synthesize and translate research for advanced nursing practice with individuals and populations. Prerequisites: admission to the DNP program or approval by Assistant Dean for the graduate program, N600, N620.

620-3 HEALTH CARE INFORMATICS. Critical elements of healthcare informatics for advancing nursing practice including searching, managing, and evaluating data, analyzing information systems, and integrating technology into practice. Prerequisite: admission to the DNP program or approval by Assistant Dean for the graduate program.

668a-3 CLINICAL CORRELATIONS AND INNOVATIONS IN ANESTHESIA PRACTICE I. Analysis of correlations between complex anesthesia cases and relevant theoretical principles. Focus on evidence based practice and synthesis of learning to promote innovative care. Prerequisites: NURS 567 a, NURS 567 b.

668b-2 CLINICAL PRACTICUM IN NURSE ANESTHESIA IV. Application of advanced theoretical principles into nurse anesthesia care of critically ill or complex patients while under the supervision of CRNA and/or Anesthesiologist preceptors. Prerequisites: NURS 567a, NURS 567b.

669a-3 CLINICAL CORRELATIONS AND INNOVATIONS IN ANESTHESIA PRACTICE II. Analysis of correlations between complex anesthesia cases and the variables that impact patient outcomes. Corequisites: NURS 669b, NURS 697e. Prerequisites: NURS 668a, NURS 668b.

669b- 2 CLINICAL PRACTICUM IN NURSE ANESTHESIA V. Application of advanced practice nursing role into care of critically ill/complex patients under supervision of CRNA and/or Anesthesiologist preceptors. Corequisites: NURS 669a and NURS 697e. Prerequisites: NURS 668a, NURS 668b.

670a-1 CLINCIAL LEADERSHIP IN ANESTHESIA SEMINAR. Exploration and analysis of critical skills and knowledge related to leadership within the nurse anesthesia practice environment. Prerequisites: NURS 567a, NURS 567b, NURS 691.

670b-1 CLINCIAL LEADERSHIP IN ANESTHESIA PRACTICUM. Application of theoretical principles into care of the peri-operative patient with focus on leadership within the nurse anesthesia clinical setting. Prerequisites: NURS 567a, NURS 567b, NURS 691.

677-5 ADVANCED PRACTICUM AND ROLE SYNTHESIS. Advanced, comprehensive practicum experience focusing on the advanced practice nursing role in primary care settings. Includes 270 practicum hours. Prerequisites: NURS 572, NURS 573, and NURS 576. Additional consent required from Adviser.

691-3 ORANIZATIONAL AND SYSTEMS LEADERSHIP IN HEALTH CARE. Exploration and analysis of critical skills and knowledge related to leadership and health policy for nurses in advanced roles and global settings. Prerequisite: admission to the DNP program or approval by Assistant Dean for the graduate program.

695a-1 HEALTH CARE INNOVATIONS SEMINAR. Exploration of innovative initiatives through interaction with healthcare leaders. Prerequisites: admission to the DNP program or approval by Assistant Dean for the graduate program, completion of or current enrollment in N600 and N620.

695c-8 DOCTORAL PROJECT. Implement project proposals to improve patient safety, access, cost-effectiveness, and quality of care within health care systems. Prerequisite: admission to the DNP program or approval by Assistant Dean for the graduate program, N695a.

697a-1 DOCTORAL PROJECT DESIGN AND MANAGEMENT. Focuses on identification and refinement of the final doctoral project topic and theoretical frameworks, based on a comprehensive literature review. Prerequisite: NURS 695a.

697b-1 DOCTORAL PROJECT DESIGN AND MANAGEMENT. Focuses on developing methods for final doctoral project implementation, based on stakeholder input, needs assessment, literature review, and projected outcome criteria. Prerequisite: NURS 697a.

697c-3 DOCTORAL PROJECT DESIGN AND MANAGEMENT. Focuses on initiating final doctoral project implementation, initial data collection, and assessment of plan effectiveness. Prerequisite: NURS 697b.

697d-1 DOCTORAL PROJECT DESIGN AND MANAGEMENT. Focuses on completion of final doctoral project implementation, with emphasis on data analysis and development of recommendations. Prerequisite: NURS 697c.

697e-1 DOCTORAL PROJECT DESIGN AND MANAGEMENT. Focuses on dissemination of final doctoral project outcomes and recommendations. Prerequisite: NURS 697d.

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. Prerequisites: MATH 250 with a grade of C or better and knowledge of a programming language.

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. Prerequisites: STAT 380 or OR 441 or IME 365 with a grade of C or better and 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 ADVANCED SIMULATION MODELING. Simulation modeling using a high-level simulation programming language: clock mechanisms, data structure, output analysis, sample applications in queuing and production. Prerequisites: STAT 380 or STAT 480b with a grade C or better.

586-3 THEORY AND TECHNIQUES OF SIMULATION. Theory and techniques of simulation: generation of random variables, output analysis, variance reduction, and experimental design and optimization.. Prerequisites: OR 442/IME 486 or OR 585 with a grade of C or better.

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 PROJECTS. 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.

PHARMACEUTICAL SCIENCE (PHPS)

700-4 PRINCIPLES OF DRUG ACTION I. Addresses the chemical and physical properties of drug action. Emphasis placed on absorption, distribution, metabolism, and elimination of drugs, receptor theory, structure-activity relationships, and toxicology.

701-2 PRINCIPLES OF DRUG ACTION II. Addresses the chemical and physical properties of drug action. Emphasis placed on drug action for the central nervous system, hormones, metabolic syndrome, microbial diseases and cancer.

702-3 BIOCHEMICAL PRINCIPLES FOR PHARMACY. Addresses molecular biology basis for drug action and human diseases. Biochemical pathways, enzyme structure and regulation, and metabolism of nutrients and food constituents covered. Prerequisite: Open to pharmacy students only or by consent of department chair.

703-2 PRINCIPLES OF PHARMACOGENOMICS. Addresses techniques of molecular biology and pharmacogenomics principles applied to human disease states. Emphasized pathological states where therapeutic drug intervention exists or might be developed.

704-2 BIOPHARMACEUTICS AND DRUG DELIVERY I. Addresses drug absorption process, Fickian mass transport concepts, and mathematical models. Common dosage forms and delivery systems are also presented.

705-2 BIOPHARMACEUTICS AND DRUG DELIVERY II. Addresses drug product preformulation, formulation, and manufacture including influence on patient product performance. Physicochemical factors relevant to drug administration, problem solving, and patient counseling emphasized.

707-2 PHARMACY SKILLS AND TECHNIQUES. Addresses the mathematical and kinesthetic skills necessary for pharmacy practice. Laboratory sessions provide an environment to practice compounding skills.

720-3 BIOPHARMACEUTICS AND DRUG DELIVERY III. Addresses the physicochemical and manufacturing factors affecting drug absorption, distribution, metabolism, and elimination. The mathematical modeling for determining patient's drug dosage regimen is covered.

722-3 MICROBIOLOGY AND IMMUNOLOGY. A study of the microbiology of infectious diseases and principles of immunology. The pharmacology and therapeutics of immunologic disorders are also covered.

745-2 PHARMACEUTICAL BIOTECHNOLOGY. Survey of biotechnology therapeutics developed using modern molecular biological approaches and review of basic science including mechanism of action at the biochemical level. Prerequisite: Open to pharmacy students only.

PHARMACOTHERAPEUTICS (PHPT)

724-5 INTEGRATED PHARMACOTHERAPEUTICS: CARDIOVASCULAR. Addresses pathophysiology, pharmacology, medicinal chemistry, and therapeutics of the cardiovascular system. Designing, implementing, monitoring, evaluating and adjusting care plans emphasized.

725-5 INTEGRATED PHARMACOTHERAPEUTICS: INFECTIOUS DISEASES. Addresses pathophysiology, pharmacology, medicinal chemistry, and therapeutics of infectious diseases. Designing, implementing, monitoring, evaluating and adjusting care plans emphasized.

726-4 INTEGRATED PHARMACOTHERAPEUTICS: ENDOCRINE/METABOLIC/RENAL. Addresses pathophysiology, pharmacology, medicinal chemistry, and therapeutics of the endocrine and metabolic and renal systems. Designing, implementing, monitoring, evaluating and adjusting care plans emphasized.

727-4 INTEGRATED PHARMACOTHERAPEUTICS: GI/RHEUMATOLOGY/PULMONARY. Addresses pathophysiology, pharmacology, medicinal chemistry, and therapeutics of the gastrointestinal, pulmonary and musculoskeletal systems. Designing, implementing, monitoring, evaluating and adjusting care plans emphasized.

740-5 INTEGRATED PHARMACOTHERAPEUTICS: PSYCHIATRY AND NEUROLOGY. Addresses pathophysiology, pharmacology, medicinal chemistry, and therapeutics of psychiatric and neurological disorders. Designing, implementing, monitoring, evaluating and adjusting care plans emphasized.

741-4 INTEGRATED PHARMACOTHERAPEUTICS: ONCOLOGY/HEMATOLOGY. Addresses pathophysiology, pharmacology, medicinal chemistry, and therapeutics of oncologic and hematologic disorders. Designing, implementing, monitoring, evaluating. and adjusting care plans emphasized.

742-2 INTEGRATED PHARMACOTHERAPEUTICS: WOMEN AND MEN'S HEALTH. Addresses pathophysiology, pharmacology, medicinal chemistry, and therapeutics of women and men's health problems. Designing, implementing, monitoring, evaluating. and adjusting care plans emphasized.

743-2 INTEGRATED PHARMACOTHERAPEUTICS: OTHER TOPICS. Addresses pathophysiology, pharmacology, and therapeutics of various disorders not covered in previous therapeutics courses. Designing, implementing, monitoring, evaluating and adjusting care plans emphasized.

PHARMACY ADMINISTRATIVE SCI. (PHAS)

708-3 HEALTH CARE SYSTEMS. Covers health care providers and networks, priciples for managing the medication use system and resource management, quality assessment strategies, pharmacy benefits and insurance systems. Prerequisite: Open to pharmacy student only or by consent of department chair.

709-2 HEALTH CARE AND FINANCIAL MANAGEMENT. Addresses principles of business, marketing, strategic planning and financial management. The economic and political environment of the American health care system addressed.

716-1 ETHICAL ISSUES IN HEALTH CARE. The course is structured as an interprofessional course where pharmacy students will collaborate with dental students to discuss ethical issues encountered in health care.

728-2 HUMAN RESOURCES MANAGEMENT. Addressing principles for recruiting, hiring, training, developing, supervising, motivating, retaining, and evaluating professional and non-professional staff. Principles of effective leadership are covered.

733-3 PHARMACY LAW. Covers legal requirements for medications and pharmacy practice.

753-2 MANAGEMENT SELECTIVE: COMMUNITY. Provides an understanding of those topics relevant to the management and administration of a community pharmacy as a small business.

755-2 MANAGEMENT SELECTIVE: INSTITUTIONAL. Provides a foundational knowledge base and develops management and leadership skills relevant to institutional pharmacy practice

PHARMACY ELECTIVE (PHEL)

400-3 INTRODUCTION TO ORGANIC MEDICINAL CHEMISTRY. Introductory course in medicinal chemistry which addresses the relationship of chemical structure to biological activity. Prerequisites: Two semesters of organic chemistry, one semester of biochemistry, at least one year of introductory biology or permission of the course instructors.

760-3 ORIENTATION TO TEACHING. Explores learning and motivation theories, teaching philosophies and portfolios, the culture of higher education, the scholarship of teaching and learning, the design of learning units, active learning strategies and assessment techniques.

761-3 INSTRUCTIONAL AND ASSESSMENT STRATEGIES. Introduces various instructional and formative and summative assessment strategies with applications to the design of a learning unit. Prerequisite: PHEL 760

763-3 DRUG-INDUCED DISEASES. This course will discuss iatrogenic events secondary to drug therapy including medication errors, adverse drug events, drug-drug, and drug-disease interactions using an organ-system approach.

764-2 PAIN AND PALLIATIVE CARE. Provides the Pharm.D. candidate with an in-depth overview of pain management, hospice, and palliative care practice and health system models.

765-3 PEDIATRIC PHARMACOTHERAPY. Addresses the pharmacotherapy of select childhood disease states for ensuring the proper care of pediatrics and adolescents.

766-3 DIABETES CARE AND EXPERIENCES. Addresses medical nutrition therapy, pharmacotherapy, advanced monitoring considerations and devices for the diabetic patient.

767-2 HISTOPATHOLOGY. A look at normal and diseased tissues, with an emphasis on the pharmacological applications to the pathological states.

768-2 ADDICTION. Provides a review of addiction medicine as it relates to the pharmacy professional and to serve a prevention function within the profession.

769- INTRODUCTION TO THE DRUG DISCOVERY PROCESS. Introduces the basic framework involved in designing a drug, taking it through the approval process, and bringing it to market.

770-3 MEDICINAL CHEMISTRY: THEORY AND PRACTICE. An introductory course in medicinal chemistry addressing the relationship of chemical structure to pharmacological action. Emphasis on drug-receptor interactions and drug targets.

771-2 MEDICAL DEVICES AND SUPPLIES. Provides an overview of medical devices and supplies used by patients in home and/or clinical settings

772-2 INTRODUCTION TO NUCLEAR PHARMACY. Introduces the student pharmacist to the specialty of nuclear pharmacy. The topics presented are radiopharmaceuticals, radioactive decay, instrumentation, production of radionuclides, radiation protection, and radiation biology.

773-2 ADVANCED PHARMACOGENOMICS. Expansion of the principles of pharmacogenomics from PHPS 703, conducting an in depth examination of genetic effects on drug metabolism and adverse events.

774-3 ADVANCED INFECTIOUS DISEASES PHARMACOTHERAPY. An in-depth review on clinical uses of antimicrobials and application of diseases treatment guidelines which involves independent reading, peer teaching and team-based learning. Prerequisite: PHPT 725 with grade of 'C' or better.

775-2 PERSPECTIVES OF MENTAL HEALTH. Enhance familiarity with the mental health system, psychopharmacology and the treatment of mental illnesses, and to define the role of pharmacists in providing mental health care.

776-2 CRITICAL CARE PHARMACOTHERAPY. Discusses the pathophysiology and therapeutic management of commonly encountered acute intensive care medical problems.

777-2 APPLICATION OF CLINICAL GUIDELINES IN AMBULATORY CARE. Reviews practice guidelines for common ambulatory care disease states and allows students to expand and apply their therapeutic knowledge. Prerequisite: Grade 'C' or better in PHPR 713, PHPT 726, PHPT 727, PHPT 740 & PHPT 742.

778-2 STERILE PHARMACEUTICAL PRODUCT PREPARATION. Provides students an in-depth examination of the skills and knowledge needed in the preparation of sterile products.

779-2 ADVANCED SELF-CARE. A study of nonprescription drugs. Emphasis will be placed on selection of the appropriate nonprescription drug for a patient and patient counseling.

780-2 MANAGED CARE PHARMACY. Addresses fundamental concepts in managed care pharmacy and the impact on the health care system.

781-2 METHODS IN DRUG DISCOVERY. The drug discovery component of a Research & Development organization is presented. Focus on current technologies for drug research, with emphasis on computational methods.

782-2 ADVANCED CARDIOVASCULAR PHARMACOTHEAPY. This elective will allow students to become familiar with disorders of the cardiovascular system through lecture, primary literature review and pharmaceutical care plan development. Prerequisite: PHPT 724

783-2 ACUTE CARE PHARMACOTHERAPY. Develops patient care skills in health system clinical pharmacy using case-based patient scenarios to emphasize dynamic drug and disease state management. Prerequisites: PHPT 724, PHPT 725, PHPT 726, and PHPT 727; or permission by course coordinator.

784-3 SPANISH LANGUAGE AND CULTURE FOR HEALTH PROFESSIONALS. Expand knowledge of Spanish language and culture with emphasis on preparing to work in health related fields. Prerequisite: At least one year of college level Spanish classes, Spanish placement test, and/or approval from instructor.

785-3 COMPOUNDING. Pharmaceutic topics are developed in the context of drug product formulation and pharmaceutical compounding. Lab exercises reinforce topics covered in lecture. Prerequisite: PHPS 720.

786-2 PERSONALIZED MEDICINE. Detailed analysis of pharmacogenomic variation affecting molecular kinetics and dynamics, FDA genotype-driven biomarker advice, and inherited susceptibilities to adverse outcome in pharmacotherapy.

787-3 GLOBAL HEALTH. Focuses on biological and psych-social-economic aspects of global health issues from a population perspective. Opportunity to work with other health professionals to address challenges.

788-2 ADVANCED CLINICAL HEMETOLOGY/ONCOLOGY OVERVIEW. This course provides additional education in the area of clinical oncology. Students will learn about topics that are not addressed in the Integrated Therapeutics course on this topic. Prerequisites: Concurrent enrollment in PHPT 741: Integrated Pharmacotherapeutics: Hematology/Oncology.

789-2 MEDICINAL PLANTS AND TROPICAL DISEASES. PHEL 789 combines lectures, readings, and projects with a field based experimental component. The tops will cover a broad perspective including natural resources and tropical diseases.

790-2 COMMUNITY PHARMACY APPLICATION AND SKILLS. A course focusing on the application of community pharmacy practice topics. Rapid diagnostic testing, patient counseling, verification of prescriptions and business aspects will be emphasized.

791-2 PHARMACY ADVOCASY AND LEADERSHIP DEVELOPMENT. This course will focus on developing the student's leadership skills and communication skills as an advocate for the profession of Pharmacy. Prerequisites: Students must have completed all requirements for the first professional year (P1) in the PharmD program.

PHARMACY EXPERIENTIAL EDUCATION (PHEP)

714-1 INTRODUCTORY PHARMACY PRACTICE EXPERIENCE I: PROFESSIONAL ROLE OBSERVATIONS. Provides an introduction to the practice of pharmacy with experiences in both community and institutional pharmacy practice. The purpose is to enhance awareness of the role of pharmacists in these practice settings. Prerequisite: Open to pharmacy students only or by consent of department chair.

715-1 INTRODUCTORY PHARMACY EXPERIENCE II: SERVICE LEARNING. Students provide a health-related service in a community setting and gain social and civic responsibility awareness.

730-2 INTRODUCTORY PHARMACY PRACTICE EXPERIENCES III. Students gain experiences in community or health system pharmacy. Options for other practice settings such as long-term care or home IV therapy exist. Students develop skills for pharmacy practice.

731-2 INTRODUCTORY PHARMACY PRACTICE EXPERIENCE IV. Students gain experiences in community or health system pharmacy. Options for other practice settings such as long-term care or home IV therapy exist. Students develop skills for pharmacy practice.

732-1 PHARMACY ROUNDS I. Students participate in weekly seminar presentations over either the fall or spring semesters where taking sides on a contemporary issue in pharmacy practice is developed.

746-1 PHARMACY ROUNDS II. Participate in independent and professional development through a variety of suggested pharmacy learning activities and processes to promote lifelong learning.

747-1 PHARMACY ROUNDS III. Participate in the practical applications of pharmacy practice, with an emphasis on evidence-based medicine and integration of disease state management.

751-1 ADVANCED PHARMACY PRACTICE EXPERIENCE PREPARATION. Prepares students for advanced pharmacy practice experiences in general, and the capstone experience in particular.

752-0 PERFORMANCE-BASED ASSESSMENT III. The performance-based assessment is intended to be an evaluation of skills and abilities for a student at their current level of education.

780-6 ADVANCED PHARMACY PRACTICE EXPERIENCE: COMMUNITY PHARMACY. Applies didactic knowledge, develops core competencies and gains patient care experiences in a community pharmacy practice environment.

781-6 ADVANCED PHARMACY PRACTICE EXPERIENCE: HOSPITAL PHARMACY. Applies didactic knowledge, develops core competencies and gains patient care experiences in a hospital practice environment.

782-6 ADVANCED PHARMACY PRACTICE EXPERIENCE: AMBULATORY CARE. Applies didactic knowledge, develops core competencies and gains patient care experiences in an ambulatory care practice environment.

783-6 ADVANCED PHARMACY PRACTICE EXPERIENCE: ACUTE CARE/GENERAL MEDICINE. Applies didactic knowledge, develops core competencies and gains patient care experiences in an acute care setting.

784-6 ADVANCED PHARMACY PRACTICE EXPERIENCE: SPECIALIZED PRACTICE. Applies didactic knowledge, develops core competencies and gains patient care experiences in a specialized practice setting.

785-6 ADVANCED PHARMACY PRACTICE EXPERIENCE: SPECIALIZED PRACTICE. Applies didactic knowledge, develops core competencies and gains patient care experiences in a specialized practice setting.

786-6 ADVANCED PHARMACY PRACTICE EXPERIENCE: SPECIALIZED PRACTICE. Applies didactic knowledge, develops core competencies and gains patient care experiences in a specialized practice setting.

787- ADVANCED PHARMACY PRACTICE EXPERIENCE: CAPSTONE. The capstone experience requires the student to develop and complete a scholarly, pharmacy-related project.

795-0-4 INDEPENDENT STUDY. Provides students with the opportunity to pursue research and study in an area of interest in pharmaceutical sciences or pharmacy practice. May be repeated for a maximum of 4 hours.

799C-0 PHARMACY INTERNSHIP: COMMUNITY. Students gain experience in community, chain or independent pharmacy practice.

799H-0 PHARMACY INTERNSHIP: HEALTH SYSTEM. Students gain experience in health system institutional pharmacy practice.

799L-0 PHARMACY INTERNSHIP: LONG-TERM CARE. Students gain experience in long-term care pharmacy practice.

799O-0 PHARMACY INTERNSHIP: OTHER PHARMACY SITE. Students gain experience in other more non-traditional practice sites

PHARMACY PRACTICE (PHPR)

706-2 INTRODUCTION TO PHARMACY PRACTICE. Addresses communication and counseling skills needed for pharmacy practice, the pharmaceutical care planning process, basic drug information about top drug products, and medical terms.

710-3 BIOMEDICAL LITERATURE EVALUATION. Addresses process of critically reviewing biomedical and pharmaceutical literature by analyzing statistics and research design. Principles of outcomes research covered.

711-2 DRUG INFORMATION. Develops ability to retrieve and evaluate literature and to utilize information resources for pharmacy practice. Drug use policy for medication management is also addressed.

713-4 SELF CARE AND ALTERNATIVE MEDICINES. Addresses use of nonprescription medications and herbal products used for self-care. Patient counseling and problem solving skills emphasized.

721-2 CLINICAL PHARMACOKINETICS. Students gain experiences in using mathematical models to design drug dosage regimens desired for optimal clinical outcomes.

735-3 PHYSICAL ASSESSMENT AND PATIENT CARE SKILLS. Develops physical assessment, laboratory tests interpretation and patient care skills for drug therapy and disease state management.

744-2 HEALTH PROMOTION AND LITERACY. Prepare students to provide care to a diversity of individuals by understanding and respecting differences including attention to health literacy concerns.

748-2 MEDICATION THERAPY MANAGEMENT SERVICES. Provides an introduction to the core elements of Medication Therapy Management Services (MTMS) and application of MTMS principles to patient care plans.

749-1 INFECTIOUS DISEASE PREVENTION AND IMMUNIZATION TRAINING. Students receive specialized training for prevention of infectious diseases controlled through immunization.

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.

406-4 ELECTROMAGNETIC FIELDS AND WAVES. Vector Calculus. Electric and magnetic fields. Scalar potential. Electric and magnetic dipoles. Maxwell's equations in integral and differential form, vector potential, introduction to electromagnet radiation. Prerequisites: Grade of C or better in PHYS 152 and PHYS 251.

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: Grade C or better in all of: PHYS 201, PHYS 201L, PHYS 251, MATH 305 or graduate status in Electrical Engineering.

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, eigenfunctions, operators, uncertainty relations, Schroedinger equation, square wells, harmonic oscillator, barriers, angular momentum, Hydrogen atom, spin, identical particles, exclusion principle, applications. Prerequisites: A grade C or better in PHYS 304 and one of: PHYS 321 or PHYS 323; MATH 321 or MATH 355..

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.

442-3 TOPICS IN MEDICAL PHYSICS. Topics variable, may include: Medical imaging: Physics of x-ray, CT, PET MRI and ultrasound techniques, radiotherapy, nuclear medicine, radiation protection, electrophysiological measurements, biomechanics, mathematical modeling. Prerequisite: Grade of C or better in all of: PHYS 201, PHYS 240, PHYS 251, CHEM 241a, or permission of instructor.

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:Grade of C or better in both PHYS 304 and PHYS 232.

471-3 LASER PHYSICS AND TECHNOLOGY. Interaction between light and matter, rate equations, resonators and cavity modes, mode locking, ultra-short pulse generation, laser systems. Applications may include communications, medicine, holography. Prerequisites: Grade of C or better in all of: PHYS 201, PHYS 201L, PHYS 251, PHYS 410 or permission of instructor.

472-3 PHOTONICS LABORATORY. A lecture/laboratory course in experimental techniques in photonics. May include: beam characterization, detectors, interferometers, optical fiber theory and applications, coupling techniques, fiber-optic communication. Prerequisites: Grade C or better in all of: PHYS 201, PHYS 201L, PHYS 251, PHYS 410 or permission of instructor.

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.

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 from semester to 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)

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.

422-3 DATA ANALYSIS WITH SPSS. Comprehensive overview of SPSS. Focus on creating databases, analyzing data and interpreting results. Build students' confidence in using the software on their own. Prerequisites: A grade of "C" or better in PSYC 220 and PSYC 221 OR permission of the instructor.

431-3 PSYCHOPATHOLOGY. Overview of psychological disorders like those described in the most recent edition of the DSM. Prerequisite: PSYC 111, grade C or better.

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.

474-3 ORGANIZATIONAL PSYCHOLOGY. Relationship between organizational functioning and job satisfaction, motivation, performance, psychological climate in work setting. Prerequisite: PSYC 320 or consent of instructor.

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 COUNSELING 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.

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, PSYC 543b, graduate standing in psychology, consent of instructor.

524-1 to 12 PRACTICUM IN CLINICAL CHILD/SCHOOL PSYCHOLOGY. Practicum experience in professional setting under staff supervision. Prerequisite: graduate standing in psychology. Prerequisites: graduate standing in psychology, consent of instructor.

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. Prerequisites: graduate standing in psychology, consent of instructor.

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: graduate standing in psychology, consent of instructor.

531-3 ADVANCED PSYCHOPATHOLOGY. Provides a general survey of the field of adult psychopathology. Course also focuses on use of current version of DSM. 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 GROUP COUNSELING AND PSYCHOTHERAPY. Current theory, research, and techniques in group counseling and psychotherapy. 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 measures to assess cognitive abilities in youth, including the exceptional child. 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 measures to assess behavior and emotion in youth, including the exceptional child. 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 student, including the exceptional child, response 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. Psychoeducational functioning of youth, including the exceptional child, through norm-referenced and alternative data-based methods. Empirically-validated interventions and instructional methods 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 standing in psychology.

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: PSYC 201 or equivalent; graduate standing in psychology or consent of instructor.

565-3 CONSULTATION: THEORY AND PRACTICE. Principles and methods of consulting in schools and mental health organizations. Includes management and instructional methods for typically developing and exceptional children. 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.

584-3 EVIDENCE-BASED ASSESSMENT AND INTERVENTION IN AUTISM SPECTRUM DISORDERS. Best practices in the assessment of Autism Spectrum Disorder, evidence-based interventions, and progress monitoring. Prerequisites: PSYCH 541a and PSYC 543a.

588-0 GRADUATE PSYCHOLOGY INTERNSHIP. Psychology-related work in a business, government, or not-for-profit setting under the supervision of an employer. Prerequisites: Minimum cumulative GPA of 3.00 and consent of Career Development Center.

589-0 GRADUATE PSYCHOLOGY CO-OP. Psychology-related work in a business, government, or not-for-profit setting under the supervision of an employer. Prerequisites: Minimum cumulative GPA of 3.00 and consent of Career Development Center.

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 CLINICAL CHILD AND SCHOOL PSYCHOLOGY. A paper reviewing theory and research on a topic approved and supervised by a faculty committee. Prerequisite: graduate standing in the Clinical Child and School Psychology Program (School Psychology track).

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: graduate standing.

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: graduate standing.

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.

561-3 APPLICATION OF BIOSTATISTICS AND EPIDEMIOLOGY PRINCIPLES TO HEALTH CARE. Application of Biostatistics with statistical software and techniques of epidemiology to health care management and policy.

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 9 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: For social work graduate students, admission to the MSW program; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, admission to the MSW program; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, admission to the MSW program; for non-social work graduate students, permission of instructor and MSW program director.

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. For social work graduate students, admission to the MSW program; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, admission to the MSW program; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, admission to the MSW program; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, admission to the MSW program; for non-social work graduate students, permission of instructor and MSW program director.

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.

526-3 FIELD INSTRUCTION I. The first of two foundation supervised social work practice experiences of at least 225 hours each in an approved social service setting. Includes an integrative seminar. Prerequisites: SOCW 501, 503, 507, 508, and permission of Director of Practica.

527-3 FIELD INSTRUCTION II. The second of two supervised social work practice experiences of at least 225 hours each in an approved social service setting. Includes an integrative seminar. Prerequisites: SOCW 526 and permission of Director of Practica.

528-3 ADVANCED FIELD INSTRUCTION III. The first of two supervised concentration field experiences of at least 250 hours each in an approved setting. Includes an integrative seminar. Prerequisites: completion of foundation curriculum or advanced standing status, and permission of Director of Practica.

529-3 ADVANCED FIELD INSTRUCTION IV. The second of two supervised concentration field experiences of at least 250 hours each in an approved setting. Includes an integrative seminar. Prerequisites: 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.

531-6 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.

532-6 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.

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: For social work graduate students, completion of the Foundation or status as an Advanced Standing student; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, completion of the Foundation or status as an Advanced Standing student; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, completion of the Foundation or status as an Advanced Standing student; for non-social work graduate students, permission of instructor and MSW program director.

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 For social work graduate students, completion of the Foundation or status as an Advanced Standing student; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, completion of the Foundation or status as an Advanced Standing student; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, completion of the Foundation or status as an Advanced Standing student; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, completion of the Foundation or status as an Advanced Standing student; for non-social work graduate students, permission of instructor and MSW program director.

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: For social work graduate students, completion of the Foundation or status as an Advanced Standing student; for non-social work graduate students, permission of instructor and MSW program director.

565-3 CAPSTONE. 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.

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.

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 FOR THE ADVANCED 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. Prerequisite: admission to teacher education program or instructor approval.

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 CHILDREN WITH SPECIAL NEEDS. 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. Knowledge and skills needed to provide educational services and supports to early childhood students with disabilities and their families. (Requires 10 hours field experience) Prerequisite: SPE 440.

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.

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.

517-3 SPECIAL EDUCATION FINANCE. An overview of fiscal issues in special education administration addressing certification/licensure requirements for the Illinois Director of Special Education endorsement.

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 STUDENTS WITH MILD/MODERATE DISABILITIES. Emphasis on current research and application of instructional methodology. Prerequisite: SPE 500 or consent of instructor.

523-3 INSTRUCTIONAL METHODS FOR STUDENTS WITH SEVERE DISABILITIES. Program characteristics, assessment, instruction and curriculum across educational environment; data-based decision-making; collaboration and leadership in programs for students with moderate/severe disabilities.

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.

578-1 to 12 FIELD STUDY. School or community based educational experiences in special education required for teacher certification or professional growth and development. Prerequisite: consent of adviser.

595-3 SEMINAR: ISSUES IN SPECIAL EDUCATION AND FIELD BASED RESEARCH. Course is for advanced master's level students. Focus on the knowledge and skills necessary to design and implement an action research project.

SPEECH PATHOLOGY AND AUDIOLOGY (SPPA)

469-3 CLINICAL PROCEDURES FOR INDIVIDUALS WITH HEARING DISORDERS. Clinical course in audiological assessment, interpretation, and management. Course includes supervised clinical labs in audiometric test procedures and hearing screenings on-and off-campus. Prerequisites: SPPA 461, 3.0 G.P.A.

498-2 AUGMENTATIVE AND ALTERNATIVE COMMUNICATION. Examination of transdisciplinary field of augmentative and alternative communication (AAC) as well as to the assistive technologies and diagnostic/treatment approaches critical for AAC. Prerequisites: SPPA 444, 446, 452 or equivalent.

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 ADVANCED NEUROANATOMY AND NEUROPHYSIOLOGY OF COMMUNICATION. An advanced course in neuroscience of normal and disordered language and cognition as they relate to communication. Prerequisite: SPPA 320, 497 or equivalent; admission in to graduate program.

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 ADVANCED SEMINAR IN CHILD SPEECH SOUND DISORDERS. Clinical and theoretical perspectives on assessment and treatment of child speech sound disorders including phonological impairments, craniofacial anomalies, developmental dysarthria, childhood apraxia, linguistic/cultural differences, etc. 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.

545-4 ACQUIRED COMMUNICATION DISORDERS IN ADULTS. Examines theories and speech and language characteristics of the acquired neurogenic disorders of aphasia, right hemisphere dysfunction, dementia, and cognitive disorders. Prerequisite: SPPA 520 or equivalent or concurrent enrollment.

547-3 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: SPPA 541, 545, 549a; good academic/clinical standing.

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: SPPA 541, 545, 549a; good academic/clinical standing.

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 without voice output. Prerequisites: SPPA 544 and SPPA 545.

560-3 PROFESSIONAL ISSUES IN SPEECH-LANGUAGE PATHOLOGY. Seminar addressing ethical and professional issues in speech-language pathology and audiology. Includes information related to foundations, policies and procedures in educational and medical settings.

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 WITH APPLICATIONS TO SCIENCE AND ENGINEERING. Designs for experimentation and their statistical inference. One-way, two-way classifications; complete and incomplete block designs. Factorial and fractional factorial 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.

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.

490-1 to 3 TOPICS IN STATISTICS. Selected topics in Statistics. Prerequisite: Consent of Instructor required.

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.

535-3 STATISTICS CONTENT, PEDAGOGY, AND CONNECTIONS. A focused look at data analysis and probability, best practices in pedagogy, and connections to other areas. Within the Department of Mathematics and Statistics credit can only be earned for the Postsecondary Mathematics Education specialization. Prerequisites: STAT 244 or higher with a C or better and MATH 250 with a C or better or consent of 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 3 SPECIAL PROJECTS. 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.